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International Interdisciplinary Virtual Conference on 'Recent Advancements In Computer Science, Management and Information Technology'

Date - 15th March 2023

Organized by

Department of Computer Science and IQAC
Shankarlal Khandelwal Arts, Science and Commerce College,
Akola, Sant Gadge Baba Amravati University,
Amravati, Maharashtra, India

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RACSMIT 2023

15th March 2023

Organised by



Department of Computer Science and IQAC
Shankarlal Khandelwal Arts, Science and Commerce College, Akola
(Reaccredited by NAAC Grade A with CGPA 3.01) affiliated to Sant
Gadge Baba Amravati University, Amravati, Maharashtra, India

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Theme of Conference

The main theme of conference is

“Recent Advancements in Computer Science, Management and Information Technology” (RACSMIT-2023)

Sub Themes:

- Computer and Information Science
- Computer Network and Security
- Artificial Intelligence & Machine Learning
- Data mining and Data Analytics
- Image and Video Processing
- Pattern Recognition
- IOT and Biometrics
- Human Computer Interaction
- Cloud Computing and Mobile Computing
- Data Centre and Virtualization Technology
- Applications of Computer Science and Engineering
- ICT uses for Green, Nano, Medicinal and Synthetic Chemistry
- Discrete Mathematics, Applied Mathematics and Graph Theory
- Material Science, Sensor, laser and Nano Technology
- Bioinformatics and Forensic Science
- Block chain Technology and its application
- Biotechnology & Agriculture Science
- Biochemistry & Genetics
- Digital Marketing
- Ethical issues and Social responsibility
- Laboratory Management and Ethics
- ICT role in Higher Education
- Environmental benefits of Information Technology



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- Khandelwal English Primary School
- Palana Ghar

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Dt. 13/03/2023

I am happy to know that Shankarlal Khandelwal Arts, Science and Commerce College, Akola is organizing one day International Interdisciplinary Virtual Conference on "Recent Advancements in Computer Science, Management and Information Technology" on 15th March 2023.

I congratulate the Department of Computer Science and IQAC for organization of such diverse event and creating a platform for the experts and beginners in the computer field to present their research work and publishing the same on the form of proceeding.

The most important aspect of computer science is problem solving, an essential skill for life. One can study the design, development and analysis of software and hardware used to solve problems in a variety of business, scientific and social contexts.

I congratulate principal, all organizing committee members and all staff members of the college for attempting this venture. I wish that these events will bring laurels to the institute.


President,

Shikshan Prasarak Mandal, Akola

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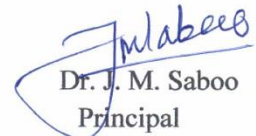
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Date : 13/03/2023

It gives me immense pleasure to know our college is organizing an International Interdisciplinary Virtual Conference on "Recent Advancements in Computer Science, Management and Information Technology" on Wednesday 15th March 2023.

This conference is intended to offer opportunity to all concerned including students, teachers, researchers and scientist from different parts of World to exchange the ideas and views regarding the latest technological advances related with computer science, management and information technology. I pass on good wishes to the Department of Computer Science and IQAC for Inspiring and encouraging stockholders of college towards research and innovation. Let us collectively contribute toward progress and prosperity of the nation.

My warm regards to one and all.


Dr. J. M. Saboo
Principal
PRINCIPAL
Shankarlal Khandelwal Arts,
Science & Commerce College,
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Dt. 13/03/2023

I am very much delighted to know that Shankarlal Khandelwal Arts, Science and Commerce College, Akola is organizing one day International Interdisciplinary Virtual Conference on "Recent Advancements in Computer Science, Management and Information Technology" on Wednesday 15th March 2023.

This International Interdisciplinary Virtual Conference is intended to offer an opportunity to all concerned including students, teachers, researchers and scientist form different parts of World to exchange the ideas and views regarding the latest technological advances in further development.

I am also happy to know that you are releasing the proceedings consisting of the papers presented by participant scholars and scientist.

I am sure that the conference will bring the specialists in field of computer science, management and Information Technology for interactions on theme and sub themes.

I congratulate you for taking a lead to organize the conference for very first time through Computer Science Department. Let me congratulate you for making the event a grand success.


Secretary,

Shikshan Prasarak Mandal, Akola.

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An Efficient Inventory Management System with QR Code using Blockchain

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ABSTRACT

Vendor-managed inventory (VMI) is a commonly used collaborative inventory management policy. Several prerequisites are information sharing, trust, systems integration and long-term collaboration. However, nowadays supply chain networks are becoming more complex, highly disjointed and geographically spread. As a consequence, the implementation of a VMI strategy may be a difficult task. In this paper, we propose a new interaction mechanism between retailers and vendors, which aims to improve their supply chain strategy and inventory policies based on a trustless and distributed mechanism. In particular, we use an autonomous trustless framework based on smart contracts and blockchain technology for governing the relationship between multiple vendors and multiple retailers.

Keywords – Supply Chain, Blockchain, VMI (Vendor Managed Inventory).

I. INTRODUCTION

In the last decades companies increased their interest in optimizing their supply chains. The spread of globalization and the development of information and communication technologies stimulated research towards the development of integrated logistics models with the aim of improving coordination. The main contributions in this direction are devoted to develop optimization models focused on two or more sequential logistics activities in the supply chain, such as inventory and routing, production or inventory, location and routing. All the resulting optimization models are based on two-echelon networks, in which one or more suppliers provide freight to many retailers or customers. Our problem falls within the field of two-echelon optimization problems in which customers must be supplied from different depots over a finite planning horizon, while transportation and inventory costs are minimized. In this setting, Vendor-Managed Inventory (VMI) gained importance in different companies. VMI consists of a vendor/supplier, and a set of customers/retailers located in a given geographical area. The supplier monitors the inventory and decides on the replenishment policy of each retailer. The VMI setting assigns to the supplier the role of leading actor in the decisional process, in order to establish when and how much to deliver. This system applies a win-win

strategy, because it guarantees an overall reduction of the logistic cost for the supplier and saving in the ordering cost for the customers. VMI is considered an example of virtual integration across the SC in which no merge is required like in vertical integration. The adoption of VMI approaches may have significant benefits for all the participants within a SC network (retailers, vendors etc.). The overall SC VMI offers reduced inventory overstocks and stock shortages, stronger retailer relationships and improved end-customer experience.

II. LITERATURE SURVEY

The supply chain overall performance. Minimize the negative consequences of information asymmetry over the echelons of a supply chain. Since supply chain management research on blockchain is still in its infancy, it is worth to start looking into possible applications and benefits that may convince supply chain managers to adopt this technology and operate in an environment where everyone trusts each other.

Vendor-managed inventory (VMI) is a very common supply chain (SC) management approach for improving multi-firm SC performance while establishing a mutual beneficial relationship between a vendor and a retailer [1]. The main idea behind VMI is that the vendor is authorized to oversee product inventory for the retailer, therefore, the vendor is responsible for tracking, monitoring and replenishing the retailer's agreed-upon inventory. VMI is a streamlined approach to inventory management and order fulfilment in which both the retailer and the vendor may smoothly and accurately control the availability and flow of goods across the SC. VMI was first introduced as a fundamental element in the partnership between Wal-Mart and Procter & Gamble and since then has been widely adopted by many industries. VMI is considered an example of virtual integration across the SC in which no merge is required like in vertical integration.

A transaction is initiated, and the data is encoded into a "block". The block of data is broadcast to the network [2]. The transaction is independently verified by the network. This block of data is connected to the one before it through a unique identifier, creating a chain. Blockchain technology is not easy to implement. They are hard to implement and analysis over large data like Inventory Management System takes a significant amount of time.

RFID tags are small transmitters that wirelessly respond to reader requests and transfer serial number or similar ID [3]. Blockchain, that helps to solve excessive problems and simplifies the process of managing the inventories. It is used beyond budget and is suitable for existing management. Any transaction recorded in blockchain is immutable (there is no possibility of deletion) and there is no possibility of fraud. RFID tags are not cost efficient, they cost ten times the cost of Bar code readers. Implementation of RFID tags can be hard and time-consuming. Blockchain technology does not allow easy modification of data once recorded, and it requires rewriting the codes in all of the blocks, which is time-consuming and expensive.

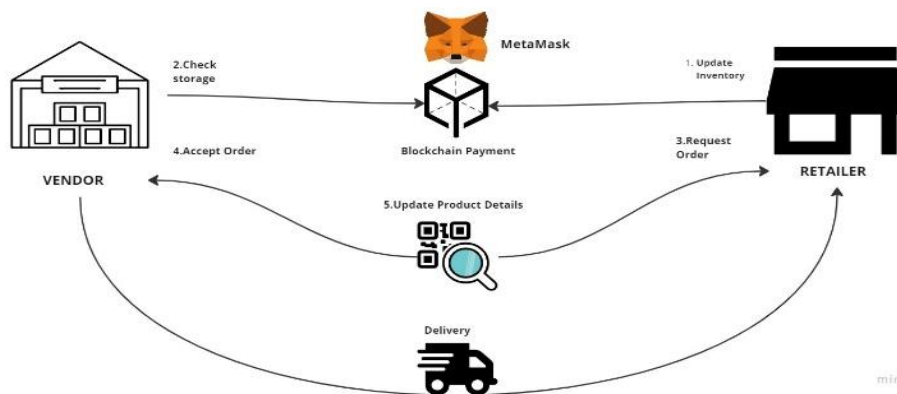
Reduce paper load for the overall VMI process. As, the central operator is eliminated it provides inclusiveness, longevity and ability to deliver [4]. Focus on the interaction of VMI with external auditors such as insurance companies, to provide enhanced functionalities. Automated pricing control mechanism is not implemented between vendors and retailers.

Smart inventory system has the ability to keep track of inventory level, scalability with the provision of security and backups [5]. In the retail industry smart inventory system is required for example through the concept of smart shelves real time inventory management has become possible. Blockchain technology does not allow easy modification of data once recorded, and it requires rewriting the codes in all of the blocks,

which is time-consuming and expensive. Blockchain technology does not allow easy modification of data once recorded, and it requires rewriting the codes in all of the blocks, which is time-consuming and expensive. The MDIRP is an NP-hard problem that aims at optimizing the trade-off between inventory and transportation management in an integrated way[6]. With respect to the state of the art, a different context is presented, characterized by a complex urban environment. Clustering phase: an integer linear programming model is solved to generate a partition of the set of customers into a set of clusters, one cluster for each depot $p \in P$. Routing construction phase: a set Rof routes is built for the clusters generated in the first phase.

III. SYSTEM OVERVIEW

As per the proposals, the detection method is based on image acquisition and change detection. This system is proposed for real time abandoned object detection and its addressing using IoT for enhancing our public security with the help of alert system.



A. DATA ACQUISITION:

An inventory management system (or inventory system) is the process by which you track your goods throughout your entire supply chain, from purchasing to production to end sales. It governs how you approach inventory management for your business. Our objective is to create efficient inventory management system with QR Code using Blockchain and reduce the gap between the vendor and the retailer. And to notify the vendor before the requirement before a product runs out of stock by the use of QR scanning.

B. WORKING OF VMI via BlockChain:

The Retailer can update the requirements by sending the data which consists of the products by scanning the QR Code. Each time the QR Code gets scanned the total number of products in the retailer's inventory is reduced. Once it reaches an expected minimum quantity, a notification request will be sent to the vendor of the details about the requirements of the retailer. Once the request is acknowledged and accepted by the vendor, the vendor will deliver the requested product to the Retailer. And the transactions will be done through metamask.

IV. IMPLEMENTATION AND RESULTS

Select a blockchain platform that meets the system requirements, such as Ethereum or Hyperledger Fabric. Design and implement the QR code system to scan items as they are added to or removed from the inventory. Develop a smart contract to store data on the blockchain, including information about each item, such as its location, quantity, and history of transactions. Link the QR code system with the blockchain to automatically update the inventory data on the blockchain as items are scanned. Retailers pays for the product using Blockchain Cryptocurrency. Users select the products from the website User scans and pay to website. A mail containing QR code with product details are send to each vendor. Users can select more than one product from different vendors. Once the user completes their purchase, they specify the quantity and confirm the order. After confirmation, a QR code is generated using user transaction details and order cost. After the vendor and retailor gives a conformation the funds are send to the vendor.

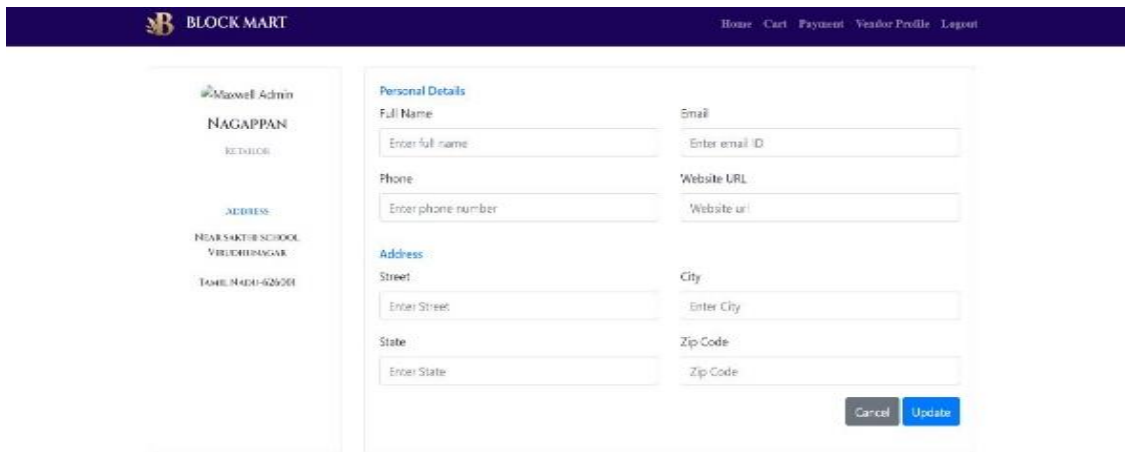


Fig 1. Registration Page

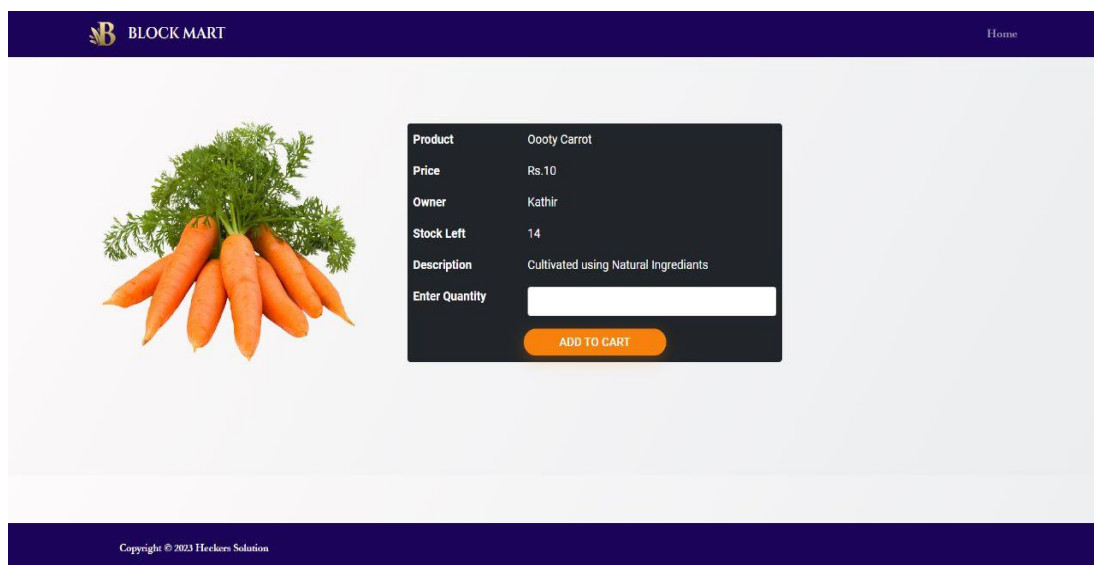


Fig 2. Add to Cart

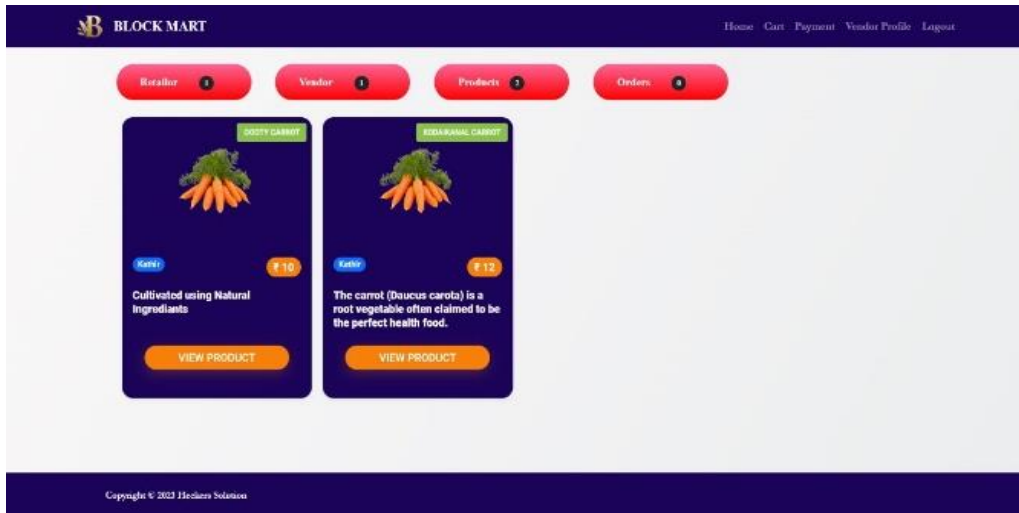


Fig 3. View Products

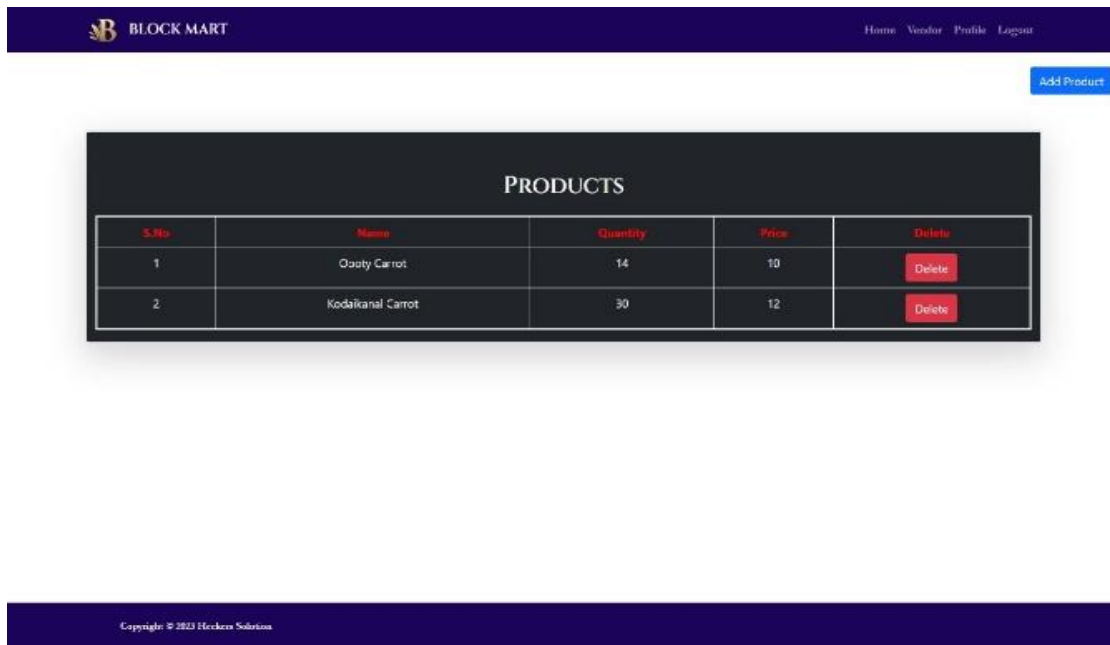


Fig 4. Updated Products

V. V.CONCLUSION

Blockchain technology is able to overcome certain impediments traditional VMI approaches present like lack of security, integration difficulties and opportunistic behaviour. In this work, we have proposed a novel VMI architecture based on blockchain and smart contracts for improving inventory policies between multiple vendors and retailers. Moreover, we provide a functional implementation through the use of a local private blockchain and various smart contracts, which implement a set of functions that enable different characteristics/benefits of VMI implementation. Therefore, we have presented a use case VMI scenario in which multiple vendors and multiple retailers may interact with each other based on a trustless and distributed mechanism. This solution enables several benefits like cost reduction, increased visibility, security and operations' automation. Future work will focus on the interaction of VMI with external auditors such as

insurance companies, to provide enhanced functionalities. Finally, other promising topics for future research include the usage of blockchain technology and smart contracts for the establishment of an automated pricing control mechanism between vendors and retailers as well as the use of blockchain tokens for establishing a more detailed VMI approach and QR.

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Automation : Augment Essentiality of Security Measures

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ABSTRACT

The desire for the quickest, easiest ways to do any work has increased along with living standards. Automation modifies people's work schedules to accommodate current demand. The importance of the automation is increased by this thing. However, it is essential to preserve socialism's fundamental aims and requirements. This paper covers security issues that necessary in today's automated society. These security measures were created with the use of digital image processing, biometrics, and artificial intelligence (AI).

Keywords: Automation, Security, Authentication, Verification, Biometric Science, Fingerprint

I. INTRODUCTION

Security must be a realistic challenge in the real world. Security can be defined in following manner, as Personal Security, Currency Security, Security of Privacy, Security against fraud, Security of information and many more. Security tasks can be provided to the persons by the help of either person-to-person interaction like in guarding operation or person-to-machine interaction like in Surveillance Camera mechanism.

Person-to-person interaction for security point is considered in the scene of person or nation or currency security where human being needed as a guard. Guard operation is very difficult and hazardous. If consider security against fraud, then we need authorization or verification operation. This task is not only difficult but also time consuming, fatigue and non-reliable. If consider security of information, then this task is very costly with full of tension.

Person-to-machine interaction for the security purpose is easy, effortless, non-hazardous, less time consuming and reliable task in compare to above. This type of security options are totally based on computer system. Tools that is required for establishing a security system either in home or enterprise area. These tools are sensors, cameras, storage area, monitoring device like desktop, laptop or mobile, alarms etc. [1]. Software is basically an application program which is used to manage security operations. Required hardware tools and security-based software applications such as- Antivirus Software, Anti-Spyware Software, Password Management Software, Tracking Software, Authorization Verification Software, Cryptographic Software[1] etc. are shown in below figure 1.1.

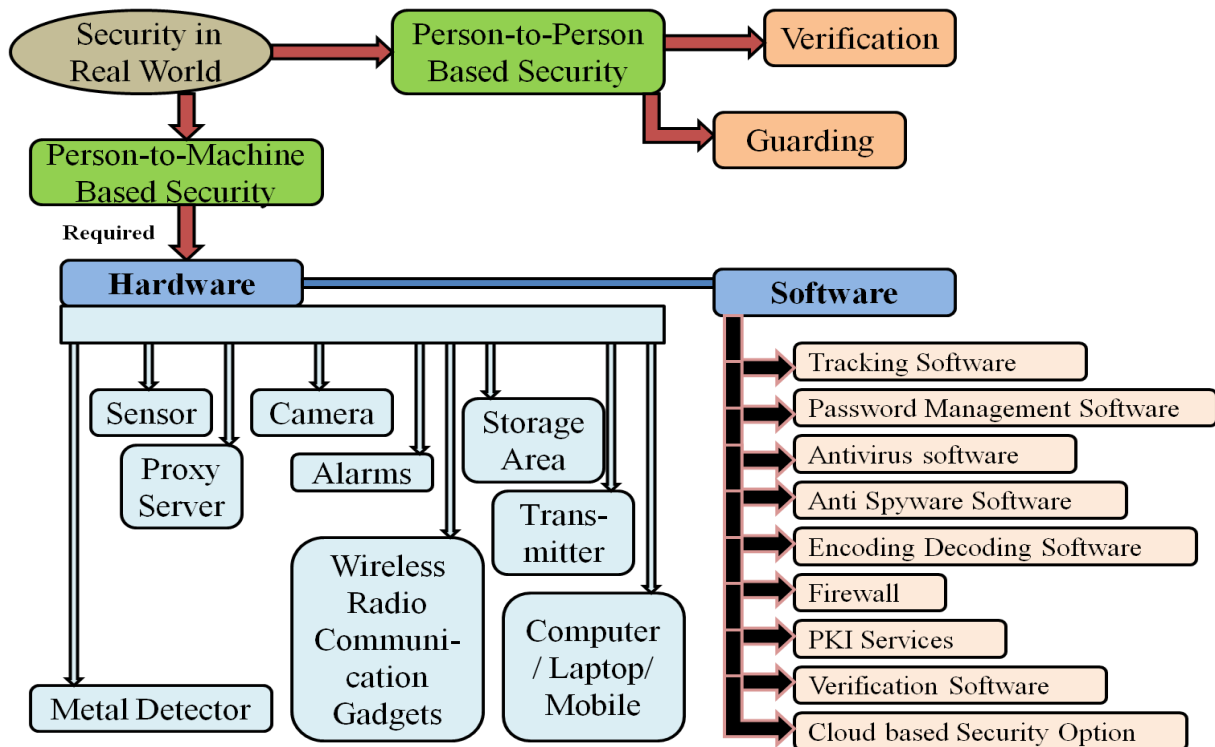


Figure 1.1: Security Measures with Required Hardware and Software Tools

Security Software

Software tools those are required to perform security operations are called security software which are designed for monitoring, provide authorization, maintain confidentiality, investigate authentication and ensure availability and many more operations [2]. Security software is based on image processing, cryptography, computational science, artificial intelligence etc.

Need of Security Software

Internet is the backbone of the digital world. Every person use internet to complete his task. Dependency on the internet is increased as a spider web. Task like question answering, searching, writing, designing, developing, communicating, and all other daily routine work are affected from this. So that's why it is very important to keep us safe in various manners -

- a) **Threat of Private Information Loss** – When personal data like identity card number, phone number and many more are leaked to unknown person. This act is very dangerous for the person because unknown person may steal their identity and misuse it.
- b) **Threat of Unauthorized Access** – If any unknown person enters in the authorized area without permission or accessing power then this act is more dangerous and become a cause of information and data loss.
- c) **Threat of Fraud** – If any unknown person cheats any individual in terms of money loss, then this act come under fraud.
- d) **Automated Infection** – When system accepts any unwanted data which is harmful, that time your system become a spreader. Harmful content can spread in other systems in a few seconds.

- e) **Unfriendly Code**– When some codes are run in our system without our knowledge and that are harmful for us. But it needs to be executed.
- f) **Unfriendly Physical Environment**– When our personal devices like laptop, mobile may be lost or stolen by someone, at that time, condition of physical attack is increased.

In the digital world, security is seeing in many ways as in [2] and it's shown in table 1.1.

Table 1.1: Types of Security

Security Name	Target	Relates to
System Security	Security for design system	Authentication
Information Security	Secure the data or information	Cryptography
Access Security	Security regarding Authorization	Authentication
Privacy Security	Keep hide personal information to others	Information Hiding
Cyber Security	Keep safe the information in a network from information breach and malicious attack [3]	Cryptography
Network Security	Secure the computer network from the intruder [4]	Cryptography

Security Policies

Every individual and organization define their requirements regarding security from the computer in person-to-machine interaction or digital world scenario. These requirements show the importance of digital security. These rules define as security policies which are described here and shown in figure 1.2.

- a. **Confidentiality** – security that provide assurance of not to leak information or data to someone other than authorized individuals. Guaranteed that no one can break the personal privacy rule [5].
- b. **Integrity** – maintain the authorization by giving permission to someone from administrating. System can't pass any unauthorized and improper information to all[5].
- c. **Availability**– to design a system in a way that it can be accessible by all in a prompt manner.
- d. **Accountability** – designing a system in a way that it can maintain a record of individuals that access the system.
- e. **Cost Effective** – easily carried out by the general people.
- f. **Unbreakable** – designed system in a way that it can handle any type of intruder attack and percentage of damage is null.
- g. **Fully Communication System** – if any changes or threat is discovered, then pass the information to everyone, who use that system.

- h. **Durability** – system design for the long-term period so that person take the functionality at once and remain stress free about security for long time period.
- i. **Easy Maintenance** – system designed in a way that it can easily accept the changes and update itself.

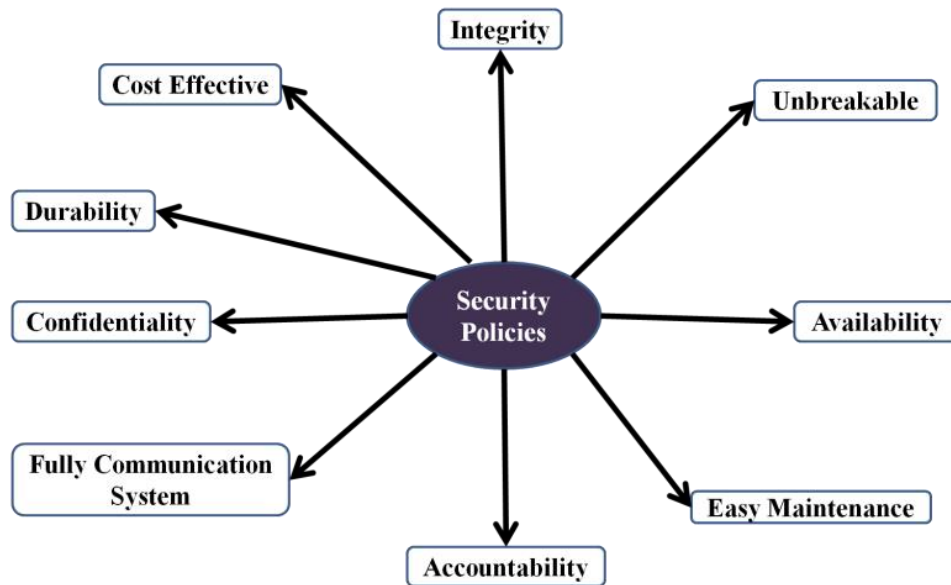


Figure 1.2: Security Policies

Computer Based Security

Person-to-machine interaction in term of security increase the demand of designing a secure computer system in which system contain all security measures with other task applications. These types of computer systems have high computational rate, large database, fast speed and high memory capabilities, which made it more powerful. The most important features which are required for it, is highly secure environment where it used and highly secured technique for securing data present in it.

Both features are related to the security issues. Highly secure environment means the place where system will be established in secured area, where no one comes without administrative permission. It is said in this way that only authenticated person can access that environment.

Highly secured techniques for securing data means system developer has to use these types of techniques by which entered data is safe. If in one case, someone enter the secure environment and stole the data or in other case, data stolen by any authenticated person, at that time no one can understand the data. This terminology is used in the cryptography field.

1.1 Highly Secure Environment or Authenticated Premises

Working environment means the place where human beings perform their specified task. Now in term of person-to-machine interaction, highly secure environment means a place where various computer systems are situated and only authenticated person or persons with administrative permission can enter the premises. After

entering the premises, persons can start their computer system when they prove their identity in front of system. The main goal of this feature is authentication of a person or an individual.

Authentication Process

Authentication process is a process which is designed to check the authenticity of the individual. This process is split into two phases–

- i) **Registration Phase** – In the registration phase, user has to register himself in the computer database by giving his identity.
- ii) **Authentication Phase** – Authentication phase is designed to check the identity of an individual. If he/she wants to come in the authenticated premises, then he/she have to give their identity to the computer when it asks. After providing the identity by the individual, computer checks their identity in the database. If the record is found, then computer will permit an individual in the premises otherwise deny him.

Authentication phase accomplish its task in two ways which are considered as Authentication Methods [6] –

Authentication Methods -

- i) **Identification Method**- Identification method is a method which is based on the $1:N$ comparison where N is the total number of persons present in the database. Authentication process run and check user identity, when user give their ID proof to the admin and admin checked it with the database which contain names of the authorized individuals [6].

This method is very time consuming because this method uses the linear search approach which has $O(n)$ time complexity. Figure 1.3 represents registration method in which method (A) store the data in standard manner and method (B) store data with unique ID.

- ii) **Verification Method** – Verification method is a method which is run with the help of Indexing technique, in which database generate one unique number to each entry as an identity number or index number (ID) in the registration phase and also give the same ID to the user.

In authentication phase, when searching algorithm is applied, then user gives their ID and admin only check that particular ID related entry record. If the user details are matched with the database entry, then user is authenticated. This method has performed $1:1$ comparison [6].

This method is very fast because comparison operation takes only $O(1)$ time complexity, which makes this method very reliable and robust [6].Figure1.4 represents verification method where method(A) shows 1-to- N process for verification and method (B) shows 1-to -1 process for verification.

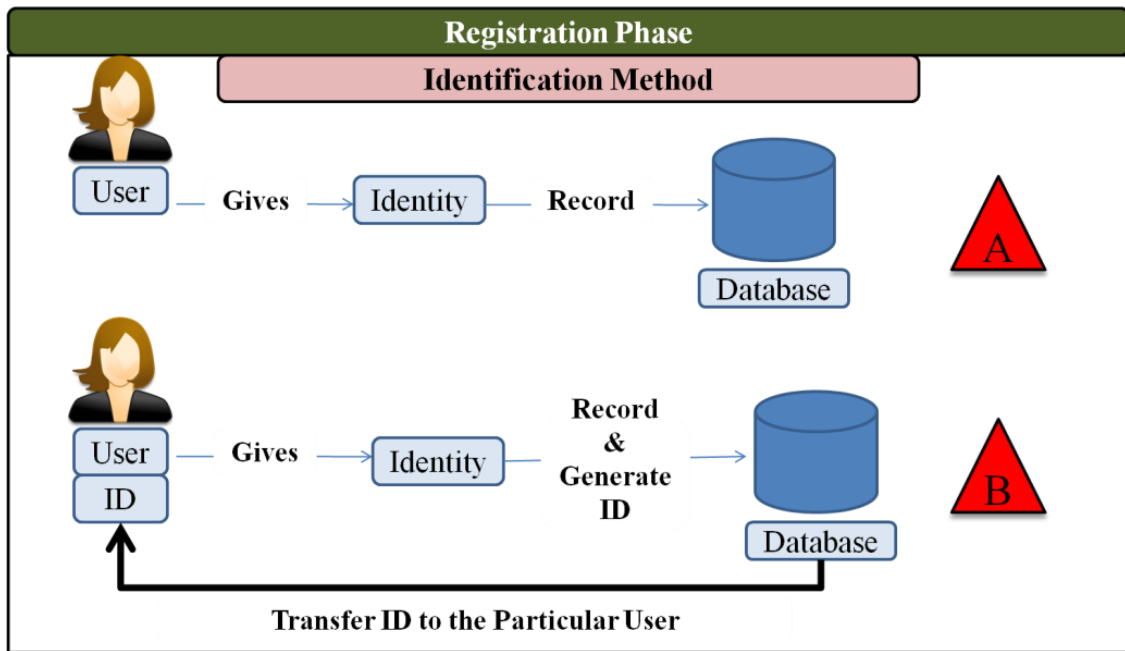


Figure 1.3: Registration Method: A) Standard Data Registration B) Data Registration Done By ID

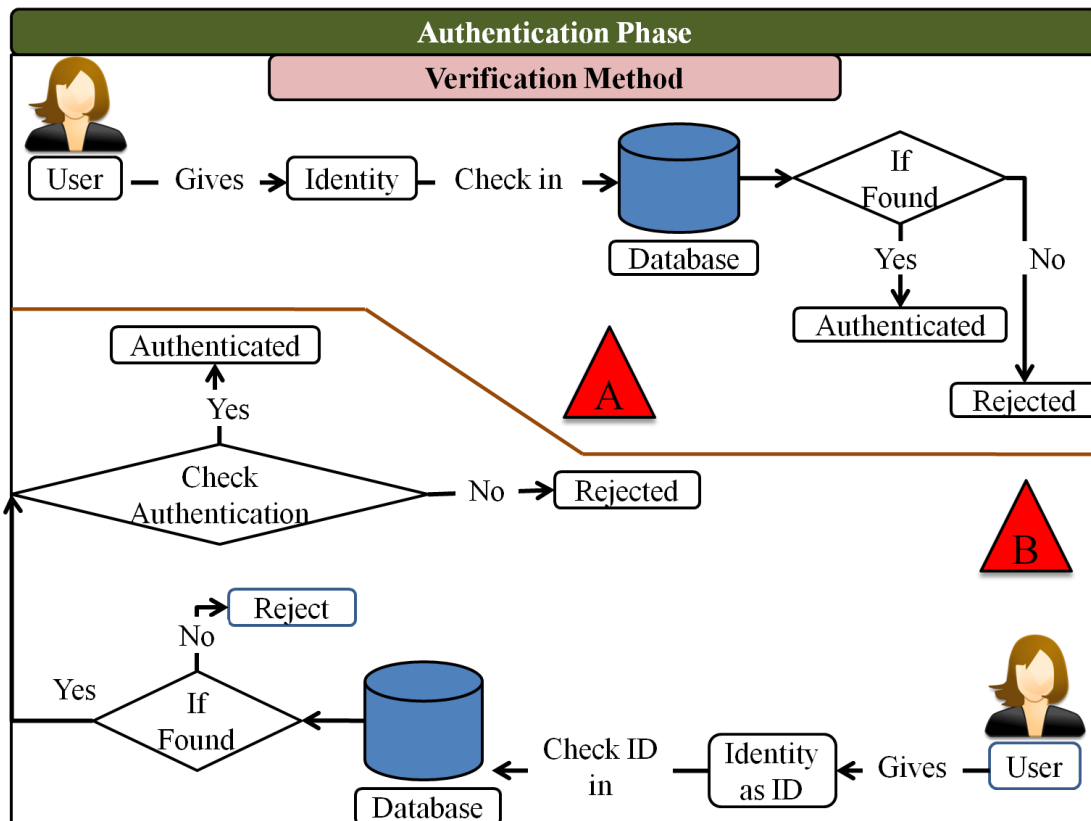


Figure 1.4: Verification Method: A) Verification by 1-to-N method B) Verification by 1-to-1 method

1.7.1 Authentication Techniques

In the real world, it is compulsory to know that how many techniques are available in the world for proving the identity of an individual. If considering about the last century, then there were various techniques for proving the authentication of an individual. These techniques are mainly doing its task on two bases [7] as -

- i) **Knowledge Based Techniques** – Knowledge based techniques are those techniques which rely on the individual's memory. For this technique, individual have to use his remembering power and remember his passwords, permanent identification numbers (PINs), secret codes [7] [8] etc. and whenever someone need to authenticate you, you have to provide it.

This technique is totally based on the human brain capacity. If someone's brain doesn't remember any identification mark, then he/she cannot use that premises. For example, if a person has one digital locker and he/she stored some important documents in it. If person forgets the password, then he/she cannot access their locker again. And in future it may be very hazardous for them.

- ii) **Token Based Techniques** – Token based techniques are techniques in which each user or individual has his own identical token which proves his identity. This identical token can be anything like Driving License, Passport, Aadhar Card, Smart Access Card, Pan Card, Voter ID Card, Cash- Machine Card, ID badges etc. [7] [8] [9].

In this technique, when someone wants to enter in the authorized premises, then he/she must provide their specified token like passport to the administrator and admin check their specified token number in the database. If token number is found, then person is authenticated otherwise not.

This technique works very well in all scenarios but there are two major problems discovered -

- i) In the case where token-based authentication technique is used to prove individual's identity, then individual must go personally to confirm his identity. This method is not convenient in the emergency and pandemic situation.
- ii) Stolen identity i.e., someone steal the identity token of any person and put himself in place of him by the help of stolen token.

If both conventional methods are weighted in the scale of security, then both are declared as insecure methods [7] [8] [10] because forgotten their password/ PINs/ Secret code, misplace their identity card, some identical relations swap their photo identity card, password may be guessed, Card cloning, are considered as threat.

In the digital world, both conventional methods are non-reliable in proving the identity of an individual.

Due to the above listed security problems; today's digital era is not accepting the conventional methods for personal authentication process. It is essential for us to design some special and effective authentication system which can handle the security issues of digital era. Biometric science has emerged as an alternative solution of this problem.

Biometric Science

Biometric Science includes the science of evaluating body characteristics [7, 9]. The most important point about human being traits is that every individual has his identical and unique features which are helpful in

differentiating an individual with others. This identical information can be classified further into two parts because of its nature. **Physiological traits** – human body traits which belongs to the physics of the human being is known as physiological traits. Physiological trait are observable characteristics of the humans [11] such as – fingerprint, iris, face, retinal patterns, ear, dental, palm print, hand geometry, lip print[8] [9] [10] [12] [13]. **Behavioral traits** – A human body trait which belongs to the expression or action or activity of the body, generated because of nervous system [7] are known as behavioral traits. These traits are voice recognition, keystroke dynamics, handwritten signature dynamics, gait, walking pattern, typing pattern etc. [8] [9] [10] [12].

1.2 Biometric Science – An Alternative of Authentication Technique

Biometric science is a science in which we can study those human features that are identical or unique property i.e. these biometric traits are good alternative for proving individual identity and cloning or stealing of these features is not an easy task. For the digital world, bio-information or biometric science is emerged as a good authentication technique with easy maintenance, reliable services, and robust system.

Working of Biometric Science for Authentication Process

Biometric information of an individual is captured by the help of sensor, or scanner or any acquisition devices and copy & save that information in the computer memory. When the individual comes and asking permission for entering in premises, computer asks for the biometric information. When individual scans their bio-information, computer compares that scanned information with the registered data which is stored in the computer memory. If the comparison is successful, then computer permit him otherwise entry is denied [9]. Figure 1.6 represents biometric based information registration and authentication process.

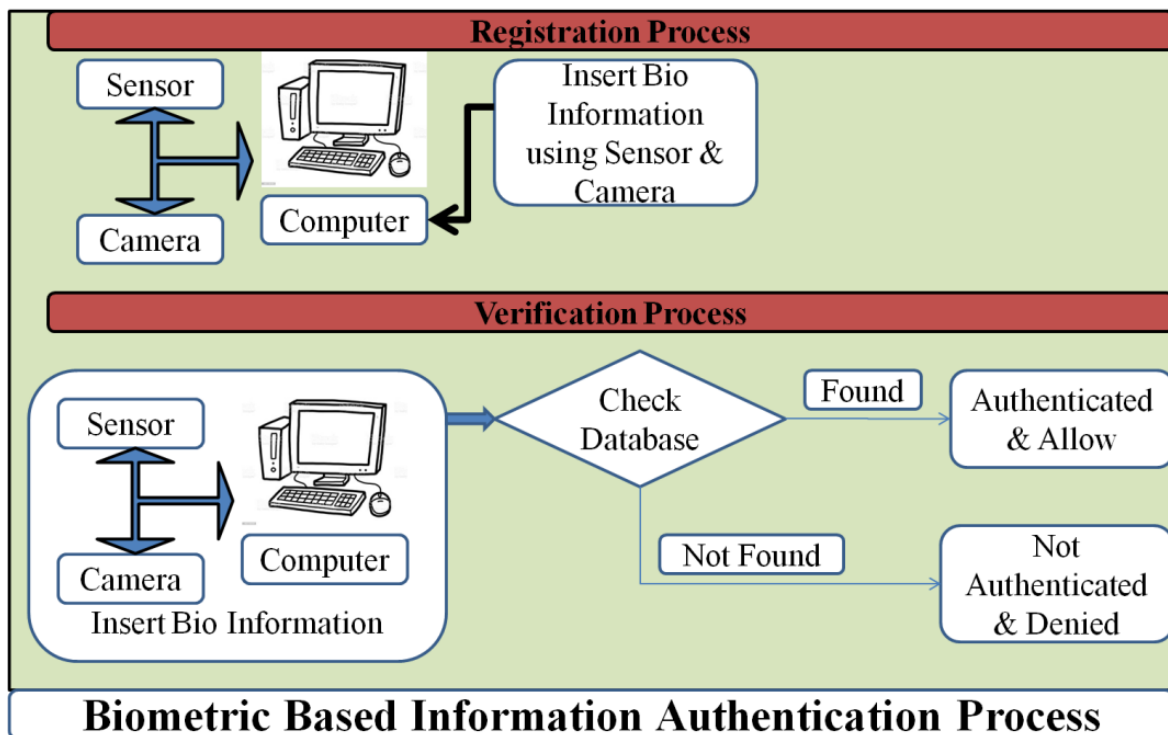


Figure 1.6: Biometric Based Information Authentication Process

Biometric Information

Human body has much identical information like fingerprint, palm print, eye retina, iris pattern etc. According to the nature-based classification of identical features, few features are described below as-

Fingerprint

Fingerprint, which is unique feature of human being, has very easiest way of use and long-term stability. Generation of fingerprint is completed at the time of birth. Generating process is based on the genes and environmental conditions during pregnancy. So that twins who have same DNA also had a different fingerprint pattern. So, it is the most reliable, secure and robust method for individual's identification, it can be easy to say that fingerprint is not affected by the genetic [6] [16].

Fingerprint is a scanned form of fingertips of an individual, which has pattern of ridges and valleys. It is formed on the skin with the mixing of ridges and valleys, and it develops a unique pattern. An individual has unique pattern of fingerprint, and it has no changes throughout the lifespan of an individual. A fingerprint pattern (as shown in figure 1.7) has curvature, terminations, bifurcations, cross-over etc. shapes in high density, which makes distinctive regions based on ridges and valleys. These regions consist of various arch, tented arch, loops (left, right, twin), core, delta, and whorl topologies. Fingerprint pattern also contain the minutiae which has two main structures [6] [17]-

- *Termination* – small region where ridges lines end abruptly
- *Bifurcation* – ridges lines are separated into two branches

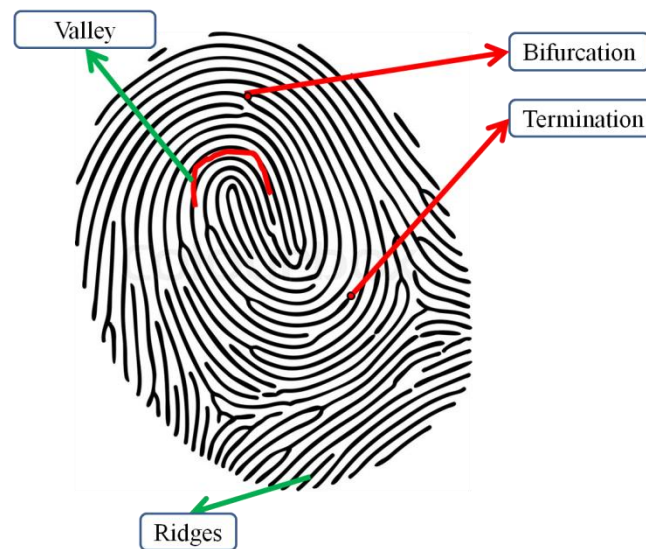


Figure 1.7: Fingerprint Pattern

1.12.1 Iris

Human eye image has different patterns in each person, formed by combined layers of pigmented epithelial cell, muscles for controlling the pupil, stomal layer consisting of connecting tissues, blood vessels and an anterior border layer [18] [19] as shown in figure 1.8. According to the medical science, iris patterns are stable

over time with uniqueness, time invariance and immovability features [12], and only minor changes happen to them in a lifespan of an individual. Iris structure is fully designed by ten months of age and remains same for the whole lifespan [12]. The other traits are changed with the time. Iris recognition system uses 240 reference point of iris for matching purpose. The iris is a circular diaphragm that punctured because of the pupil, and it lies between cornea and lens. How much light can enter through the pupil (a circular aperture area) is controlled by the iris .The pupil size can vary from 10% to 80% of the iris diameter where the diameter is approximately 12mm [12].

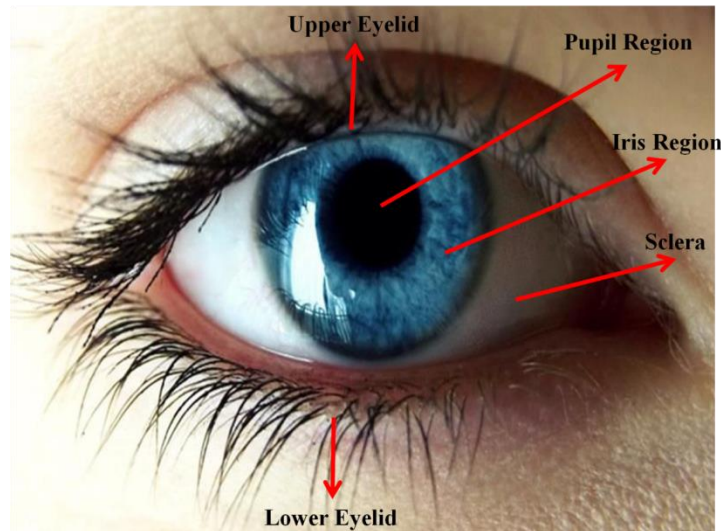


Figure 1.8: Eye pattern

Walking Pattern

Every person moves with their legs. But it is very unusual thing that pattern of walking of every person has unique features. And walking shows the behavior of the person. That is why it is considered in the behavioral trait in authentication process. Uniqueness consider in walking pattern depends on the footstep, pressure on the foot, sound generate by the footstep, angle made between thigh, knee and leg. All these are measured by the help of sensor and stored in the database for each person [20].

II. CONCLUSION

The demand for security software is boosted due to increasing rate of automation and digitalization. In the current world, security can be provided in a variety of classic and contemporary ways. The conventional approach relies on human memory, statistics, patterns, etc. However, modern methods use biometric science in designing security software. one of the most reachable security software in based on automatically identified individuals by a computer system using their own particular biometric traits.

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A Review on Face Recognition in Video Images

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ABSTRACT

There has been a lot of study done on face recognition using images of faces, but there hasn't been nearly as much done on video-based face recognition. Recently, scientists have dedicated a lot of time and energy to solving the challenge of facial recognition. The purpose of this study is to present an up-to-date overview of key research that has been done on human face recognition using video images. In the first part of this article, we will provide an overview of face recognition and the uses it has. The next step is a discussion of a literature study on the most recent developments in face recognition algorithms. Although many still pictures or video sequences may be degenerately treated as a single still image, they really possess a number of unique properties of their own. Three characteristics that may be seen in a series of still photographs or videos are summarized in this chapter. Then, using the exhibited qualities, we discuss newly suggested methods such as Eigen-faces, Neural Networks, Fisher Discriminant Analysis (FDA), Artificial Neural Network Fuzzy classification, and Genetic algorithm.

Keywords— Face recognition, Video images, soft computing, PCA, LDA, FDA, Adaptive Skin color model, Eigen-faces. Artificial Neural Network, Fuzy Logic and Genitic Algorithm.

I. INTRODUCTION

Face recognition is a significant research issue that crosses many professions and disciplines. This is because of the many practical applications of facial recognition technology, such as in ID verification, criminal background checks, bank card verification, security and surveillance, and mug shot searches. It's a trait shared by all humans and crucial for effective communication and social engagement. As video recording technology has become more commonplace, researchers have begun to concentrate their efforts on video-based scenarios in which facial recognition may be used. In video-based face recognition, the video sequence of an individual is used as the query or target in order to identify that person. There are primarily three instances when video-based facial recognition is useful. An example of this is the V2S (Video-to-still) scenario, which evaluates a user-provided video against a database of still images of a person's face (mug shots, ID pictures, licence photos, etc.), These are often consumed in well regulated settings, and as a result are of superior quality. Systems for screening watch lists often need to deal with this circumstance. Instead, In the S2V (Still-to-Video) scenario, In order to find a person of interest in recorded surveillance footage, the application compares a still face snapshot to a database containing video sequences. The third and final scenario is referred to as the "V2V (Video-to-

Video) case," and it involves comparing a single video sequence to a group of target video sequences. Such a system may be put to use, for instance, to locate a missing person by comparing and contrasting images from several surveillance cameras.

II. LITERATURE REVIEW

Citation no.	Author	Methodology	Results	Limitations
[1]	Zhiwu Huang, Shiguang Shan,	a benchmarking and comparing research that was based on the freshly compiled COX1 Face DB still/video face database viewed and experimentally contrasted several set-based techniques in use included a brand-new Point-to-Set Correlation Learning (PSCL) technique.	Their face recognition approaches for V2S/S2V tasks may also be used to the V2V task, and they ultimately get encouraging results for this test.	The development of practical video-based facial recognition applications requires additional work.
[2]	Daniel Schofield, Arsha Nagrani	A deep convolutional neural network (CNN) method is used and provided a completely automated pathway for the identification of faces in long-term video recordings of wild chimpanzees.	The total success rate for both name recognition and sex categorization was 92.5%. They created co-occurrence matrices using the recognised faces to track changes in the social network structure of an ageing population.	longitudinal video archives and their promise to address fundamental issues in conservation and behaviour.
[3]	Guodong Guo Na Zhang	The strategies for recognising faces using deep learning were given and reviewed in detail. About 330 papers in this field have been summarised that suggest various deep learning techniques. It examined key deep learning theories present a brief summary of studies on problems relevant to face image analysis and face recognition, such as adapting for changes in stance, age, lighting, mood, and heterogeneous face matching.	Deep approaches have shown to be effective in a variety of areas, including the processing of RGB-D and video in addition to heterogeneous face matching. We have also offered face databases that include related information, photos, videos, and to different types of face data, enabling cross-modal FR. Many significant steps forward have been made because of developments in face recognition technology, even if it can only work with static images.	In practise, there are still some challenges.

[4]	Yi-Chen Chen, Vishal M. Patel	The author developed the idea of face recognition using video dictionaries, which generalizes the work done with sparse representation as well as face recognition using still image dictionaries. Unrestricted video sequences are the goal of the Face as well as Ocular Challenge Series (FOCS) Video Challenge, was used by the author to illustrate their methodology.	According to experimental findings on three separate datasets, individuals perform best at face and body recognition while observing the subject in motion.	Next-generation video identification algorithms should make effective use of both facial and bodily features.
[5]	Hao yang and xiaofeng han	The author primarily establishes four directions to consider the issues: Face recognition attendance monitoring system interface settings; actual check-in accuracy rate of the a face recognition system; face recognition attendance system absenteeism rate. In conclusion, we suggest implementing a face recognition system.	In experiments, The video face recognition system's success rate has been calculated, and it stands at 82% at present. The facial recognition attendance system may minimize the time it takes to check in by roughly 60%. The phenomenon of pupils leaving class early and skipping it has significantly decreased in frequency.	The system has achieved significant advancements that have significantly increased attendance rates and the accuracy of facial recognition technology. It merits further scientific investigation and understanding.
[6]		For video face recognition, the author proposes a new approach When several face photos are fed into a component-wise feature aggregation network (C-FAN), and a single feature vector is generated to be utilised for recognition. To train the whole network, there are two stages: To recognise faces in videos, I first train a standard convolutional neural network (CNN) on still	The proposed C-FAN network effectively aggregates data to reach state-of-the-art performance feature vectors from across all video frames to generate The results of experiments on 3 benchmark datasets YouTube Faces, IJB-A, as well as IJB-S—show that the 512-dimensional feature representation is compact enough to represent merely a	Future research will look at an aggregation network that combines several degrees of fusion.

		images, and Then, In order to gather the quality score for every feature piece, I have an aggregation module added to a original network.	video sequence.	
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III. METHODS

A. Eigen-faces:

A collection of eigenvectors called Eigen-faces is used to the computer vision issue of recognizing human faces. They make reference to an appearance-based method of face recognition that aims to identify variations among a group of face photographs and then uses this data to encode and contrast pictures of different faces.

The issue of precisely which components of the face stimulus are crucial for identification has been largely disregarded in earlier automated face recognition research, which assumed that predetermined measures were adequate and relevant. This gave rise to the idea that coding and decoding face photos according to information theory would help us understand the information contained in them by highlighting important local and global "features." It's possible that these traits have little to do with how our eyes, nose, lips, as well as hair are seen. The objective is to use information theory to facial images in order to extract the most relevant information, encode it, and then compare it to a database of encoded models. Unaffected by any evaluation of features, capturing variance in a group of face photographs and The information contained in a face picture may be easily extracted by utilising it to encode as well as compare several versions of the same face. Either the main components of a distribution of a collection of face photographs or the eigenvectors of their covariance matrix must be found. These eigenvectors may be thought of as a set of characteristics that, when combined, characterise the diversity in face images. Since each pixel in the picture contributes differently to the total eigenvector, we may think of the Eigen face as a form of spectral face.

It's possible that a combination of Eigen faces may represent each face picture in the training set. There are as many possible Eigen faces as there are images of human faces in the training set. You may get a close approximation of the faces by using just the "best" Eigen faces, which ones have the largest eigenvalues and hence explain the most variation in the collection of faces. The efficiency of computing is the main justification for employing fewer Eigen faces. The largest M' Eigen faces occupy a region of "face space" that is M' dimensions in size. Eigen functions of linear systems as well as the fundamental functions of the a Fourier decomposition (sinusoids with varying frequency and phase) form the basis vectors of a Eigen face decomposition.

The stages involved in recognition are outlined below:

- Initialization: The Eigen faces, which characterise the face space, cannot be calculated without first obtaining the training dataset of facial images.
- When a new face picture is encountered, the input image is projected onto each of the M Eigen faces to generate a set of weights.

- Check to see whether the picture is sufficiently near to "face space" to determine if the image is indeed a face (whether known or unknown).
- When a face is detected, the individual's unique weight distribution is classified as either known or unknown.

B. Neural Networks:

• Feature extraction:

Face representational data or feature vectors are the target of feature extraction. There are three primary techniques for obtaining features: Three common statistical methods are principal component analysis (PCA), linear discriminant analysis (LDA), as well as Fisher discriminant analysis (FDA).

• Principal Component Analysis (PCA):

The information theory method is used to guide the usage of PCA for face recognition. It effectively extracts the pertinent data from a face image and encodes it. The training face image data's subspace in the image space is identified, and the pixel values are de-correlated. The traditional depiction of a face is achieved by projecting the original face picture onto a coordinate system established by its basic components. Information compression, decorrelation, and dimensionality reduction are all achieved by projecting facial images into the main component subspace, which aids in decision-making. For the most relevant components in the face distribution, one may use mathematics to search for eigenvectors of the covariance matrix of a collection of face images.

• Linear discriminant analysis (LDA):

In machine learning, linear discriminant analysis is used to find the best linear features to use when dividing data into several groups. Next, a linear classifier is built from the resulting combinations. Since a multidimensional area is mapped into the a space with fewer dimensions, this is also considered feature reduction before further categorization. Linear discriminant analysis is often used in contexts involving classification. In the case of face recognition, for example, the numerous pixels that make up a face are first converted into a smaller number of linear combinations so that they may be sorted into appropriate categories. Fisher-faces are the linear combinations that can be found using LDA. Face identification uses linear discriminant analysis (LDA), whereas eigenfeature discriminant analysis is used for face retrieval. The LDA is a method for representing an image that draws attention to its discriminatory character by projecting it onto a system of fisher-faces with nonzero eigenvalues. In LDA, we choose the linear subspace which maximises the quotient:

$$\frac{|\Phi^T S_b \Phi|}{|\Phi^T S_w \Phi|}$$

$$S_b = \frac{1}{c} \sum_{k=1}^c (\mu_k - \mu)(\mu_k - \mu)^T$$

is the between-class scatter matrix, as well as

$$S_w = \frac{1}{M} \sum_{k=1}^c \sum_{i|x_i \in C_k} (x_i - \mu_k)(x_i - \mu_k)^T$$

the within-class scatter matrix,

where c is the client count, M is the sample size of face photos used for training, x_i , μ is the grand mean, as well as μ_k is the mean of class C_k .

- **Fisher Discriminant Analysis (FDA):**

One of the most important feature extraction methods is Fisher discriminant analysis. Fisher discriminant analysis is often used in two different ways: the Foley-Sammon linear discriminant analysis (FSLDA) as well as the uncorrelated linear discriminant analysis (UCLDA). Studies demonstrate that each FSLDA discriminant vector's Fisher criteria value is consistently greater than the value of the equivalent ULDA discriminant vector. This might be seen as a benefit for FSLDA as a higher Fisher criteria value for a discriminant vector indicates stronger discriminability. While FSLDA often gets correlative feature components and perhaps extremely correlative feature components, ULDA invariably receives the uncorrelated feature components. It seems that discriminant vectors perform better when the feature components they extract from data are less correlated to one another. Therefore, removing uncorrelated feature components provides a benefit for ULDA in this regard. The best discriminant vectors seem to also correlate to the lowest correlations between the retrieved feature components and the maximum Fisher criteria values. Unfortunately, neither ULDA nor FSLDA can provide such perfect discriminant vectors. Additionally, neither the FSLDA nor the ULDA are particularly effective. We may assume that, for discriminant vectors, there is an equilibrium between values on the Fisher criteria that are high, low correlation between recovered features components, with excellent discriminant vector performance.

C. Neural Networks:

Neural networks are a very efficient and trustworthy classification approach that may be used to make predictions both for known and unknown data. It performs well on nonlinear and linear data sets that can be kept apart. Voice recognition, face recognition, fingerprint recognition, iris recognition, as well as scene interpretation are just some of the many uses that have been found using NN. Synthetic "neurons," or "nodes," form the backbone of an ANN. These nodes are connected by edges, and the strength of the excitation (maximum value +1.0) or inhibition (minor value -1.0) at each node is indicated by its connection (maximum value -1.0). (a -1.0 maximum is possible) High values for connections stand for robust ties. Each node is built with a transfer function built in. An ANN consists of three distinct sorts of neurons: input nodes, hidden nodes, as well as output nodes.

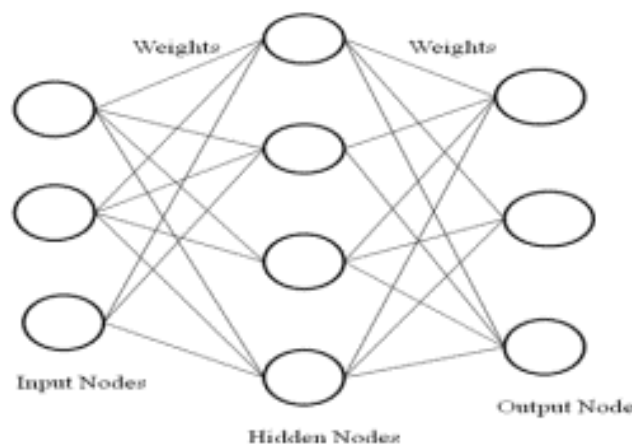


Figure 1NN

Data may be entered as numerical expressions into the input nodes. Activation values are used to display the information, with larger values indicating more robust activity at the corresponding nodes. The data then arrives to the network. The amount of activation that is transmitted from node to node depends on a number of factors, including weights, inhibition or excitation, and transfer functions. Values of activation received from each node are added, and then the sum is scaled up or down depending on the node's transfer function. Before reaching the final output nodes, the activation passes via the network's "hidden layers." As a result, the meaningful is mirrored in the nodes of the output graph.

D. Artificial Neural Network:

Gender categorization, face recognition, and expression classification are just some of the pattern classification problems that ANN machine learning has been used to. An ANN classifier offers excellent generalization and strong learning capabilities, which are benefits for classification. The need to oversimplify the classifier is avoided when an ANN is used, because it may be taught, using the features vector as input, a sophisticated mapping for classification. Face recognition systems that make use of neural networks and other learning approaches have been implemented owing to their promise for greater generalisation.

The artificial neural network (ANN) paradigm used here is the multilayer feed-forward network (MFNN). For those unfamiliar, an MFNN is a subset of non-linear networks that consists of inputs (the input layer), hidden non-linear neurons, as well as an additional non-linear output layer. MFNN's highly adaptable non-linear structure makes it a powerful tool for dealing with a broad range of difficult pattern recognition as well as regression issues. As a supervised learning technique, Showing the network examples from the a training set over and over again while modifying the neural weights to obtain the desired output is what error-correcting back-propagation is all about. How you train a network to perform a specific task. For the sake of the greatest possible descent, the weight matrices in a gradient descent algorithm are adjusted. It's important to choose η , the learning constant, carefully. The method may frequently overshoot the answer if it is too big, meaning that convergence may be slow or may not occur at all. If it's too little, the algorithm will move very slowly toward the answer, which will again cause a delayed convergence and raise the likelihood that the algorithm would become trapped in local minima. Momentum and adaptive learning are the two basic strategies for solving these issues. If we are continually moving in the same way as the momentum technique dictates, then we want to develop some momentum in that direction. If successful, this will help overcome any small local minima as well as speed up the convergence process.

Standard: $\Delta w(t) = -\eta \nabla E(t)$

Momentum: $\Delta w(t) = -\eta \nabla E(t) + \alpha \Delta w(t-1)$

where α is the momentum term.

To prevent overshooting, It is common practise for adaptive learning rates to begin with a high value and gradually decrease as we get closer to the answer. The feature extraction module's output data serves as the training's input data.

Euclidean distance (E.D.):

The closest mean classifier, often known as the Euclidean distance, is a common measure of distancing in the context of decision rules.

$$d_E(x, w_k) = \sqrt{(x - w_k)^T (x - w_k)}$$

Fuzzy classification:

The fuzzy set theory-based computer framework known as fuzzy inference systems (FIS) has been effectively used in a variety of applications. Success is primarily attributable to their compatibility with human perception and reasoning, as well as to the fact that they are easy to use and intuitive, all of which are crucial for system acceptability and usage. Unit fuzzification, rule base, inference engine, and defuzzification are crucial components of a fuzzy inference system. Fuzzification is the process of changing a variable's clear value to a cryptic one. Several fuzzy rules make up the rule basis. The inference engine calculates the outcome of a blanket application of all rules using the current values of any and all fuzzy variables. The defuzzification unit determines the defuzzified value of the inference engine's total fuzzy output.

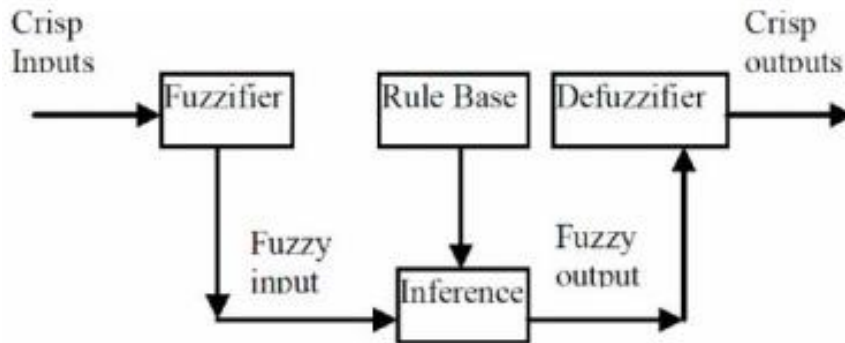


Figure 2 FIS

Recognition system:

Several 2D images will be gathered while video is being acquired using a camera. One or more persons may be seen in every image. The initial phase is segmenting the images in order to identify areas of interest that correlate to the various faces in each frame before doing face detection. Once an area of interest has been identified, Next, we proceed to the classification phase, which enables us to assign a percentage of likelihood that each recognised face belongs to each face class. The figure illustrates the fuzzy recognition system's organisational structure.

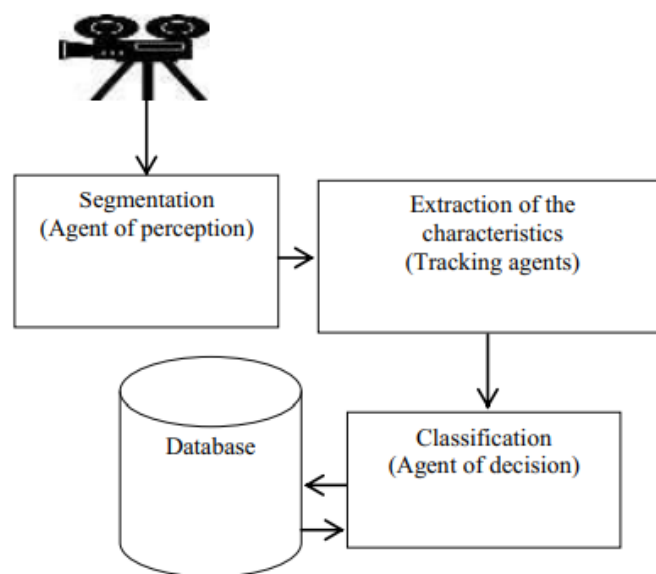


Figure 3 Structure of Fuzzy recognition system

Structure of the fuzzy controller:

Following is a formulation of the fuzzy problem of face recognition:

Let $C = \{C_1; C_2; \dots; C_m\}$ be a collection of m face classes that are kept in a database, with m standing for the total number of classes.

Let X_j be a face j's characteristic vector containing d real values.

$$X_j = (e_1; e_2; \dots; e_d) \in \mathfrak{R}^d$$

$$f : \mathfrak{R}^d \rightarrow [0,1]^m$$

$$f(x_j) = (\mu_1(X_j); \dots; \mu_m(X_j))$$

Where $\mu_i(X_j)$ represents the degree of membership of the face X_j to the class C_i

A system called a fuzzy controller has many inputs and many outputs. Each set of input values has a unique set of output values in this controller. Giving each identified face j a vector D_j with real values between 0 as well as 1 describes the degree to which the face j belongs to each class C_i in this fuzzy clustering approach.

The figure below illustrates the fuzzy controller's structure.

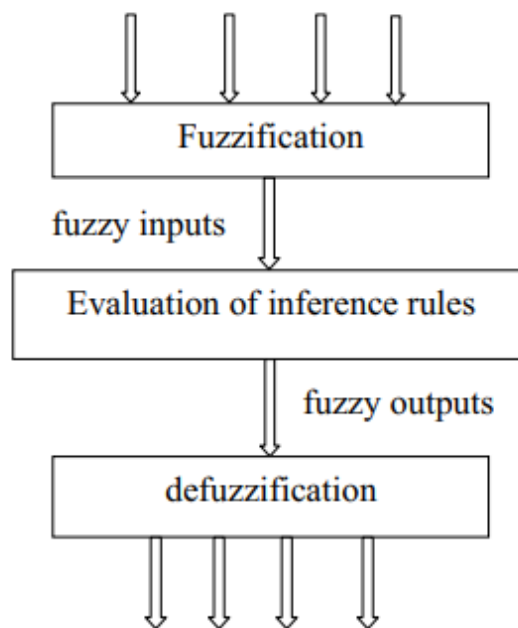


Figure 4 Structure of fuzzy controller

Three matrices M_k ($k=1-3$), whose column shows faces and those whose lines represent face classes, are produced via this fuzzy classification.

$$M_k = \begin{bmatrix} D_{c_1}(x_1) & \dots & D_{c_1}(x_n) \\ \dots & \dots & \dots \\ D_{c_m}(x_1) & & D_{c_m}(x_n) \end{bmatrix}$$

Where,

M_1 : Matrix of the fuzzy set "bad similarity"

M_2 : Matrix of the fuzzy set "average similarity"

M_3 : Matrix of the fuzzy set "good similarity"

$D_{c_i}(x_j)$: Degree of membership of the face x_j to class C_i

With: $0 \leq D_{c_i}(x_j) \leq 1$ and $\sum_{i=0}^m D_{c_i}(x_j) = 1$

$$D_{c_i}(x_j) = \frac{\text{dist}(x_j, c_i)}{\sum_{k=1}^m \text{dist}(x_j, c_k)} \text{ pour } 0 \leq j \leq n-1$$

Where:

m: represent the number of classes,

n: represent the number of face t classify,

c_i : is the characteristic vector of the center of gravity of the class i,

$\text{dist}(x_j, c_i)$: represent the Euclidian distance enter a face x_j as well as the center of gravity of the class c_i .

Fuzzification involves applying the preceding formula on the matrix M_k in order to calculate it. It permits the conversion of digital data into language variable.

Each face in our article is defined by four factors.

- The skin tone
- The horizontal eye-width (Hb). The (D1) Distance
- The distance between the lips as well as the eyes (D5 et D4)

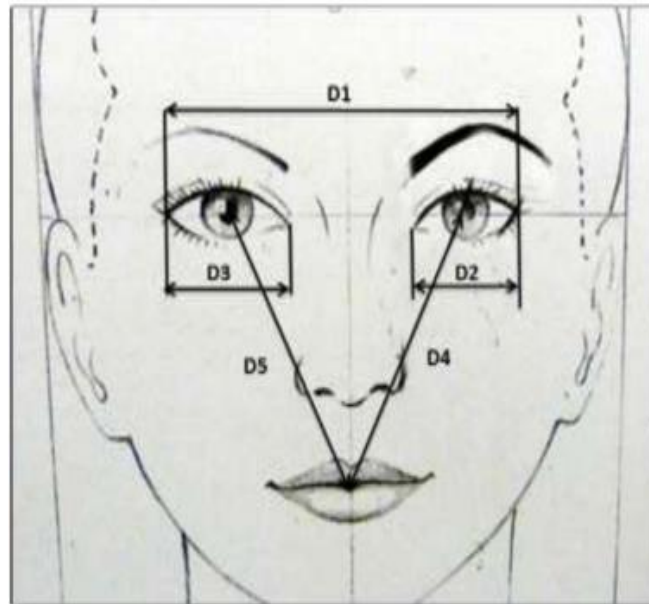


Figure 5 The parameters characteristic of the face

Since there might be several fuzzy subsets of an input value, the purpose of the fuzzy inference process is to calculate the relative degrees of membership for each. A facial membership function for each fuzzy collection is therefore unnecessary. Good similarity, medium similarity, as well as awful similarity fuzzy sets were used.

Genetic algorithm:

It is a kind of a random search algorithm motivated by both genetics and natural selection. After each cycle, a pool of potential answers is maintained by simulating biological reproduction, crossover, and mutation, and On the basis of some measure, the best people are selected from the groupings of solutions. Genetic operators combine individuals to produce fresh generations of solutions until the convergence index is reached.

A genetic algorithm consists of four main components: the genetic operators (selection, crossover, as well as variation), the fitness function, the coding method, and the settings for control. The potential answers to the issue will be encoded into chromosomes, or persons, when a genetic algorithm is employed to solve it. A group of people get together to produce the first solution. The people meeting the termination requirements may be output after computing the fitness function, and the procedure is then complete. If not, people will mix, mutate, and recombine to create the subsequent population. The previous generation's positive traits are passed down to the next population, which is superior to it, allowing it to steadily progress toward a better solution.

It is clear from the previous introduction that genetic algorithms provide a generic framework for resolving complex system optimization issues that is independent of the area and kind of issues. Fitness function is the foundation of the genetic algorithm. Rearranging the population's unique structure may be done in cycles by applying genetic operations to its members. There are many straightforward genetic algorithm models that fit these descriptions:

As a formula: C- unique coding approach

E-Individual fitness evaluation functionality

P0- initial population

N- Population size

U- Selection operator

C-Crossover operator

W-Mutation operator

T- Genetic operation's termination condition

1. Initial population coding and generation

Select the best method of coding for the problem at hand. As well as create a population of N chromosomes with a predetermined length at random.

$$f_i = \text{fitness}(\text{pop}_i(t)) \quad \text{pop}_i(t), t=1, i=1,2,\dots,N$$

2. Evaluation of Health and Fitness Potential

Each chromosome's fitness in population pop (t) is determined by its fitness value, tpop (t).

$$f_i = \text{fitness}(\text{pop}_i(t))$$

3. Assess whether or not the convergence condition holds. The procedure will continue if the search results returned are appropriate.

4. Select operation

Each person's likelihood of being chosen is based on their level of fitness.

$$p_i = \frac{f_i}{\sum_{i=1}^N f_i}, i=1,2,3,\dots,N$$

Next-generation populations are generated by randomly selecting individuals from the above probability distribution, which is based on the current generation's population TPOP (t).

$$newpop(t+1) = \{pop_j(t) | j=1,2,\dots,N\} \quad newpop(t+1) = \{pop_j(t) | j=1,2,\dots,N\}$$

5. Cross operation

By mating with probability P_c , N chromosomes $tcrosspop(t+1)$ were produced.

6. Mutation operation

To cause chromosomal genes to mutate, use a lower probability P_m . The t mutpop ($t+1$) population is created. The offspring of a geno-surgery are referred to as the pop (t) = mutpop ($t+1$) population. It's the progenitor of the next genetic operation and loops back to 2 at the same time.

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Crop Recommendation Using Machine Learning Classification Techniques

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ABSTRACT

Agriculture plays an important role in the Indian economy. It is challenging to deal with various climactic changes affecting the yield production in this field. Use of technologies can help to improve the agricultural yield production. Machine learning and IoT are emerging technologies which are proving best in the almost all areas. By using machine learning it becomes easier for farmers to predict the crop for cultivation based on various factors such as contents of soil, climate, and water resources. In this paper various Machine Learning classification algorithms such as decision tree, support vector machine, KNN, random forest are implemented on soil dataset to recommend the suitable crop. The accuracy of these algorithms is also tested and compared

Keywords: Agriculture, machine Learning, IoT, cultivation.

I. INTRODUCTION

To feed the growing population is becoming challenging as the amount of yield produced in the farm is less compared to the requirement of food. Farmers are required to cultivate more and more crops because the environmental conditions and requirement of particular food items are changing drastically. But most of the farmers don't have enough knowledge about the new crops and the suitable environmental conditions required for these kind of crops which leads to take wrong decisions about the crop selection. With the help of machine learning techniques, farming can be done more smart and efficient way. Machine learning refers to the set of techniques meant to deal with huge data in the most intelligent way in order to derive actionable insights [1]. Farming practices would change into with the so-called knowledge-based agriculture that would be able to increase production levels and products quality. The ultimate view point of ML is to automate the data analysis process with the help of algorithms that are enabled with continuous learning skill [2]. Hence ML refers to the set of techniques meant to deal with huge data, collected from IoT sensors in the most intelligent way in order to derive actionable insights [3]. There are three major types of ML algorithms (i) Supervised (Task driven) (ii) Unsupervised (Data Driven) (iii) Reinforcement learning (learns to react to an environment) [4]. The dataset is used as an experimental basis. After the data processing it is divided into training dataset and testing dataset.

In the proposed system the environmental parameters such as temperature, humidity, rainfall with soil characteristics like ph, N, P,K contents of soil are being considered to suggest a suitable crop to the farmer. The proposed system is implemented in python using machine learning classification algorithms. The aim of this is model is to provide more accurate information about the crop cultivation for the particular soil type and climatic conditions.

II. LITERATURE SURVEY

Champaneri, Mayank implemented a model for predicting the crop yield in advance of its harvest would help the policy makers and farmers for taking appropriate measures for marketing and storage. Random forest is the most popular and powerful supervised machine learning algorithm capable of performing both classification and regression tasks [5]. Jeevan Nagendra Kumar, Y. et al. implemented a system to predict crop production from the collection of past data. Using data mining techniques crop yield is predicted. Random Forest algorithm is used for predicting the best crop yield as output. In agriculture field, the crop yield prediction is mostly appropriate[6]. B S, Anisha, and Ramakanth P. Kumar implemented smart agriculture for maximizing agricultural farm water supplies, crop prediction, and wild animal prevention. Depending on the level of soil moisture, the system can be used to turn the water sprinkler on / off, thereby making the process easier to use[7]. Kalimuthu, M., P. Vaishnavi, and M. Kishore used Naive Bayes, a supervised learning algorithm to predict the crop at high accuracy. Using seed data of crop is used with the appropriate parameters like temperature, humidity and moisture content, which helps the crops to achieve a successful growth. In addition the authors developed the software, a mobile application for Android is being developed[8]. Yamaç et al. evaluated the performance of deep learning (DL), artificial neural network (ANN) and k-nearest neighbour (kNN) models to estimate field capacity (FC) and permanent wilting point (PWP) using four combinations of soil data. The DL, ANN and KNN models are compared with the previous published pedotransfer functions (PTF)[9]. Kavita, and Pratistha Mathur presented research shows several existing models that consider elements such as temperature, weather condition, performing models for the effective crop yield prediction. In the experimental study they showed the combination of ML with the agricultural domain field for improving the advancement in crop prediction. Most of the existing models utilized neural networks, random forests, KNN regression techniques for CYP and a variety of ML techniques were also used for best prediction[10]. The research work done by Pant J et.al. shows the different machine algorithms are used to predict crop yield in India. Researchers have used the data set for making prediction for four primary crops such as potatoes, rice, wheat and maize. The decision tree Regressor achieves highest accuracy to predict crop yield[11]. M. Keerthana et al. have implemented a system for crop yield prediction from formerly collected data. This has been settled with usage of some of the machine learning techniques. In this study Ensemble of Decision Tree Regressor with AdaBoost Regressor is used to predict the outcome with increased accuracy rate[12]. D. J. Reddy and M. R. Kumar explored various ML techniques utilized in the field of crop yield estimation and provided a detailed analysis in terms of accuracy using the techniques. The research shows several existing models that consider elements such as temperature, weather condition, performing models for the effective crop yield prediction[13]. Paper presented by S. Vaishnavi et al. depicts many Machine Learning techniques have been used to analyse the agriculture parameters. Proper prediction of crops can be informed to agriculturists in time basis[14].

III. METHODOLOGY

The farmers get suggestions about the crop selection based on contents of the soil and the environmental conditions. In this paper four different classification algorithms such as decision tree, support vector machine, KNN, random forest are used to develop the crop recommendation model. Dataset of soil with the features is used to train the model. Further model is evaluated and performance analysis of model against these algorithms is done. The overall working of the proposed system is depicted in Fig. 1

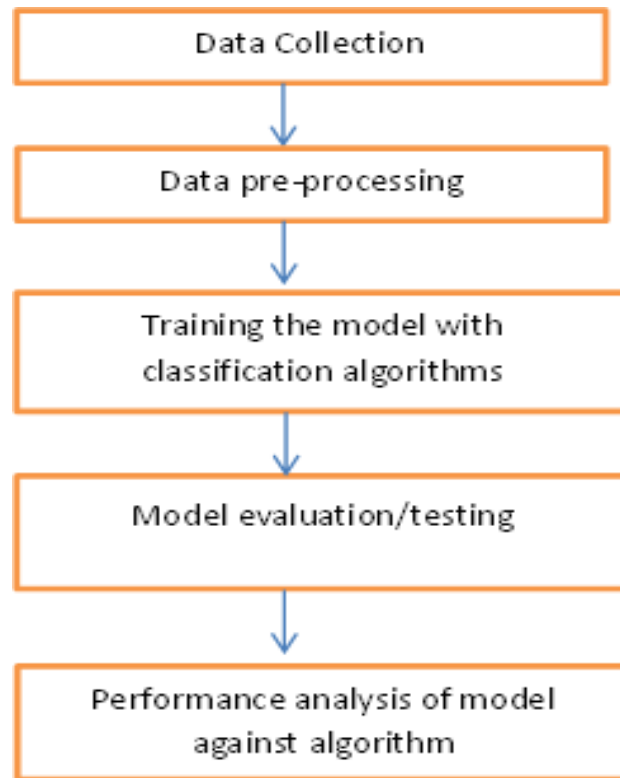


Fig. 1. Workflow of the proposed system

1.1 Data Collection

The experimental data is collected from Kaggle repository. The dataset contains the N, P,K contents of soil, temperature, humidity, ph and rainfall as independent features. Label is a dependent variable showing 22 types of crops . Each label has 100 values . Dataset contains total 2200 instances.

1.2 Data Pre-processing and Exploratory data Analysis

Preprocessing of data is very important in machine learning. Preprocessing involves dealing with the missing values, incomplete, inconsistent and duplicate data values. Exploratory Data Analysis is an approach in analyzing datasets to summarize their main characteristics, often using statistical graphics and other data visualization methods[15].In this phase dataset is pre-processed by checking null values and applying scaling and normalization on it. After pre-processing the data, it is divided into training and testing parts. Training data is used to train the model and testing data is used to evaluate the model. Table 1 shows the few samples from dataset.

N	P	K	temperature	humidity	Ph	rainfall	label
51	56	18	28.127878	64.209777	6.706506	70.863408	blackgram
63	50	52	28.645556	93.226426	6.751748	115.816394	papaya
94	26	27	26.366299	52.257385	7.456460	177.317616	coffee
86	37	16	20.517168	59.212355	5.561511	67.610137	maize
29	78	25	19.959917	59.331578	5.982855	195.787103	pigeonpeas
57	64	55	26.683865	92.958541	6.583760	62.506897	papaya
69	51	23	22.217382	72.854628	6.801639	106.621316	maize
26	80	18	19.325096	23.333479	5.581022	104.778395	kidneybeans
1	35	34	30.793757	46.695368	6.273398	92.213186	mango
90	86	52	25.850370	81.955805	5.793260	119.085617	banana

Table 1. Sample data from dataset

1.3 Implementation of Machine Learning Algorithm on Dataset

Before deciding the best model for crop recommendation it is necessary to evaluate each model by its performance. In this phase supervised machine learning-classification algorithms such as Decision Tree, K-nearest neighbor, Random Forest and support vector machine are used to train the model.

1) k-Nearest Neighbors.

The k-NN algorithm is the simplest machine learning algorithm. Here 'k' is the number of neighbors. Building the model consists only of storing the training dataset [16]. To make a prediction for a new data point, the algorithm finds the closest data points in the training dataset—its “nearest neighbors” using Euclidian distance measures Formula as eq.1

$$\text{Dis}(A,B)=\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Fig. 1 depicts the training and testing accuracy of model for 1 to 10 value of k for the given dataset. From Fig. it is clear that if the value of k is 5 then better accuracy can achieved with minimum training and testing accuracy difference.

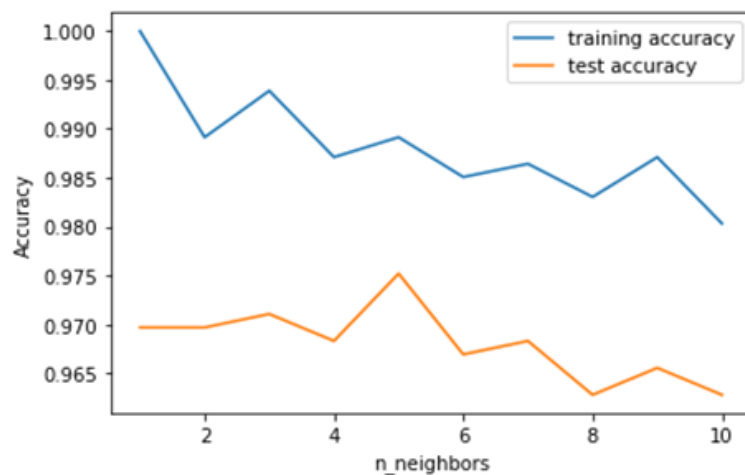


Fig. 2. Training and testing accuracy of k-Nearest Neighbours

2) Decision tree.

Decision trees are widely used models for classification and regression tasks. Essentially, they learn a hierarchy of if/else questions, leading to a decision [17]. Using decision tree algorithm on the experimental dataset ,the accuracy on the training set is 100%, while the test set accuracy is much worse. This is an indicative that the tree is overfitting and not generalizing well to new data. Therefore, we need to apply pre-pruning to the tree. If `max_depth=3` is set then it decreases overfitting. This leads to a lower accuracy on the training set, but an improvement on the test set.

Feature importance rates how important each feature is for the decision a tree makes. It is a number between 0 and 1 for each feature, where 0 means “not used at all” and 1 means “perfectly predicts the target.” The feature importance always sum to 1 fig.3 shows the feature importance of the seven features from the dataset.

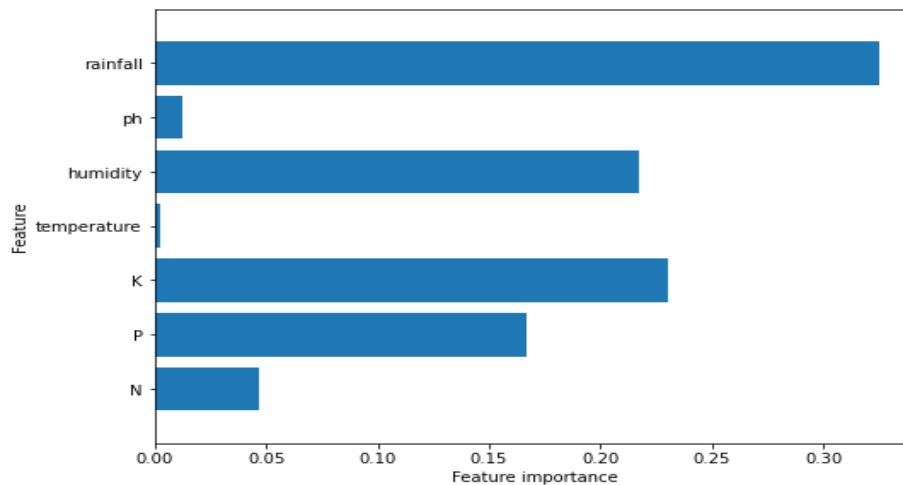


Fig. 3. Feature importance for decision tree

3) Support Vector Machine.

SVM model is basically a representation of different classes in a hyperplane in multidimensional space[18]. Support vector machines classify data by finding the hyperplane that maximizes the margin between the classes in the training data. The hyperplane will be generated in an iterative manner by SVM so that the error can be minimized. The goal of SVM is to divide the datasets into classes to find a maximum marginal hyperplane (MMH)[19]. For the given dataset the Linear Kernel Accuracy is 0.99, Rbf Kernel Accuracy is 0.31 and Poly Kernel Accuracy is 0.96. To increase SVC Linear model accuracy parameter tuning is used which gives 0.97 accuracy. From this it is clear that Linear kernel also gives satisfactory results but fine tuning increases the computation and might be inefficient in some cases. The accuracy can be increased in poly kernel by tweaking parameters but might lead to intensive overfitting.

4) Random Forest.

Accuracy of the model for given dataset is improved by use of Random Forest classifier. Random forest contains multiple decision trees and compute the average to improve the accuracy[20].The final output depends on the maximum votes of predictions from each tree, instead of relying on one decision tree. Fig. 4 depicts the feature importance of the seven features. Less important feature can be omitted to improve the accuracy of the model. For the given dataset random forest gives maximum accuracy that is 99 percent. The overfitting problem is prevented. The greater number of trees in the forest leads to higher accuracy.

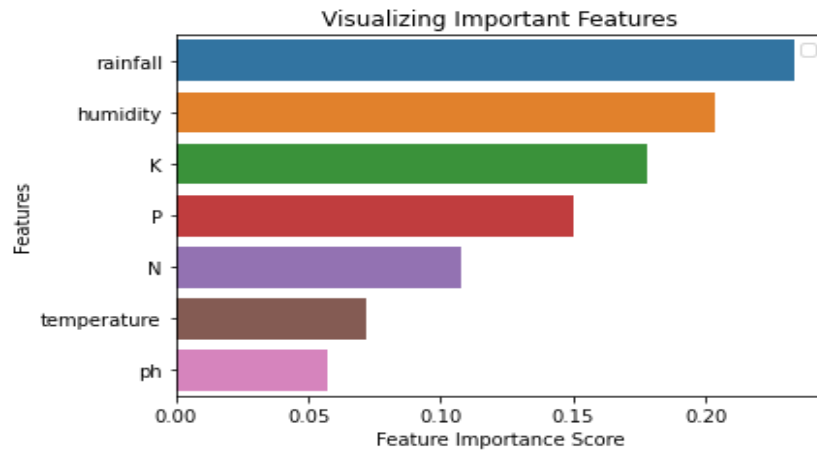


Fig. 4. Feature importance for Random Forest classifier

Fig.5 depicts the accuracies achieved on the soil dataset using four types of classification algorithm such as SVM, Decision tree, Random Forest and KNN classifier.

	Model	Accuracy
0	SVM	0.975207
1	Decision Tree	0.972452
2	Random Forest	0.993113
3	KNN	0.975207

Fig. 5. Accuracies of four classifiers

IV. CONCLUSIONS

The study carried out for prediction of suitable crop by using machine learning models shows the accuracy of models and how to control model complexity. For many of the algorithms, setting the right parameters is important for good performance. From the dataset it is seen that KNN gives better accuracy for optimal value of K. For Decision tree, model performs well if max depth and n_estimator are important to fine tune otherwise trees will be densely graphed which will be a classic case of overfitting. Max_depth=4 and n_estimators=10 gives pretty much satisfying results by making sure model is able to generalize well. For SVM, linear kernel has better results than rbf kernel and poly kernel SVM. The random forest gives us an accuracy of 99%, better than the linear models or a single decision tree, without tuning any parameters.

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Harmonizing Emotional Intelligence Through Meditation: An Ethical and Social Responsibility For 'Making New India'

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ABSTRACT

Our country is the fastest growing economy in the world, according to the growth ratio our purchasing power parity (PPP) is increasing. This growing economy expecting more active participation from us, this is resultant into increasing competition, expectations and different emotional problems among us. To become a part of the growth and competition we have opted the different life style, food habits, social changes, and demographic changes. According to the various behavioral studies these are the major causes of creating anxieties, stress, various health issues, effect on academic performance and unbalance emotional frustration, which is resultant into increasing suicidal cases in India. According to the record around 40,000 students' committed suicide cases in last five years.

The main challenge is how to fit ourselves according to these changes and how can we stable our emotional intelligence. This research paper will focus on the importance of emotional intelligence in our day to day life, how we can achieve balance emotional intelligence through meditation, how can we reduce stress and how it can be a helpful tool to write a success story of a New India.

Keywords: Emotional Intelligence, Meditation, stress management

I. INTRODUCTION

It is a generally accepted scientific theory that human beings are social animals and are empowered with intellectual capabilities, which is constantly influencing them to better their ways of living. This means that every person has to function within the norms set by society in general, and his immediate circle in particular. While functioning within these boundaries he/she has to fulfill his/her aspirations along with the activity of earning his/her lively hood. Therefore over long years of civilization, we have developed a very complex structure of society, which is fragmented in many ways. Depending upon the parameters of culture, profession, caste, creed, religion etc. Similarly a business executive has to meet his/her career aspirations, company commitments, family obligations and social expectations. Women have to meet the job commitments, stringent family commitments, and social bindings. As the world moves on the population grows, trying to get their share of the limited resources. This is compounded by the growing aspirations of individuals, groups, states, countries, being Influenced by technology, mass media, and so on. The direct result is an increased state of

competition, between individuals, groups, and countries at all conceivable levels, including society. The result: high pressure... but the show must go on and we continue to do our work and try to meet our obligations over prolonged durations.

II. PROBABLE CAUSES

Today's world of increased aspirations of the individual and highly competitive environment compounded with an ever increasing phenomenon of recession has pushed the individual against the wall.

He/She works against tremendous pressure without being sure of the results of his/her efforts. This leads to the situation of stress. Today stress is an irrefutable reality!! A reality from which there is no escape. So the only option is to attempt to manage it . The medical science is aware of the innumerable and often fatal diseases resulting from stress.

Our is a restless age- an age where rapid changes in technology are causing a breakdown of old values and fragmenting our personality. The result of this is tremendous psychological disturbances, stress and tension. Happiness seems to be eluding us and we are constantly seeking answers. In the name of religion people of different countries and communities are waging a war amongst themselves.

III. SOCIAL COST

If one evaluates one's current situation or the general situation in society , it is obvious that all is not well. There is a rapidly increasing situation of poor health , violence, crime, etc.

IV. STRESS AND EMOTIONAL INTELLIGENCE

Stress is anything that causes fear, anxiety , worry , apprehensions, anger and even excitement when we face difficult situations in daily life, whether mental or emotional. Continuous efforts to cope with such situations have adverse effects on human systems for want of relief from mental and emotional strains and it leads diseases.

Emotional Intelligence

According to the Oxford English Dictionary, emotional intelligence is:

The capacity to be aware of, control and express one's emotions, and to handle interpersonal relationships judiciously and empathetically; emotional intelligence is the key to both personal and professional success.

Although emotional intelligence, as a term, is claimed to have been created by Peter Salovey and John Mayer in 1990 [Perceiving Affective Content in Ambiguous Visual Stimuli: A Component of Emotional Intelligence, 1990 and Emotional Intelligence: Imagination, Cognition, and Personality, 1990], the origins can be traced back to 1964 when it was first mentioned by Michael Meaning in Three Modes of Communication, The Communication of Emotional Meaning]. Whilst emotional intelligence and understanding your own emotions better attributes to remaining calm, EI is not, in itself, calmness; it is not happiness, optimism, agreeableness or other personality traits. Emotional intelligence is the insight into and understanding of how your emotions can positively, or negatively, impact your life and capacity through your behavioural skills. EI is the process of

recognition and assessment. It's not a term that represents a state such as blissful happiness or contentment. EI is awareness.

“Emotional intelligence, as we described it, is the capacity to reason about emotions and emotional information, and of emotions to enhance thought.” John D Mayer Ph.D. Beldoch [Sensitivity to Expression of Emotional meaning]

V. WHEN STRESS IS HARMFUL

By itself stress never causes a problem. It is the way one responds to stress which leads to problems. The response is generally in three stages:

Alarm - In the face of a challenge or a threat, the nervous system is highly stimulated, heart rate increases, muscles become tense, and breathing becomes fast. The body system is now ready to fight or flee.

Resistance - If the cause producing the stress continues the body chemistry adjust to that situation (i.e. steady flow of adrenal and other glands secretion and in order to keep the body at a more easily maintained level of arousal during the time needed to fight or get away.

Exhaustion - If the challenge continues for a long time, the resources for arousal and resistance are used. They are involuntary physical responses to stress for which built-in mechanisms exists in the human body. Even imagining or thinking about an upcoming situation may trigger these.

So long as the problem is solved and we are able to rest, even the acute effects of stress are not dangerous to a healthy person. Due to repeated occurrences of emergencies, the person has to pass through the stages of alarm and resistance time and again in the accumulated pressures causing exhaustion, diseases or emotional problems, leading to fall in performance levels, productivity and strained relations within the family and at workplace. Some times, however, a person may even get withdrawn into a depression. These are chronic effects of stress, which are the signals that life style or work habits should be adjusted before worst problems emerge. Hence the importance of effective stress management.

VI. METHODS

A systematic review of peer-reviewed publications was carried out to summarise the information on the impact of emotional intelligence and the academic performance of the students. Google Scholar were searched with an intention to ensure that, most literature in the field could be identified, while keeping focus on literatures of greatest pertinence to the research objective

Objectives of the study:

Objectives of the study:

1. To study the impact of emotional intelligence.
2. To study the effects of mediation on emotional intelligence.

Hypothesis:

Meditation reduce stress and balanced emotional intelligence

VII. IMPACT OF EMOTIONAL INTELLIGENCE

Emotional intelligence effects on the different areas of our life. it is indicated by various studies take place on emotional intelligence that it effects on academic performance of students', workplace of the institute , al. (2004) perceived organizational performance outcomes as management rating of employees' performance, employees' innovation, and employment relations.

A. Impact of emotional intelligence on academic performance of students:

Students are viewed as leaders of tomorrow and are expected to perform various roles with competence and efficacy. It is essential to develop the level of emotional intelligence right from the schooling as they have to get along with other people and to get things done through and with people. They should develop a right attitude towards working with people and be equipped with emotional intelligence to handle the intricacy of life. Our 15th and current Prime Minister of India Narendra Damodardas Modi is having a positive approach towards developing more Dr. Aruna entrepreneurs under various schemes like Make in India, which demands more level of emotional intelligence among the students who are the backbone of the future Indian economy. There is an impact of emotional intelligence on the academic achievements of the students in general and college students in particular. It is proved by the various studies that there is a positive relationship between emotional intelligence and academic achievement among students.

Kolachina (2014) in his studies examines the relationship between emotional intelligence and academic achievement of expatriate students. The findings of the study reveal positive relationship between emotional intelligence and academic achievement among expatriate students. The research reveals that the level of emotional intelligence of the students has an influence with high and low academic achievement motivation among the students. ArockiaMaraichelvi, Sangeetha Rajan (2013) in their study shows that Emotional Intelligence (EI) has been considered as a successful predictor of academic success/performance/achievement. Researchers have claimed that EI predicts success at schools, and colleges/ universities.

B. Impact of Emotional Intelligence on Employees' Performance:

Huselid (1995) found that human resource practices influence various aspects of organizational performance, including turnover, productivity, and corporate financial performance. Delaney and Huselid (1996) and Lai and Cheng (2005) considered perceived market performance and productivity performance as an important index of organizational performance. Furthermore, Guest et .

C. Impact of Emotional Intelligence on stress management:

Emotional intelligence is emerging as valuable competence for work and life performance. EQ helps improve performance by mitigating the negative effect of stress. (Lorenzo fariselli, Joshua freedman 2008). The intertwined relationship between occupational stress and emotion has also been proposed to play a role in stress-out comes relationship. Utilizing EI was related to the experience of occupational stress and to outcomes of occupational stress such that employees who reported using EI were less likely to report feelings of stress. (Lisa Gardner, 2005).

VIII. MEDITATION IS AN EFFECTIVE TOOL FOR STRESS MANAGEMENT AND IMPROVING EMOTIONAL INTELLIGENCE



A number of ways have been evolved over the years to tackle stress. Meditation is the best relaxation technique. In Sahaja yoga, the regular practice of meditation, after the self-realization, can bring necessary additional change as the person is evolved leading to a balanced outlook toward events and situations a person has to face in daily life.

In fact, as Shree Mataji Nirmala Devi says, "We are waging war with ourselves, with our very being, how can we get peace? We make everything false in the name of truth, how can we discover light?"

Self-realization is the only way you can get the lightin.

Sahaja Yoga is a simple technique of self-realization, wherein the dormant energy, which is inborn within you, is awakened and connected with the all-pervading cosmic energy.

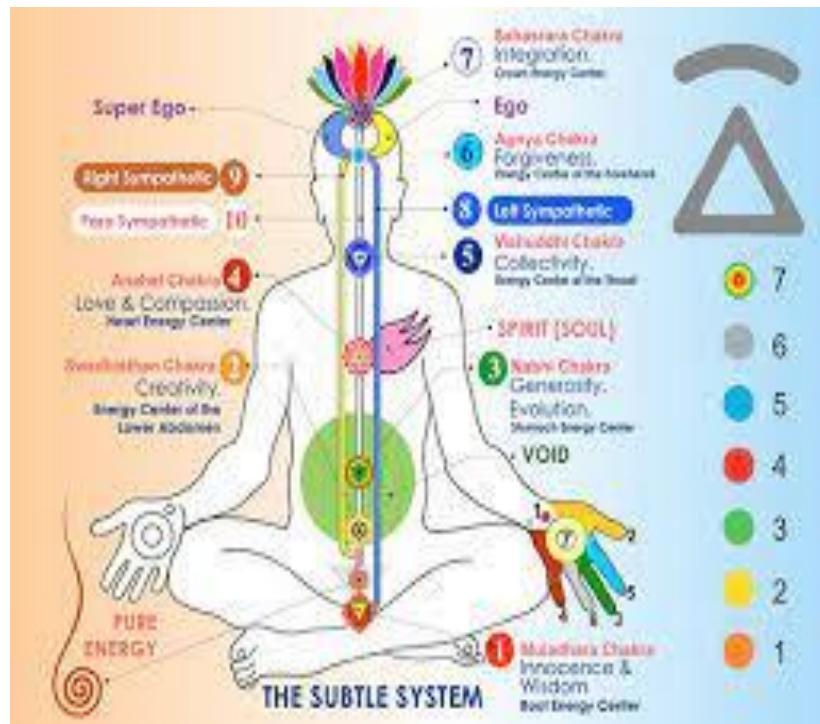
Sahaja Yoga is the gift of Shree Mataji Nirmala Devi to humanity. Self-Realization is the final aim of human existence. It is an empirically verifiable scientific method that explains how the very desire for becoming united with the Absolute is built within us as Kundalini.

In the human nervous system there are different subtle centers, called chakras and they control the physical, vital, mental and spiritual well being of an individual.

its innate ability to heal, renew, balance and recycle.

The chakras represent the different stages of evolution and within each chakra resides the particular qualities of the Absolute. The understanding of the delicate functioning of these chakras and the connection of the individual with his own Spirit is the aim of all Yoga.

Recent research conducted on varied groups of individual Sahaja Yoga meditators has revealed that the practice of Sahaja Yoga is accompanied by decrease in tension, anxiety, depression, neuroticism and hypertension. With meditation there is an experience of inner peace and harmony and one moves in the direction of greater self-control, self-awareness, actualizing one potential and thus moving towards happiness.



IX. CONCLUSION

Sahaja yoga meditation brings about equilibrium between the sympathetic and Para-sympathetic nervous system response in the process knocking down the sympathetic dominance usually seen in stressful situations, and thereby helps prevent stress disorders.

The technique is simple- it is a way of activating a mechanism- the Kundalini- which is the divine energy that lies dormant at the base of the spine. This mechanism is the moving force of our enlightenment and is a living force, which seeks self-organization, self-regeneration and ascent. Through self-organization it sustains and protects the human system. Self-regeneration is And, ascent is its ability to transcend the mind and body and to attain collective consciousness.

Until recently the process was not available to ordinary human beings. But Shree Mataji Nirmla Devi has perfected a way to lead mankind into its next step of evolution. By Her extraordinary spiritual powers She has made this possible for each one of us. Sahaja yoga technique is spontaneous and effortless which can be practiced by anybody irrespective of their background, religious beliefs or way of life.

One who practices Sahaja Yoga meditation, finds himself move into a different dimension which enables him to harness the unused sectors of the brain. Once this happens, a new supply of energy is available to us. The actual experiences of people moving into this level of functioning are a feeling of total inner silence, complete health and well-being. There is thoughtless awareness and the person feels a cool breeze of vibrations on the head and on the palms of the hands.

This is important to balance our emotional intelligence to resolve our stress . if we are believing on making new India, it is our ethical and social responsibility to move ourselves towards good mental and physical health. Our betterment of life and developing new India Meditation is the intelligent solution.

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Ethics and Social Responsibilities

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ABSTRACT

Ethics: a branch of philosophy that involves systematizing defending and recommending concepts of right or wrong. Talking about Social Responsibility; refers to an individual or corporate world to fulfill basic duties and once taken in to action will benefit the society. Students are taught about these basic responsibilities since childhood which they reflect in the society from time to time, whether in school, college, society or corporate world. Students' Ethics are the responsibility that we take for our actions and decisions, raising concerns about anything that is not ethically right or socially acceptable. It also adds to practice integrity by being honest and truthful, acting within law. This also includes Intellectual freedom; We as a part of the society protect freedom of expression and free speech. Further talking about Social Responsibility as a company manager: the manager makes decision to maximize profits and protect the interest of community and society as a whole. Secondly he as a manager provides time for employees to support their own social initiatives can also build pride, loyalty and motivation amongst team members. Talking in wider sense Social Responsibility is defined as operating a business in manner that meets or exceeds the ethical expectations that society has for us.

I. INTRODUCTION

Ethics refers to a set of moral principles that helps to govern an individual or a person. Initially talking about an individual: he/she can be any person from society. It is always a question that when is the correct time for an individual to learn ethics or being a socially responsible person. For me he/she should inculcate it from very beginning of his/her life. This is the responsibility of parents and teachers to work on this part rather than only sticking on hard skills. A personality is truly an impressive personality when he/she has soft within.

Nowadays it's a compulsory to learn Ethics, in fact a trend to understand social responsibility. If we peep into past of a few decades earlier it was inculcated within us since childhood. Our parents and teachers were the major reason behind the Ethical Personality that we are today and are thankful to them for we are socially responsible today. Being a faculty we too are carrying the same legacy and offering the same to our kids; our students. Making this sure that they will definitely be promising personalities in the future, not only as a student but also as a corporate person or a businessman. This begins at home and school.

How can it start from school to higher school?

Teacher can help their students to understand and learn to share and care in the community.

- Initially students can volunteer for various tasks within the classroom or any competition.
- Further, when they learn the responsibility to lead they should be given a chance to know the importance of social responsibility which is providing them with resources and keeping them informed about them informed about them and their importance like providing them access to websites and teaching ethical ways to learn and be cautious about cyber crimes and securities, pros and cons of social media, sitting and reading in library and having access to different subject books and other information resources that the environment and social impact of consumer products.
- As student enters higher school they should be provided with those targets which are related to environmental concerns. Further they should be encouraged to make the environment better and should be given a chance to know how and why to make it better to get these answers, certain competitions should be organized like elocution, debates, etc.

Above all... they should be encouraged to follow etiquette and manners and soft skills.

When talking in terms of IT sector students should be encouraged to learn the responsibility towards the sector.

The world is progressing and the IT sector is a promising sector for the development of our nation.

And students choose this sector as their career. Once they enter this sector the working environment is challenging where they have to face many challenges like hacking and cyber crime. Here, when they are already inculcated with such ethics where they understand their social responsibilities they are encouraged from hacking to ethical hacking, cyber crime to cyber security. Further in CSR they play a role of major asset for the nation.

Corporate Social responsibility in IT industry:

The CSR in any industry depends on its corporate governance policy. The CSR provided by IT companies like Infosys, TCS and Wipro are towards social development.

Future Scope of this work may be more on focusing the corporate governance policy and real implementation. The actual implementation reflects current status.

In case of different IT industries, the cost of Licensing is a standard. But Open Source is another aspect where these companies can build application for education and promoting NGOs, small and medium enterprise as open source at low cost or free of cost.

The term "Open Source" was given a big boost at an event organized in April 1998 by technology publisher Tim O'Reilly. Originally titled the "Freeware Summit" and later known as the "Open Source Summit", the event brought together the leaders of many of the most important free and open source projects, including Linus Torvalds, Larry Wall, Brian Behlendorf, Eric Allman, Guido van Rossum, Michael Tiemann, Paul Vixie, Jamie Zawinski of Netscape, and Eric Raymond. At that meeting, the confusion caused by the name free software was brought up. Tiemann argued for "source ware" as a new term, while Raymond argued for "open source." The assembled developers took a vote, and the winner was announced at a press conference that evening. Five days later, Raymond made the first public call to the free software community to adopt the new term. The Open Source Initiative was formed shortly thereafter.

Some Important foundations working for promoting "Open Sources" are-

- The Eclipse foundation,
- The linux Foundation

- The free Software Foundation
- The Mozillia foundation
- OASIS
- Python Software Foundation
- Cloud Native Computing Foundation
- Digital freedom Foundation
- The document foundation, etc.

Social responsibility in business world:

Open and productive two way communication with corporate sectors whether it's with stakeholders, business partners, delegates not only improves the company's reputation but also opens up new business opportunities.

Advantages of such Social Responsibilities:

- Gives company a competitive edge
- Attract strong candidates and increase retention
- Makes your business attractive to investors
- Improve business culture
- Improve company reputation
- Improves profitability and value

These advantages can be enjoyed when a businessman carries those ethics and feel socially responsible.

Examples of Social Responsibilities in corporate world:

- Charitable giving and volunteer efforts,
- Changes to company policies to improve or benefit the environment.
- Improve labour policies and embracing trade fare.

II. CONCLUSION

Talking about the Ethical journey that leads to Social Responsibilities since childhood to corporate world is all in hands of us: "We as a Parents, We as a Faculty, We as a Society." Nowadays we are forgetting this responsibility and are just the part of rat race, where all are after earning name and fame. Our ideals are shifted from Chanakya, Rabindranath Tagore, Sardar Vallabhbhai Patel, Bhagat Singh, Gandhi, Milkha Singh, Dhyan Chand to celebrities. Talking in terms of CSR; the scope is conceptually unbound in practical scenario. The shift from childhood to higher School, from higher school to corporate world is significant. This includes the debate between private sectors, civil sectors and government. All these focuses on this major issue. CSR is not limited to single issue of economical condition but also on Social and Environmental progress. Hence mind set is needed to put emphasis on doing things because they are Ethically right and just not only because its increasing economical wealth where as it's the main factor which is developing mankind. Therefore we need to start this from very beginning of life of the bright future of our nation.

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Image Processing and Modification for Improving Perception of Color-Blind Viewers

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ABSTRACT

About 8% of men and 0.5% women in world are affected by the Colour Vision Deficiency. As we observe the statistics, we can find that there are nearly 200 million colour blind people in the world. CVD affects their ability to effectively execute color and visualization-related tasks. A colour vision deficient will not be able to attain every critical aspect of information present in the image or video. But with the help of Image processing, many methods have been developed that can modify the image and make it suitable for viewing by the person suffering from CVD. This paper focuses on some of the methods of modifying images such that viewers suffering from deuteranopia are able to better perceive image detail and color dynamics.

Keywords: Deuteranopia, Dichromacy, CVD, LMS Daltonization, RGB Color Contrast, LAB Color Correction.

I. INTRODUCTION

In last few decades, multimedia has significantly increased the use of colors to convey the information. The Color vision deficient people cannot distinguish the multimedia contents as a normal person can do. As stated by William Woods[1], Color blindness affects roughly ten percent of humans. About ninety-nine percent of this ratio suffer from some sort of red-green deficiency, where a person cannot differentiate efficiently between red and green. Dichromacy is a general term for a person's lack of ability to perceive one of these three wavelengths.

Types of color blindness:

A. **Monochromacy** -If there is no cone or only one type of cone present at retina of eye then it is called Monochromacy. In Monochromacy, person is not able to see any color other than black, white and gray.

- B. *Dichromacy***- If there are only two types of cones present at retina of eye then it is called Dichromacy. In Dichromacy, any one type of cones is missing. So the information about that particular wavelength is lost. Dichromacy is again of three types according to the missing cone:-
- 1) *Protanopia*
 - 2) *Deuteranopia*.
 - 3) *Tritanopia*
- C. *Anomalous Trichromacy***- In this condition all the types of cones are present but they are not aligned properly. Hence, the sensitivity to a particular color is reduced. Depending upon which cone is not aligned properly it is further divided into:
- 1) *Protanomaly*
 - 2) *Dueteranomaly*
 - 3) *Tritanomaly*

In this paper, we have focused on deuteranopia, a type of dichromacy where the patient does not naturally develop “green”, or medium wavelength, cones in his or her eyes. For this we have considered three algorithms for image processing; : LMS daltonization, Color contrast enhancement, and LAB color adjustment. Two separate processing algorithms are also included to evaluate the effectiveness of these adjustment techniques. We simulate deuteranopia on both the original and processed images to see effects of algorithm from the perspective of a color blind viewer. We calculate the delta E value between the two images in order to assess how greatly the image changes from the perspective of a non-colorblind viewer. Color contrast enhancement provides the greatest advantage to color blind viewers, but also changes the image most significantly for non-color blind viewers. LAB coloradjustment has the least effect in both cases, and LMS daltonization falls in between the other two techniques.

II. LITERATURE REVIEW

This report presents the techniques of simulation and modification to solve the main limitations of the basic techniques. Both techniques were successfully integrated into a visualization system, which allowed the practical validation of its results. Both works were published in visualization journals (MACHADO; OLIVEIRA; FER NANDES, 2009; MACHADO; OLIVEIRA, 2010).

III. PROPOSED SCHEME

Approximately 200 million people worldwide are affected by Color vision deficiency (CVD),compromising the ability of these individuals to effectively perform color and visualization-related tasks. This has a significant impact on their private and professional lives.This project presents a model for simulating color perception. Besides modeling normal color vision, it also accounts for the hereditary and most prevalent cases of color vision deficiency (i.e., deuteranopia).This model is based on the stage theory of human color vision and is derived from data reported in various studies. It is a model to efficiently consider normal color vision and dichromacy in a unified way.

The proposed model was validated through an experimental evaluation involving groups of color visiondeficient individuals and normal color vision ones. It can provide insights and feedback on how to improve visualization experiences for individuals with CVD.This report also presents an image-recoloring technique for enhancing color contrast for dichromats.

Unlike previous approaches, this technique preserves temporal coherence and, so it is suitable for image recoloring. This project demonstrates the effectiveness of the proposed technique by integrating it into a visualization system and showing high-quality recolored visualizations for dichromats.

IV. IMPLEMENTATION

I. SIMULATING DEUTERANOPIA

In order to assess the effectiveness of the algorithms, we have to simulate an image through the eyes of a person suffering from deuteranopia[7]. A simple conversion method can be considered where the image is first converted into the LMS color space. Theimread function of Matlab reads images in the RGB color space, so we convert it from RGB to LMS.

This is a simple linear matrix multiplication operation.

$$\begin{matrix} L & 17.8824 & 43.5161 & 4.11935 & R \\ M = & 3.4565 & 27.1554 & 3.86714 & * G \\ S & 0.02996 & 0.18431 & 1.46709 & B \end{matrix}$$

This operation is applied to every pixel of the image and it results in a new set of pixels whose information is now defined for the LMS color space. Now the image exists in the LMS color space, we remove information associated with the M cone and replace it with information perceived by L and S cones[7]. It can be seen below that the M information is removed, however the M component of the new pixel is not empty. It is filled with a proportion of information from the L and S cones because that M light is seen by the eye but perceived as being from the L and S wavelength bands instead. This requires another matrix multiplication operation.

$$\begin{matrix} L_{deut} & 1 & 0 & 0 & L \\ M_{deut} = & 0.49421 & 0 & 1.24827 & * M \\ S_{deut} & 0 & 0 & 1 & S \end{matrix}$$

The medium wavelength information has been removed from the image and the new M pixel is filled appropriately, thus deuteranopia has been simulated. In order to view the results, we simply convert back to the RGB color space by performing matrix multiplication again on each LMS pixel where the matrix is the inverse of that found in above equation.

II. DELTA E

The second tool required for assessing the impact of color blindness compensation techniques is Delta E. Delta E is a popular metric for measuring color difference. We choose this metric in order to help determine the extent to which the algorithm in question changes the original image, i.e. negatively affecting the image as seen by viewers without color blindness. The Delta E algorithm is another simple operation, calculated for each pixel of an image. This function takes into two images in order to evaluate the color difference between them. Both images are first converted from RGB to the LAB color space. Matlab has a built in function which allows the user to convert between these two color spaces; no such function exists for the prior RGB to LMS

conversion. LAB pixel values hold lightness, L, and color coordinates A and B, based on a compressed version of the standard XYZ colorcoordinate space. The actual Delta E value for each pixel is calculated as follows.

$$\Delta E = \sqrt{(l_2 - l_1)^2 + (a_2 - a_1)^2 + (b_2 - b_1)^2}$$

A recent study suggests that the Delta E value for a just noticeable difference is approximately 2.3. This will be worthy of consideration while assessing our results.

THE COMPENSATION ALGORITHMS

Many algorithms are designed to adjust images in such a way that color blind viewers are able to attain the detail originally lost due to their color blindness. However we choose to examine only these three in order to provide useful results while still maintaining a reasonably limited scope for the project. These ultimately strive to compensate for color blindness and each is performed in a different color space and thus provides some amount of theoretical diversity.

- A. *LMS Daltonization*
- B. *RGB Color Constrasting*
- C. *LAB Color Correction*

A. LMS Daltonization

LMS daltonization uses the information lost in the deuteranopia simulation in order to improve the original image. The lost information from the original simulation is converted from the LMS color space to RGB and then mapped to wavelengths perceptible to the viewer, in this case long and short wavelengths, mostly red and blue. This lost information, now shifted to colors the viewer can see, is then added back to the image. The fact to be considered is how to convert from LMS to RGB color spaces. The lost information, now as RGB pixels, is mapped using the following matrix multiplication.

$$\begin{pmatrix} R_{map} \\ G_{map} \\ B_{map} \end{pmatrix} = \begin{pmatrix} 1 & 0.7 & 0 \\ 0 & 0 & 0 \\ 0 & 0.7 & 1 \end{pmatrix} * \begin{pmatrix} R_{lost} \\ G_{lost} \\ B_{lost} \end{pmatrix}$$

It is clear that this operation does nothing to the lost red and blue information, but shifts the lost green partially into red and partially into blue. These new mapped RGB components are added to the original image. Finally, the image is checked and concatenated to ensure that no pixel value rises above one or below zero.

B. RGB Color Constrasting

This algorithm adjusts an image’s RGB values in order to enhance contrast between red and green and, in general, make green pixels appear to be bluer. The process begins by halving every pixel in the original image in order to provide room for pixel values to be increased. For each pixel, three operations occur. The first step is to increase the value of the pixel’s red component relative to pure red. Reds further from pure red are increased significantly while reds already very close to pure red are only marginally increased. The green component of each pixel is manipulated next by applying exactly the same logic as that used on the red components. Finally, for pixels that are mostly red, the value of the blue component is reduced. For pixels that are mostly green, the blue component is increased. The scaling values here are determined through experimental evidence found through trial and error with color blind subjects

C. LAB Color Correction

This algorithm modifies reds and greens of an image to increase color contrast and clarity for a color blind individual. This process is different from RGB Color Contrasting as it is performed in the LAB color space. The algorithm generally operates as follows.

The original image pixels are converted from RGB to LAB color space. The first operation is on each pixel's A component, where a positive A means it is closer to red and negative A means it is closer to green. Just as in RGB Color Contrasting, this A value is adjusted relative to its maximum, making positive values a bit more positive and negative values a bit more negative. Again, in each pixel the B component is adjusted relative to how green or red it is in order to bring out blue and yellow hues in the image. Finally, L, the brightness of the pixel, is also adjusted relative to the pixels A value. The image is converted back to the RGB color space and concatenated to ensure pixel values lie between zero and one. As with RGB ColorContrasting, this algorithm lacks clear theoretical basis. It is also based upon experimental procedures relying mostly on trial and error in the presence of a color blind viewer.

V. EXPERIMENTAL RESULTS

This study approaches different methods of modifying and adjusting images so that the persons suffering from dichromacy are able to better perceive image detail and color dynamics in a better manner[7].

The image to be considered is to be simulated and algorithms are applied. The algorithms include:

- a) LMS Daltonization,
- b) RGB Color Contrasting and
- c) LAB Color Correction.

For the purpose of implementation of the algorithms, we have considered an image of flowers.



Fig 5(a)

Fig 5(b)

The result of implementation of these methods is expected as shown above. Here the original image and image seen by a deuteranopia patient are shown in Fig 5(a) and Fig 5(b) respectively. The original image consists of different colors which are orange red, green, yellow and blue. It is observed that a normal person can distinguish these different colors but a person affected by deuteranopia can't distinguish red and green. So first

this original image is taken in RGB color space shown in Fig 5(a), then it is simulated so as to understand the perception of a deuteranopic viewer, it is shown in Fig 5(b).



Fig 5(c)

Fig 5(d)

Image adjustment technique is applied, through the Daltonization process, on original image, which is shown in Fig 5(c) and Fig 5(d) shows how it is seen by the CVD person.



Fig 5(e)

Fig 5(f)

Then the color contrast enhancement shown in Fig 5(e) has been done and perception of a deuteranopic viewer can understood by Fig 5(f).



Fig 5(g)

Fig 5(h)

After enhancing, the contrasted image is used for LAB color correction for the deuteranopia patients. The LAB color corrected image is shown in fig 5(g) and in the next step, the LAB color corrected image as seen by CVD viewer is shown in fig 5(h).

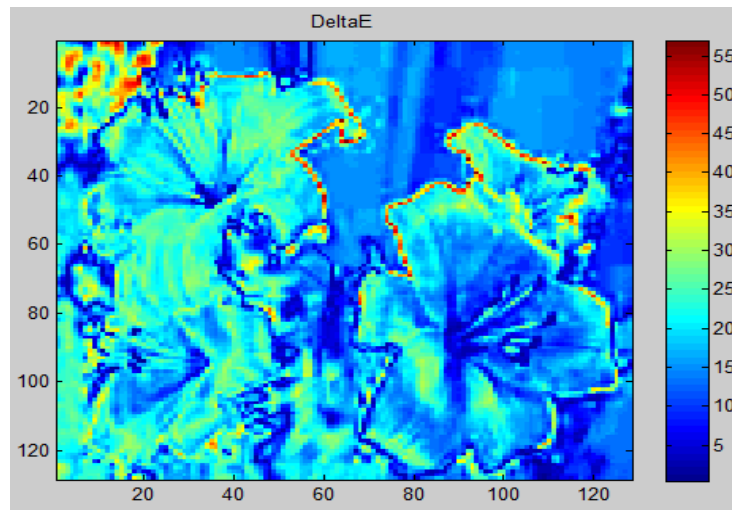


Fig 5(i)

A function Delta E is evaluated so as to know the difference between two images. In this case, we have considered the original image and the color contrasted image and we have evaluated Delta E in the image form as shown in fig 5(i). In this case, we have considered the original image and the color contrast image to obtain the Delta E image. This will provide us with the image difference between the two images taken into account. We can visualize the extent to which the original image has changed.

One can compare the three algorithms on the basis of efficient and clear perception of the CVD viewer. RGB color contrasting proves to be yielding better results as compared to Daltonization and LAB color Correction.

VI. CONCLUSION

The proposed paper proposes a novel Image Modification algorithm for people with CVD. This paper is expected to show how the contrasting technique changes the image drastically for both color blind and non-color blind viewers; it also compares this technique with daltonization and color correction methods. With the help of these algorithms, the CVD viewer will be able to perceive the information that was lost due to his colourblindness. This paper explores the effectiveness of different methods to improve their perception.

We have considered Images of the original, adjusted and simulated formats, as well as plots of Delta E for each algorithm. The effectiveness of color blindness correction algorithms might be best served by applying them to an Ishihara color blindness test, but we have chosen to explore its effects on an image. Hence, we have made the unconventional choice of testing these algorithms on the image. This analysis shows that the contrasting technique changes the image drastically for both color blind and non-color blind viewers. Any adjustment in an image, from the perspective of a non-color blind individual, is a change from the original artistic vision. However, the changes for color blind individuals are both good and bad. The clarity obtained after image modification is crucial and available only after applying the RGB Color Contrasting algorithm. LMS Daltonization affects the image only marginally for both viewers; the adjusted images require close inspection to notice differences. Finally, the color correction algorithm is even more benign as it barely affects the test image whatsoever. This project gives us the opportunity to see the world through the eyes of someone suffering from colorblindness and explores the effectiveness of different attempts to improve their world.

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Environment Protection and Sustainable IT

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ABSTRACT

Environment is a precious gift given to Human beings, its resources are finite and valuable, but due to increase in technology, we are directly-indirectly destroying environmental resources that are not regenerated easily, but improved technology is also a need of hour. The damage that environment is suffering through the enormous use of IT tools in the form of E-waste, itself find the solution to minimize this valuable loss of nature with the process of "Remanufacturing", i.e., the reuse E-wastage material to prepare new product that are equal to brand new and also to save our Environment.

Keywords: Environment, E-waste, Carbon footprint, Sustainable IT, Circular Computing,

I. INTRODUCTION

An Environment is the blending of various Biotic and Abiotic factors, where biotic factors include all flora and fauna, and abiotic include water, sunlight, land, air, rocks, climate etc. and also Humans are blessed with the huge treasure of metals and minerals.

Technology the word came from Greek tekne (technical, art, skill) and logos (knowledge), it is the set of knowledge, expertise, experience and method through which humans change, transform and use our environment to create tools, machines, products and services that meet our needs and desires, from last few years technology has rapidly increased way of thinking and ease of living, but under the name of technology we Humans are rapidly using and destroying our valuable asset our environment. We exhume large area of land for extracting metals and minerals, we cut huge amount of woodland to obtain wood, Human manufactured chemical compounds changed environment, and many of combustion products that produce carbon-di-oxide in environment. Our routine activities generate lot of wastes that are hazardous to our environment.

II. INFORMATION TECHNOLOGY

It is the use of computer and related device to store and access information as per need. It is the base of our communication, technological advancement, innovation, sustainability and recreation, Productivity, Management. It is the base of workforce of any organization.

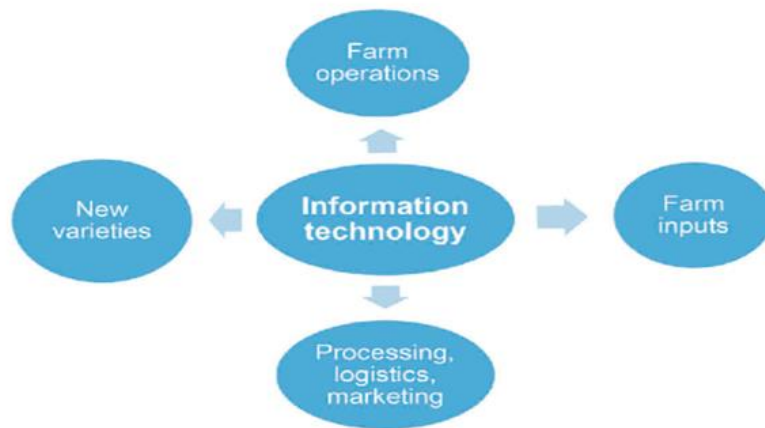


Fig 1. Role of Information Technology

III. INFORMATIONTECHNOLOGY SERVICES

Network: When two or more computers are connected wirelessly via cables, it comprises a network.

Compute: Through the method of computing, or data processing, is an important aspect of Information Technology. It helps in storing the data in the CPU.

Data Storage: The place where the information is stated somewhere safe without directly being processed. Storage solutions like solid-state drives and cloud storage databases are included in this drive.

Security: Cyber security helps institutions to protect their data and other technological assets to be saved from any unauthorized access.

Technical Support: This is used to fix hardware or software issues. Technical support primarily ranges from unlocking a laptop to solving network usage.

IV. IT AND E-WASTE

With rapid use of IT, we are facing the problem of E-waste. The E-wastes are non-biodegradable, toxic and amass in soil, water and living things-wastes are not only harmful to flora and fauna, but if not handled properly we will have a a momentous loss of limited and valuable raw materials, including precious metals, It is not easy to extract metal from E-waste

V. SUSTAAINABLE IT: NEED OF HOUR

Sustainable IT is also known as “Green IT”, where manufacturing, use, administration and discarding of E-waste done in such a way that it reduces its impact on the environment.

VI. SUSTAINABLE IT AND CIRCULAR COMPUTING

The laptop is an efficient and powerful portable computer just like a desktop computer, that make our daily business operations easier and more convenient, but sometimes due to more changing technical environment,

or laptop gets old we threw it away. From the study it is found that every year more than 272 million new laptops are manufactured. And every day 160 thousand old laptops are disposed of resulting in excessive resource consumption, climate change, pollution and e-waste. For manufacturing Laptop, we use several natural resources, which are extracted, refined and manufactured to turn them into Laptops. For manufacturing single new Laptop over three tones of CO₂ is produced and near about 190000 liters of water is used in extraction and refining material.

VII. RAW MATERIALS USED IN LAPTOP

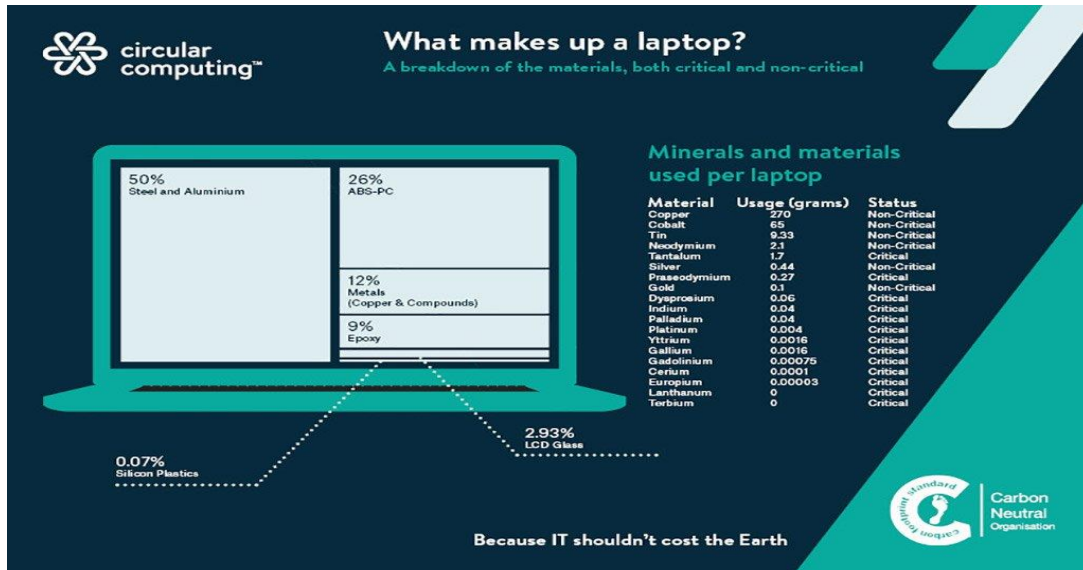


Fig.2 Raw materials used in Laptop Manufacturing

VIII. “REMANUFACTURING LAPTOPS WILL REDUCE THE IT CARBON FOOTPRINT”

The circular computing, a process of remanufacturing Laptop with better quality just like new but using carbon neutral products that helps to reduce impact of global warming and keeping environment cool and to avoid E-waste.

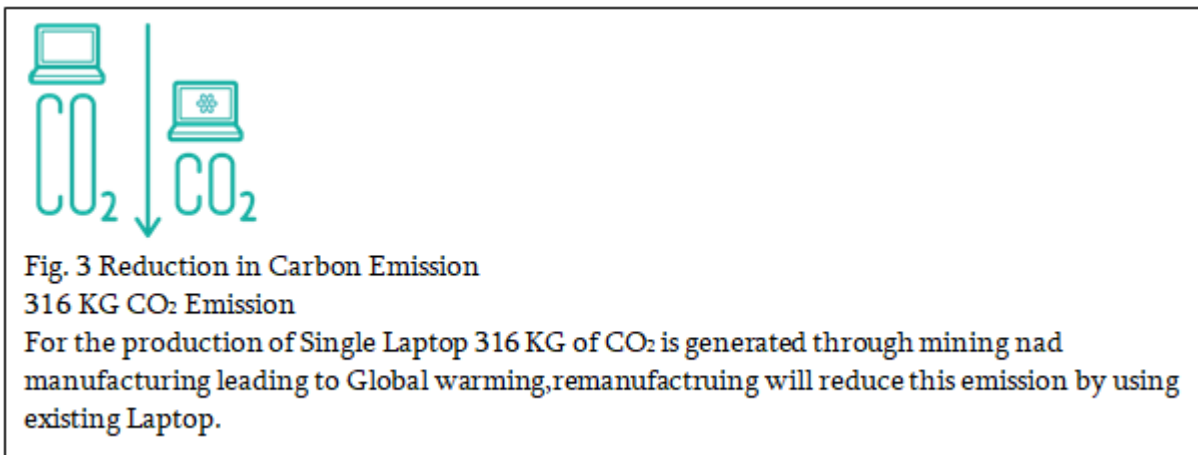




Fig. 4 Water consumption
 190,000 Liters of water
 Just for one laptop 190,000 of water is used for mining and production, by remanufacturing we can reduce wastage of our valuable asset.



Fig. 5 Use of Valuable Earth Resources
 1200 Kg of Earth Resource's
 To prepare each component of Laptop 1200 KG of environmental resources are mined and used remanufacturing not only reduce use of additional resources but it will help in reducing E-waste

Circular Computing is world's first BSI Kitemark™ certified company for laptop remanufacturing – a breakthrough for sustainable technology. The world's first remanufactured laptop BSI Kitemark™ was accomplish in November 2021, representing an assurance of quality in the company's Circular Remanufacturing Process. Every laptop goes through the same remanufacturing process to BS 8887 standards, to create a product that is equal to new one. The highlights of the 360-point stage accredited process, include:

- Initial inspection
- Disassembly
- Component inspection and remediation, replacement and upgrades
- Cosmetic remediation
- Reassembly and functional testing
- Final stress testing
- Visual inspection and quality checks
- Quality control and sign off

Some of the Carbon Neutral Remanufacturing Laptops are:

Lenovo T450, Lenovo T460

Lenovo T470, Lenovo T470s

HP 840 G4, HP 840 G5

Dell E5470, Dell 5490, HP 840 G2, HP 840 G3,

Lenovo T480, Lenovo T480s

IX. CONCLUSION

Our Environment always give us with full of its treasure, thus it's become the Human responsibility to save environment blessings and save it by reducing the emission of harmful CO2.

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Cluster Prediction of Students Data by using K-Means Clustering Algorithm

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ABSTRACT

Academic performance prediction of students is actually a challenging task in current scenario. To enhance the quality of education system, student performance analysis plays a vital role for decision support. Evaluation of students' performance is an important aspect in every educational institute. Important decisions can be made by the academic leaders with the help of the huge data available to them using various algorithms. Clustering is the grouping of a particular set of objects based on their characteristics and aggregating them according to their similarities. In this paper data clustering is used as k-means clustering to evaluate students' performance.

Keywords- Data mining, Clustering, Classification, K Means Clustering Algorithm

I. INTRODUCTION

The growth in information and statement technologies has changed the way in which large quantities of information are accessed, such that the work of academic leaders is reduced or made easy. Important decisions can be made by the academic leaders with the help of the huge data available to them using various algorithms. This research paper presents k-means clustering algorithm as a simple and efficient tool to monitor the progression of students' academic performance.

Cluster analysis could be divided into hierarchical clustering and non-hierarchical clustering techniques [5,8,25,28]. Examples of hierarchical techniques are single linkage, complete linkage, average linkage, median, and Ward. Non-hierarchical techniques include k-means, adaptive k-means, k-medoids, and fuzzy clustering. To determine which algorithm is good is a function of the type of data available and the particular purpose of analysis. In more objective way, the stability of clusters can be investigated in simulation studies. The problem of selecting the "best" algorithm/parameter setting is a difficult one. A good clustering algorithm ideally should produce groups with distinct non-overlapping boundaries, although a perfect separation cannot typically be achieved in practice. Figure of merit measures (indices) such as the silhouette width score can be used to evaluate the quality of separation obtained using a clustering algorithm. The concept of stability of a clustering algorithm was considered in. The idea behind this validation approach is that an algorithm should be rewarded for consistency. [5,8,25,28]

The clustering algorithm used in the proposed methodology is K-means algorithm. . K-means is one of the easiest algorithms of unsupervised learning used for clustering [5]. Clustering is the grouping of a particular set of objects based on their characteristics and aggregating them according to their similarities[19,20,23]. With respect to data mining this methodology partitions the data implementing a specific join algorithm, most suitable for the desired information analysis. It allows an object not to be part of a cluster, or strictly belong to it, calling this type of grouping hard partitioning. In the other hand, soft partitioning states that every object belongs to a cluster in a determined degree. More specific divisions can be possible to create objects belonging to multiple clusters, to force an object to participate in only one cluster or even construct hierarchical trees on group relationships. The clustering algorithm used in the proposed methodology is parallel k-Means algorithm. It is one of the most popular and simple clustering algorithms is K-Means which, was first published in 1955. In spite of the fact that K-Means was proposed over 50 years ago and thousands of clustering algorithms have been published since then, K-Means is still widely used.

Clustering is the data mining technique that has attracted a great deal of attention in the information industry and in society as a whole, due to the wide availability of huge amount of data and imminent need for turning such data into useful information and knowledge. In this paper, we used k-means clustering algorithm, elbow method and silhouette score in the analysis of the students' academic performance prediction.

II. LITERATURE SURVEY

Prashantsaxena, Govil M. C. [5], in there paper they apply the k-means clustering technique to analyze the relationship between students behavioral and their success. In this paper an extraction method known as principal component analysis is used for predicting cluster analysis. The primary data is collected from a self-finance university, based at Jaipur, India. Questionnaire method is also used to collect data based on some selected input variables. They conclude that type of school is not influence student performance and parent's occupation plays a major role in predicting performance.

Md. Hedayetul Islam Shovon, MahfuzaHaque [7], in there paper present a hybrid procedure based on decision tree and k means data clustering algorithm to predict students GPA and based on this instructor take decisions to improve students' academic performance. 50 training samples are taken for processing. After applying algorithm on training data students are divided in three classes i.e. High, Medium and Low.

Oyelade O. J et al [8], in there paper they implemented the k-means clustering algorithm for analyzing students result data. The model was also combined with the deterministic model to analyze the students result. Database is taken from private institution in Nigeria. They also use Euclidian distance as a measure of similarity distance. They conclude that k means clustering algorithm is good to monitor the performance of students. It also enhances the decision making by academicians to monitor students' progress semester by semester and improve future academic result.

E.Venkatesan, S.Selvaragini [16], in there paper they use expectation Maximization (EM) and k means algorithm, and sorting algorithms such as C4.5, k-Nearest neighbor and naïve Bayes for prediction of students performance, data is taken from four private Arts Science colleges in Chennai city of Tamilnadu, India. WEKA and Matlab is used to measure the operation of several data mining algorithms. They observe that best clustering algorithm is k means. Also accuracy is verified by classification algorithms J48, JRIP and CART by its various performance criteria. In this classification algorithms CART was found more serious than others.

Yann Ling Goh et al [27] in their paper they use k means clustering algorithm along with deterministic model is used to analyze the students' performance. Data set contains students score in A.Y. 2019 of a college. The number of students is 106 with 8 subjects. They conclude that this methodology will assist academic planners in measuring students' academic performance and assessing student's progression whether students are meeting course requirements.

Zhihui Wang [33] in their paper they use k means clustering algorithm on Iris data set. The K-means algorithm and the improved K-means algorithm with student information are investigated. As a result, this paper proposes a mechanistic analysis of higher education management and student performance evaluation based on clustering algorithm to assess the quality of college classroom teaching from two perspectives: students' learning effects and teachers' teaching work, with the K-Means algorithm as the primary method. The theory and application of clustering are highlighted based on a summary of data mining theory. This research presents a set of scientific and reasonable management capability evaluation index systems for universities, which serves as a strong foundation for relevant departments to conduct university administration capability evaluations in the future and, as a result, contributes significantly to raising the standard of university administration.

III. METHODOLOGY

K-means clustering algorithm is one of the most widely used algorithms in clustering techniques because of its simplicity and performance. Parallel k-Means algorithm, is used to solve the k-Means clustering problem. The first step in this algorithm is to decide the number of clusters. It is mandatory that the number of clusters decided should match the data. An incorrect choice of the number of clusters will invalidate the whole process. An empirical way to find the best number of clusters is to try parallel k-Means clustering with different number of clusters and measure the resulting sum of squares. Then the center of the clusters should be initialized. The closest cluster should be attributed to each data point and the position of each cluster is set to the mean of all data points belonging to that cluster. This process should be repeated until convergence. The performance of K-means clustering is highly affected when the dataset used is of high dimension. The accuracy and time complexity are highly dropped because of the high dimension data.

Figure 1: Generalised Pseudocode of Traditional k-means [5,8,9,18,25,27]

- Srep 1: Step 1: Accept the number of clusters to group data into and the dataset to cluster as input values
- Srep 2: Step 2: Initialize the first K clusters
- Take first k instances or
 - Take Random sampling of k elements
- Srep 3: Step 3: Calculate the arithmetic means of each cluster formed in the dataset.
- Srep 4: Step 4: K-means assigns each record in the dataset to only one of the initial clusters - Each record is assigned to the nearest cluster using a measure of distance (e.g Euclidean distance).
- Srep 5: Step 5: K-means re-assigns each record in the dataset to the most similar cluster and re-calculates the arithmetic mean of all the clusters in the dataset.

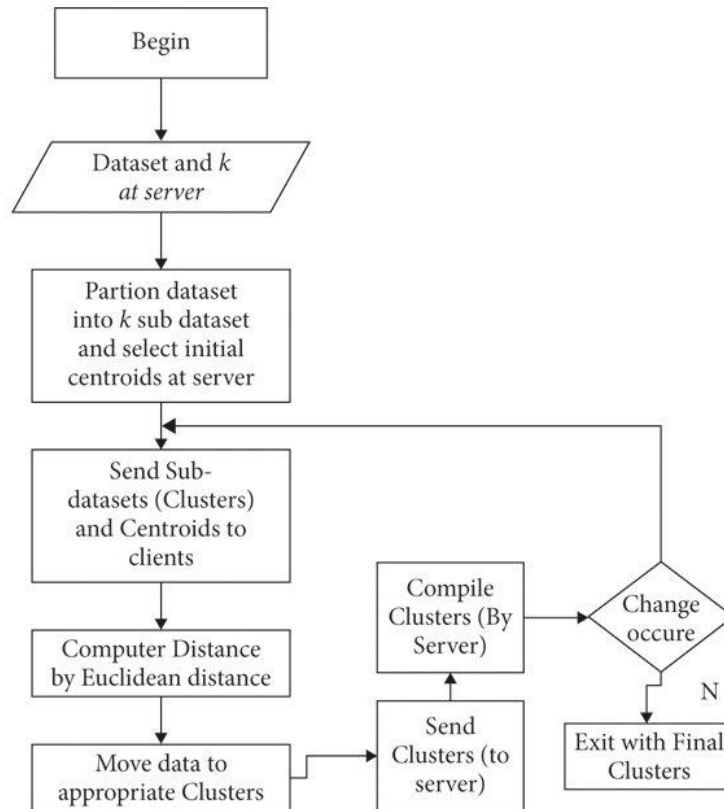


Fig. 2 Flow Chart of K Means Clustering Algorithm

Figure 3: Traditional k-means algorithm [5,8,25]

1. $MSE = \text{largenumber};$
2. Select initial cluster centroids $\{m_j\}_{j=1}^K$;
3. Do
4. $OldMSE = MSE$;
5. $MSE_1 = 0$;
6. For $j = 1$ to k
7. $m_j = 0; n_j = 0$;
8. end for
9. For $i = 1$ to n
10. For $j = 1$ to k
11. Compute squared Euclidean distance $d^2(x_i, m_j)$;
12. end for
13. Find the closest centroid m_j to x_i ;
14. $m_j = m_j + x_i; n_j = n_j + 1$;
15. $MSE_1 = MSE_1 + d^2(x_i, m_j)$;
16. end for
17. For $j = 1$ to k
18. $n_j = \max(n_j, 1); m_j = m_j / n_j$;
19. end for
20. $MSE = MSE_1$; while $(MSE < OldMSE)$

This produces a separation of the objects into groups from which the metric to be minimized can be calculated. The k-means is simple clustering algorithm that has been improved to several problem domains. After obtaining the k partitions, we will get the value of k which is used to predict the student performance by using different machine learning algorithms.

IV. EXPERIMENTAL ANALYSIS AND DISCUSSION

Student academic performance is predicted based on multiple input attributes. Algorithms such as, K-means are used on the input attributes to generate a classification model in-order to predict academic performance of students. In this research, all the pre-processing on the data is done by using different libraries from Python such as Pyspark etc. From the experimental point of view, the dataset is created by importing basic data sets of students from Kaggle.

All the above information will be consolidated as a whole form into complete dataset for the proposed methodology. After applying the K means algorithm, for Elbow method, we got the value of K and its corresponding cost. We have plotted Elbow graph which is used to predict the students' performance. Again, after applying the same K means algorithm, we got the value of K and its corresponding Silhouette score, with which we could plot Silhouette graph.

K means algorithm implementation

The dataset has the attributes "gender", "race/ethnicity", "parental level of education", "lunch", "test preparation course", "math score", "reading score", "writing score". In data processing for first 5 attributes are taken into account.

a. Then for all attributes in dataset following steps are implemented:

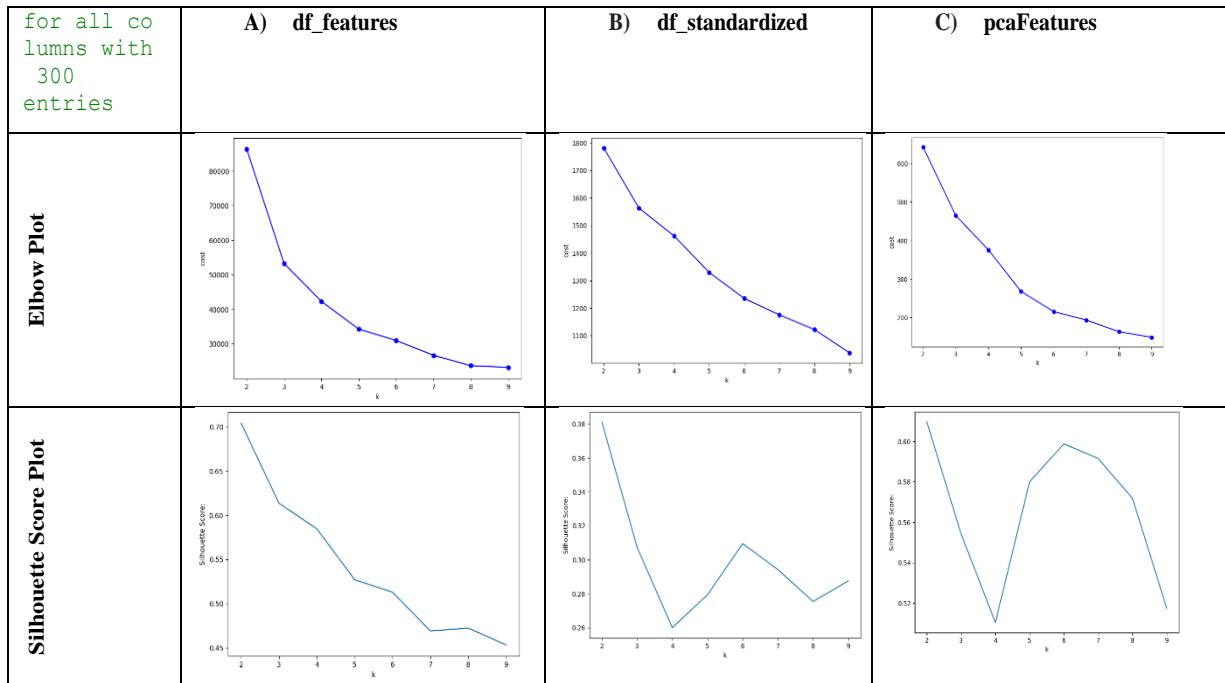
1. Vector assembler is used to assemble the data in to single columnvector which yielded thedf_features.
2. Then StandardScaler is used it creates another column i.e., df_standardized are generated. StandardScaler removes the mean and scales each feature/variable to unit variance.
3. PCA features are extracted using in new column i.e., pcaFeatures are generated. The Principal Component Analysis is a popular unsupervised learning technique for reducing the dimensionality of data. It increases interpretability yet, at the same time, it minimizes information loss. It helps to find the most significant features in a dataset and makes the data easy for plotting in 2D and 3D.

b. Then for last 4 columns in dataset following steps are implemented:

1. Vector assembler is used to assemble the data in to single columnvector which yielded thedf_features.
2. ThenStandardScaler is used it creates another column i.e., df_standardized are generated. StandardScaler removes the mean and scales each feature/variable to unit variance.
3. PCA features are extracted using in new column i.e., pcaFeatures are generated. The Principal Component Analysis is a popular unsupervised learning technique for reducing the dimensionality of data. It increases interpretability yet, at the same time, it minimizes information loss. It helps to find the most significant features in a dataset and makes the data easy for plotting in 2D and 3D.

Above steps a and b are used to create input and the elbow plot and silhouette score plot id plotted to identify proper clustering.

FIG2. ELBOW PLOT AND SILHOUETTE SCORE PLOT FOR ALL COLUMNS



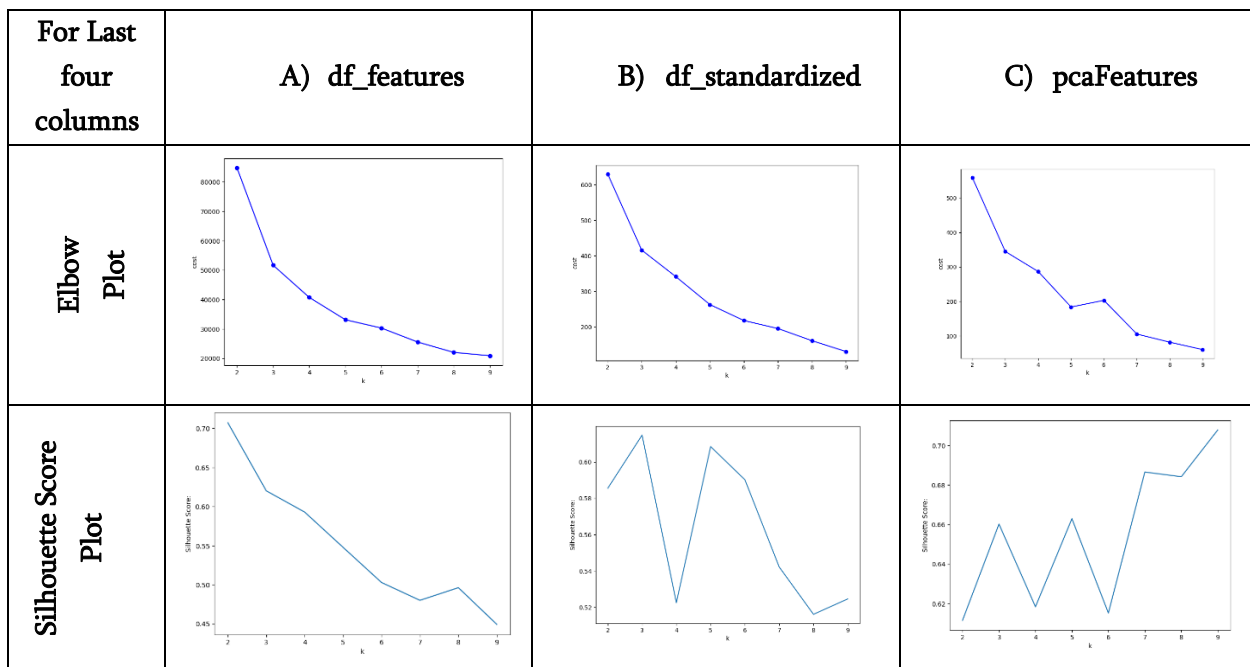
In the above plots Fig 2A i.e. Graph of Df_features, we see elbow plot in which we have to see the first or most significant turning point of the curve which is visible as an elbow which suggest the right number of clusters [4]. In this case, it can be 4, 5, 6, 7 or any of these. The Silhouette score reaches its global maximum at the optimal k. This should ideally appear as a peak in the silhouette values versus-k plot. But there is no clarity with the Silhoutte plot. There is no a clear maximum or minima visible.

In the above plots Fig 2B i.e. Graph of Df_Standardized, we see elbow plot in which we have to see the first or most significant turning point of the curve which is visible as an elbow which suggest the right number of clusters [4]., here we cannot see elbow like bend, so no clarity, same case with Silhoutte plot, no clear maxima, minima are visible.

In the above plots Fig 2C i.e. Graph of PCA features, we see an elbow plot in which we have to see the first or most significant turning point of the curve which is visible as an elbow which suggest the right number of clusters [4].In this case also, it can be 4, 5, 6, 7 or any of these.

To find exact answer, we can take help from Silhouette plot;theSilhouette score reaches its global maximum at the optimal k. This should ideally appear as a peak in the silhouette values versus-k plot. In this case, it is 5 and it is present in list of elbow point, so we can select 5 as a number of clusters for these.

FIG3. ELBOW PLOT AND SILHOUETTE SCORE PLOT FOR LAST FOUR COLUMNS



In the above plots Fig 3A i.e.Graph ofDf_features, we see Elbow plot in which we have to see the first or most significant turning point of the curve which is visible as an elbow which suggest the right number of clusters [4]. In this case, it can be 4, 5, 6, 7 or any of these. The Silhouette score reaches its global maximum at the optimal k. This should ideally appear as a peak in the silhouette values versus-k plot. But there is no clarity with the Silhoutte plot. There is no a clear maximum or minima visible.

In the above plots Fig 3B i.e.Graph ofDf_Standardized, In the above plots, we see the first or most significant turning point of the curve which is visible as an elbow which suggest the right number of clusters [4]. In this case also, it can be 4, 5, 6, 7 or any of these.

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In the above plots Fig 3C i.e.Graph of PCA features, we see elbow plot in which we have to see the first or most significant turning point of the curve which is visible as an elbow which suggest the right number of clusters [4], so in this case there is no clarity, same case with Silhoutte plot, no clear maxima, minima are visible.

The Elbow Method: This is one of the most popular methods to determine the optimal number of clusters. It is a little bit simple approach. In this method, we calculate the cost which consists of sum of squared distances of points to their nearest centres.

The drawback of Elbow method is that sometimes we cannot get the optimal value of k. We can get the ambiguous value of k. In such ambiguous situation, we have to use the Silhoutte method.

The Silhoutte method: This method estimates a value which shows how a point is closer to its own cluster as compared to other clusters. The value of silhouette coefficient is between -1 to 1 [4].

One cannot bypass the Elbow method and consider only The Silhoutte one. The Elbow method is used to get a rough estimate of k whereas Silhoutte value method is used to get the exact value of k. Both the methods conjunctively form a tool for us to take confident decision for the determination of value of k.

V. CONCLUSION

In this paper we have taken student dataset of 300 records from Kaggle, we have applied parallel K means algorithm on the dataset. Then vector assembler is used to assemble the data in to single (column) vector i.e., df_features are generated. Then StandardScaler is used it creates another column i.e., df_standardized are generated. PCA features are extracted using in new column i.e., pcaFeatures are generated. The df_features, df_standardized and pcaFeatures are used to create input and the elbow plot and silhouette score plot id are plotted to identify proper clustering. It is observed that for all attributes the PCA features results looks good. Also for last four columns the df_standardized results looks good. In both case we get five clusters i.e. K=5.

VI. ACKNOWLEDGEMENT

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Ethical Issues and Social Responsibilities

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ABSTRACT

The Social and Ethical Responsibilities of Computing (SERC) is facilitating the development of responsible “habits of mind and action” for those who create and deploy computing technologies and fostering the creation of technologies in the public interest.

It is also discovered that we are vulnerable to their malfunction and misuse, creating problems such as computer crime, software theft, hacking, viruses, and invasion of privacy, an over-reliance on intelligent machines and workplace stress, each of which has created one or more ethical dilemmas for the computer profession

Keywords: Software theft, Netiquette, Ethical Dilemmas, ransomware

I. INTRODUCTION

The digital computer is a key technology of the modern era and has been central and essential to key operations in modern industrial society, including manufacturing, transport and distribution, government, the military, health services, education and research. And their impact will most likely increased over the next century.

Most technological problems these days get blamed on computers including power supplies failing, phone systems going down, air traffic controls seizing up, traffic lights on the blink. Also computers get blamed for mistakes made by utilities, governmental agencies, credit-checking bureaus, the police, etc.

New social problems caused by computerization

Computer crime

- New technology brings with it new opportunities for crime, but in many ways, computers and computer networks have left many open doors for criminal to enter.
- People are stealing or doctoring data, or threatening to destroy data to extort money from companies.
- ATMs (Automated teller machines), EFT (Electronic funds transfer), EDI (Electronic data interchange), cellular phones are all vulnerable.
- Desktop publishing has made forgery and counterfeiting easier than it used to be, as is phone fraud.

Software theft

- Software theft costs the software industry an estimated \$12 billion a year.
- Users have an opinion on the ethics of copying software that does not match the publishers and it is not always certain where the law stands on this around the world.
- Companies are not sure whether copyrights or patents is the best way to protect intellectual property and several look and feel cases have left the issues unresolved.
- The large question is how to protect intellectual property right without stifling creativity overall.
- **Filmy Hit, Tamil Rockers, Afilmywap** and other file-swapping sites have caused music and movies to be copied illegally and widely disseminated. It is estimated that such illegal product costs the music industry more than 500 crores of Rs. a year domestically (source: ITA web site).

Hacking

- Attacks by hackers and computer viruses have cost computer operators a great deal of time and money.
- Hackers have:
 - broken into computer systems to change exam results (and sometimes grades),
 - disrupted 100 systems,
 - hacked into Ministry computers
 - sold stolen data to the RAW and other Terrorist organizations
 - and blackmailed Innocent people and banks into hiring them as "security consultants."

Viruses

Viruses have erased file, damaged disks, and shut down computer systems. Below are some of the Infamous viruses in India

- **UHBVN Ransomware Attack**

Uttar Haryana BijliVitrان Nigam was hit by a ransomware attack where the hackers gained access to the computer systems of the power company and stole the billing data of customers. **The attackers demanded Rs.1 crore or \$10 million in return for giving back the data.**

- **WannaCry**

India was the third worst-hit nation by WannaCryransomware, **affecting more than 2 lakh computer systems.** During the first wave of attacks, this ransomware attack had hit banks in India including few enterprises in Tamil Nadu and Gujarat. The ransomware majorly affected the US healthcare system and a well-known French car manufacturing firm.

- **Mirai Botnet Malware Attack**

This botnet malware took over the internet, targeting home routers and IoT devices. This malware affected **2.5 million IoT devices including a large number of computer systems in India.** This self-propagating malware was capable of using exploitable unpatched vulnerabilities to access networks and systems.

- **Petya**

India was one of the top 10 countries to be hit by Petyaransomware. This ransomware attack halted work at one of the terminals of India's largest seaport causing computer lockdown and serious consequences for the country's exports.

- **BSNL Malware Attack**

The state-owned telecom operator BSNL was hit by a major malware attack, **impacting nearly 2000 broadband modems! 60,000 modems became dysfunctional after the malware attack** hit the Telecom Circle.

Netiquette

- "Netiquette" is network etiquette, the do's and don'ts of online communication. Netiquette covers both common courtesy online and the informal "rules of the road" of cyberspace.¹
- When you enter any new culture - and cyberspace has its own culture - you're liable to commit a few social blunders. you might offend people without meaning to. Or you might misunderstand what others say and take offense when it's not intended. To make matters worse, something about cyberspace makes it easy to forget that you're interacting with real people - not just ASCII characters on a screen, but live human characters.
- There have been instances where "flame wars" (major verbal battles) have been place over the Internet because someone wrote something at which someone else took great offense - and the writer never intended it.

Privacy

- Safeguarding privacy in a modern society where so much information about us is public is extremely difficult if not impossible. There have been data disasters involving mistaken identities, data mix-ups, and doctored data which adversely affect people's lives, including driving and credit records.
- Aggravating the problem are the issues of calling number identification (CNID or Caller ID) monitoring of e-mail, and data marketing.

AI and Expert Systems

There is a hornets' net of issues associated by giving the computer the ability to make medical, legal, judicial, political and administrative decisions. Given what we know about unreliable software, is it wise to trust it? And what is product liability on this kind of matter.

Computers in the Workplace

This has led to 2 primary issues: repetitive stress syndrome (Carpal Tunnel disorder) and job monitoring, as well as other health-related issues.

Because of its constantly changing nature, the area of computer technology is one that is difficult to assign a specific set of moral codes, although it is necessary that ethics be considered when making decisions in this area. Computing creates a whole new set of ethical problems, unique unto itself.

Such problems include:

"...the unauthorized use of hardware, the theft of software, disputed rights to products, the use of computers to commit fraud, the phenomenon of hacking and data theft, sabotage in the form of viruses, responsibility for the reliability of output, making false claims for computers, and the degradation of work."

Ethical Dilemmas for Computer Users

- Some of these dilemmas are new (such as copying software), while others are new version of older problems dealing with right and wrong, honesty, loyalty, responsibility, confidentiality, trust, accountability, and fairness. Users face some of these problems while computer professionals face all of them.
- Some of these involve crimes, many that people frequently regard as "victimless" crimes. Are they truly victimless?
- Which is more important: access to affordable software or intellectual property rights? How do we protect developers so that they have the necessary incentive to be creative?
- Is hacking always wrong? Creating viruses?
- Who is responsible when a computer system fails to perform as it is supposed to? What kind of warranty should there be and from whom?
- What information on a database should be private? When are they doing us a service by providing that information?
- To what extent can we trust intelligent systems? Should we fund military systems?
- How should health hazards in the workplace be handled? Should we allow employers to monitor employee activities?

The Ten Commandments for Computer Ethics

1. You shall not use a computer to harm other people.
2. You shall not interfere with other people's computer work.
3. You shall not snoop around in other people's files.
4. You shall not use a computer to steal.
5. You shall not use a computer to bear false witness.
6. You shall not use or copy software for which you have not paid.
7. You shall not use other people's computer resources without authorization.
8. You shall not appropriate other people's intellectual output.
9. You shall think about the social consequences of the program you write.
10. You shall use a computer in ways that show consideration and respect.

Software engineers shall commit themselves to making the analysis, specification, design, development, testing and maintenance of software a beneficial and respected profession. In accordance with their commitment to the health, safety and welfare of the public, software engineers shall adhere to the following Eight Principles:

Preamble:

1. **PUBLIC** - Software engineers shall act consistently with the public interest.
2. **CLIENT AND EMPLOYER** - Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.
3. **PRODUCT** - Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.

4. **JUDGMENT** - Software engineers shall maintain integrity and independence in their professional judgment.
5. **MANAGEMENT** - Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.
6. **PROFESSION** - Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.
7. **COLLEAGUES** - Software engineers shall be fair to and supportive of their colleagues.
8. **SELF** - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.

Conclusion& Suggestions

As we continue to develop smart cities and smart grid technologies in 2021, the risk of ransomware attacks will stay put as a big challenge for all organizations. Apart from focusing on development and advancement, every industry vertical must understand the crucial role of cyber security.

With the help of these below listed proactive measures organizations can reduce or prevent the constantly evolving ransomware attacks in the future:

Employee Awareness Training

Cyber threat actors majorly use emails as bait in attempting cyber-attacks on an organization and humans being the weakest link tend to easily fall for it. So to avoid and overcome this problem, organizations must educate their employees by making them aware of the prevailing cyber threats.

A right [security attack simulator and awareness training tool](#) can help in reducing the threat of employee error. Such tools help in mitigating existing cyber risks within the organization and enhance the cyber security posture.

Backup Your Data Separately

The best way to stay proactive is by backing up your data in a separate external storage device but it should not be connected to your computer. Backing up your data will help in securing it from being encrypted and misused by cyber attackers.

Regular Vulnerability Assessment

Basic cyber security hygiene like [vulnerability assessment and penetration testing](#) can help in preventing malware like ransomware. With the help of continuous vulnerability assessment, one can find out the exploitable vulnerabilities and fix them before any threat actor discovers it.

Never Click on Unverified Links

Avoid clicking links that are attached in spam emails or on an unfamiliar website. Such links are the bearers of malicious files that badly infect the user's computer when clicked. Moreover, these links are the pathways for ransomware to access the user's system and encrypt or lock confidential data for ransom.

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Comparative Analysis of a Novel Web Caching Algorithm CachoHit with LRU and FIFO

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ABSTRACT

In order to improve the network bandwidth and the server's reliability, availability and response time [1] Web caching is a very important feature. A key factor behind a cache [2] is its page replacement policy, which decides which page will be evicted from the cache to make space for a new page. In this paper we have made comparative analysis of Web caching algorithms in optimizing the overall performance (based on important measures such as network traffic, hit ratio, response time, etc).

Keywords: Caching, LRU, FIFO, LFU, page replacement algorithm

I. INTRODUCTION

Everyday Internet traffic is increasing heavily as a result showing its impact on network congestion which increases server load ultimately affecting access time, response time and many other factors. Thus, web caching [3] is crucial for reducing the load on network, shorten network latency and improve clients' waiting time. There are n number of web caching policies like, First In First Out, Least Recently Used, Least Frequently used, Optimal Page Replacement [4] and so on are implemented which decides how and which object or page should be evicted from cache to make space available for incoming request, Most of the existed Web cache replacement algorithms [5] consider few factors and ignore many other factors that have an impact on the efficiency of the Web caching. Moreover, a combination of these factors to get wise replacement decision is not a simple task. Therefore, many objects, which are stored in the cache, are never requested again or for a long time. This leads to "cache pollution", meaning is that objects are inactive objects. This causes a reduction of the effective cache size and negatively affects the performance of Web proxy caching [6].

Many researchers have proven disadvantages of existed conventional algorithms and tried to overcome these but still there are some challenges which can be resolved by various techniques. In this paper we are comparing of Web caching algorithms in optimizing the overall performance based on hit ratio.

WORKING OF CACHE

A web cache is a methodology for the temporary storage (caching) of web pages, such as HTML pages and images to optimize the use of bandwidth, server load and perceived lag [7]. A web cache stores copies of documents passing through it; subsequent requests may be satisfied from the cache if certain conditions are

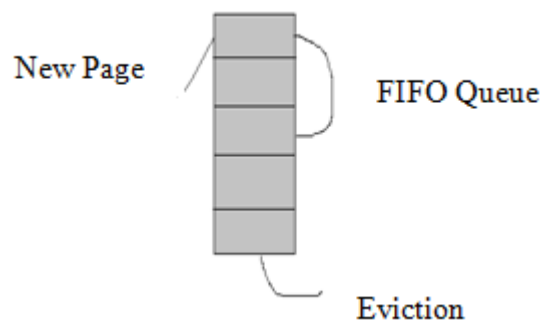
met. Web sites are continually updating their contents [8]. News headlines change, stock quotes change, weather changes. It may seem that caching is not worthwhile if it is returning outdated material. A traffic report that is two hours old doesn't do you much good. Fortunately there are checks and balances in place to ensure that the content you are viewing is current. Web sites are made up of many small pieces that come together to make a complete page. A site might have logos, photographs, tables, text, and sounds. Each item will be cached as a different object, and some items may not cache at all. For example, when you access CNN.com frequently your cache may hang on to the CNN logo objects some advertising bars, and the rest of the stuff that makes up the basic look of the CNN Web site[9]. But the news items will not sit in cache because they change so often. In this case your cache has made the CNN site much easier and faster to download because all the static graphics are already on hand and the only thing you need to complete the picture is the news content.

II. CACHE REPLACEMENT POLICIES: IN BRIEF

Caching, an essential approach in present computing, extensively used in application in storage systems, databases, Web servers, processors, file systems, disk drives, operating systems, and data compression applications. Cache replacement policy plays a vital role in web caching. Web Caching can enhance data access response time by preserving data that tend to be requested in the future. Therefore, the design of efficient cache replacement algorithms is very important. Due to limitation on size of Cache, a cache replacement policy is needed to handle the cache content carefully. When the cache to store the current/incoming object, the replacement policy will determine which object is to be evicted to make space for the new object. The optimal policy improve cache hit rates, and to reduce loads on the server. The following are different page replacement policies for review:

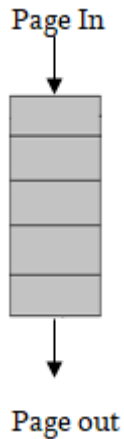
2.1 Least Recently Used (LRU)

This is most commonly used page replacement caching algorithm which keeps recently used request close to the top of the cache. Whenever a new request is accessed, the LRU places it at the top of the cache. And whenever the cache limit has been reached, the request that have been accessed less recently will be evicted from the bottom of the cache. This can be a costly as it has to maintain the access time-stamp of request. In addition to that, when a LRU cache algorithm deletes an less recently request, the access time-stamp must be changed on all other request also.

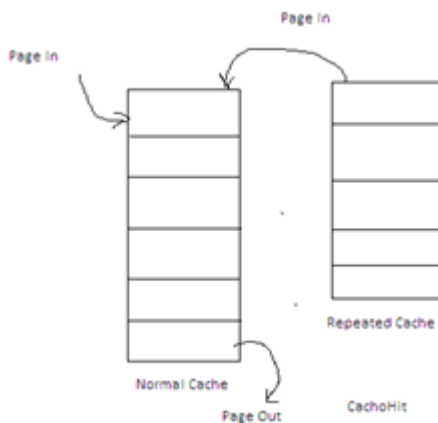


2.2 First In First Out (FIFO)

According to eviction policy of FIFO page entered is evicted in the same order as they come in. In FIFO when new request is made and consider cache is reached at the max limit, the page that was placed first (First-In) in the store is the consider for eviction (First-Out).



2.3 CachoHit



III. IMPLEMENTATION

The performance of above discussed caching algorithms is evaluated on various parameters. The most important factor is cache hit ratio, which depends on the page replacement policy.

Cache Hit Ratio:

The Cache Hit Ratio is the ratio of the number of cache entries are repeated to the number of request available, usually expressed as a percentage. Depending on cache size configured, expected hit ratios may vary from 60% to greater than 99% [10].

To calculate hit ratio we have conducted test from on various data sets. The cache size was from 400 MB random requests and 900 MB size.

Page hit ration is calculated using following formula:

$$\text{Cache hit ratio} = [\text{Cache Hits} / (\text{Cache Hits} + \text{Cache Misses})] \times 100 \%$$

IV. RESULT AND DISCUSSION

To test the result we have used CloudSim Simulator 1.3.1. When we compared LFU, LRU performance using this simulator we observed the page hit ratio for of LFU is 27.12% is the best compared with LRU with 14.25%, FIFO with 10.15%

Table 4.1

Algorithm	Page Hits
LRU	14.25
LFU	27.12
FIFO	10.15

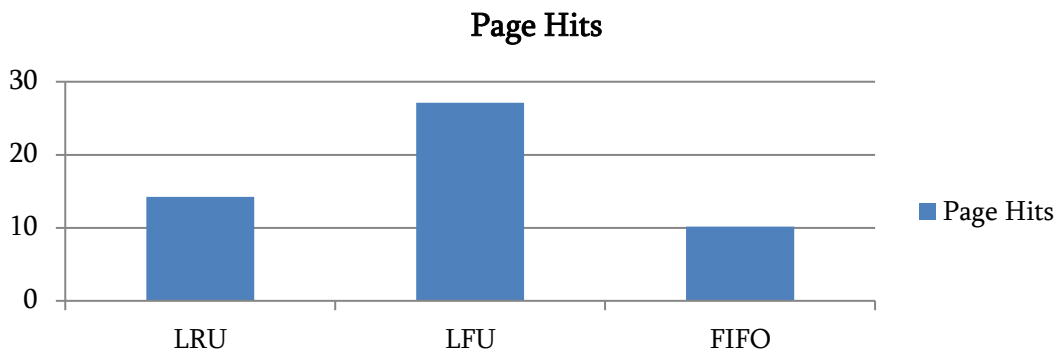


Fig 1: Page Hit % vs Cache Size

For cache size 900, the page hit ratio of LFU is again best compared with LRU and FIFO. LFU has shown page hits 42.10% which is high when compared LRU with 16.75% and FIFO with 12.21%.

Algorithm	Page Hits
LRU	50%
FIFO	30%
CachoHit	65%

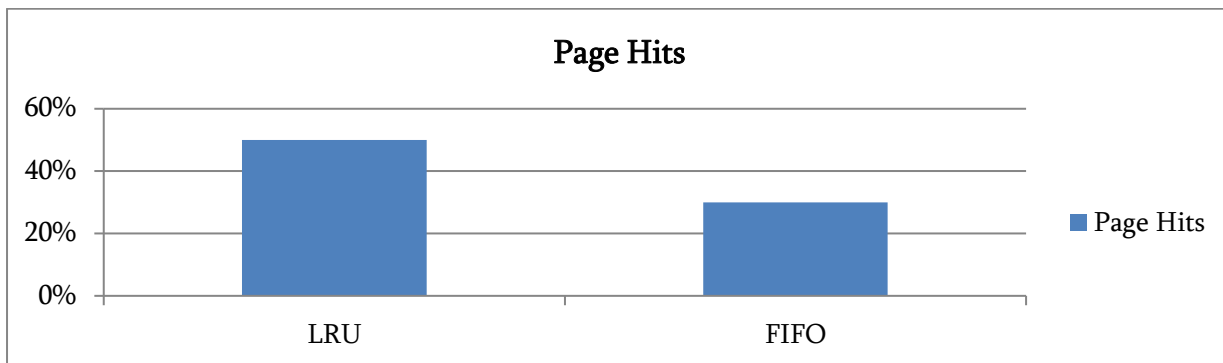


Fig 2: Page Hit % vs Cache Size

From the above results it is observed that page hits of LFU are better than LRU and FIFO in all cases.

V. CONCLUSION

There are various web caching policies have been proposed by different researchers, still lots of overheads and are difficult needs to implement. In this paper, a new replacement policy is developed in order to overcome some of the problems found in the literature. The proposed strategy was able to evict the object with small frequency, size and oldest web object in cache. This was seen in the simulation results through calculating the hit ratio and Byte Hit Ratio. The simulation results showed that proposed.

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Digital Marketing

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ABSTRACT

Digital marketing is the area of marketing that promotes goods and services using the Internet and other online-based digital technology like desktop and mobile computers, as well as other digital media and platforms. The 1990s and 2000s saw its rise, which altered how companies and brands use technology for marketing. Digital marketing campaigns are increasingly common, combining search engine optimization (SEO), search engine marketing (SEM), content marketing, influencer marketing, content automation, campaign marketing, data-driven marketing, e-commerce marketing, and social media marketing. This is due to the increasing integration of digital platforms into marketing strategies and daily life. The term "digital marketing" encompasses non-Internet platforms that offer digital media, such as television, mobile phones (SMS and MMS), callback, and on-hold ringtones. Digital marketing is distinct from online marketing because it has been expanded to offline venues.

I. INTRODUCTION

Digital marketing is the practice of promoting goods and services via online platforms like social media, search engine optimization (SEO), email, and mobile apps. Digital marketing is any type of advertising that uses electronic media. It can be done online and offline; in fact, both kinds are important for a well-rounded digital marketing strategy.

In practice, digital marketing typically refers to marketing campaigns that appear on a computer, phone, tablet, or other device. It can take many forms, including online video, display ads, search engine marketing, paid social ads and social media posts.

How Digital Marketing Works

Marketing refers to activities that a company uses to promote its products and services and improve its market share. It requires a combination of advertising savvy, sales, and the ability to deliver goods to end-users if it's going to be successful. Professionals, known as marketers, take on these tasks either internally (for companies) or externally with marketing firms.

Corporations traditionally focused on marketing through print, television, and radio. Although these options still exist, the internet led to a shift in the way companies reach consumers. That's where digital marketing came into play. This form of marketing involves the use of websites, social media, search engines, and apps anything that incorporates marketing with customer feedback or a two way interaction between the company and its customers.

Increased technology and newer trends forced companies to change their marketing strategies. Email became a popular marketing tool in the early days of digital marketing. That focus shifted to search engines like Netscape, which allowed businesses to tag and keyword stuff to get themselves noticed. The development of sites like Facebook made it possible for companies to track data to cater to consumer trends.

Smartphones and other digital devices now make it easier for companies to market themselves and their products and services to consumers. Studies show that people prefer using their phones to go online. So it should come as no surprise that 70% of individuals make buying decisions (usually on their phones) before they actually hit the purchase button

II. TYPES OF DIGITAL MARKETING CHANNELS

As noted above, marketing was traditionally done through print (newspapers and magazines) and broadcast ads (TV and radio). These are channels that still exist today. Digital marketing channels have evolved and continue to do so. The following are eight of the most common avenues that companies can take to boost their marketing efforts. Keep in mind that some companies may use multiple channels in their efforts.

A) Website Marketing

A website is the centerpiece of all digital marketing activities. It is a very powerful channel on its own, but it's also the medium needed to execute a variety of online marketing campaigns. A website should represent a brand, product, and service in a clear and memorable way. It should be fast, mobile-friendly, and easy to use.

B) Pay-Per-Click Advertising

Pay-per-click advertising enables marketers to reach Internet users on a number of digital platforms through paid ads. Marketers can set up PPC campaigns on Google, Bing, LinkedIn, Twitter or Facebook and show their ads to people searching for terms related to the products or services.

These campaigns can segment users based on their demographic characteristics (such as by age or gender), or even target their particular interests or location. The most popular platforms are Google Ads and Facebook Ads.

C) Content Marketing

The goal of content marketing is to reach potential customers through the use of content. Content is usually published on a website and then promoted through social media, email marketing, search engine optimization, or even pay-per-click campaigns. The tools of content marketing include blogs, eBooks, online courses, info graphics, podcasts, and webinars.

D) Email Marketing

Email marketing is still one of the most effective digital marketing channels. Many people confuse email marketing with spam email messages, but that's not what email marketing is all about. This type of marketing allows companies to get in touch with potential customers and anyone interested in their brands.

Many digital marketers use all other digital marketing channels to add leads to their email lists and then, through email marketing, they create customer acquisition funnels to turn those leads into customers.

E) Social Media Marketing

The primary goal of a social media marketing campaign is brand awareness and establishing social trust. As you go deeper into social media marketing, you can use it to get leads or even as a direct marketing or sales channel. Promoted posts and tweets are two examples of social media marketing.

F) Affiliate Marketing

Affiliate marketing is one of the oldest forms of marketing, and the internet has brought new life to this old standby. With affiliate marketing, influencers promote other people's products and get a commission every time a sale is made or a lead is introduced. Many well-known companies like Amazon have affiliate programs that pay out millions of dollars per month to websites that sell their products.

G) Video Marketing

YouTube is one of the most popular search engines in the world. A lot of users are turning to YouTube before making a buying decision, to learn something, read a review, or just relax.

There are several video marketing platforms, including Facebook Videos, Instagram, and even TikTok to use to run a video marketing campaign. Companies find the most success with video by integrating it with SEO, content marketing, and broader social media marketing campaigns.

H) SMS Messaging

Companies and nonprofit organizations also use SMS or text messages to send information about their latest promotions or give opportunities to willing customers. Political candidates running for office also use SMS message campaigns to spread positive information about their own platforms. As technology has advanced, many text-to-give campaigns also allow customers to directly pay or give via a simple text message.

III. KEY PERFORMANCE INDICATORS (KPIs) IN DIGITAL MARKETING

Another key point to remember is that digital marketers use key performance indicators (KPIs) just like traditional marketers. KPIs are quantifiable ways that companies can measure long-term performance by comparing them to their competition. This includes corporate strategies, financial goals and achievements, operational activities, and even marketing campaigns.

The following are some of the most common KPIs that marketers can use to help companies achieve their goals:

- **Blog Articles:** Marketers can use this KPI to figure out how many times a company publishes blog posts each month.
- **Click through Rates:** Companies can use this KPI to figure out how many clicks take place for email distributions. This includes the number of people that open an email and click on a link to complete a sale.
- **Conversion Rate:** This measure focuses on call-to-action promotional programs. These programs ask consumers to follow through with certain actions, such as buying a product or service before the end of a promotional period. Companies can determine the conversion rate by dividing successful engagements by the total number of requests made.
- **Traffic on Social Media:** This tracks how many people interact with corporate social media profiles. This includes likes, follows, views, shares, and/or other measurable actions.

- **Website Traffic:** Marketers can use this metric to track how many people visit a company's website. Corporate management can use this information to understand whether the site's design and structure contribute to sales.

IV. DIGITAL MARKETING CHALLENGES

Digital marketing poses special challenges for its purveyors. Digital channels proliferate rapidly, and digital marketers have to keep up with how these channels work, how they're used by receivers, and how to use these channels to effectively market their products or services.

It's becoming more difficult to capture receivers' attention because receivers are increasingly inundated with competing ads. Digital marketers also find it challenging to analyze the vast troves of data they capture and then exploit this information in new marketing efforts.

The challenge of capturing and using data effectively highlights that digital marketing requires an approach to marketing based on a deep understanding of consumer behavior. For example, it may require a company to analyze new forms of consumer behavior, such as using website heat maps to learn more about the customer journey.

V. IMPLICIT BIAS IN DIGITAL MARKETING

Implicit bias has a way of creeping into digital marketing, even when marketers and companies do all they can to ensure it doesn't. The term implicit bias refers to attitudes and stereotypes people have against or toward other groups of people that occur automatically without any conscious knowledge

Algorithms are a major foundation of digital marketing, which makes them very important when companies craft their marketing strategies. These algorithms are often created with the intention of being unbiased.

Keep in mind, though, that this is all programmed by various individuals, including engineers, developers, data scientists, and marketers—all of whom come with their own implicit biases. This means they may program, input, and manipulate data in certain ways, even if they don't intend to on purpose.

Something as simple as adding stock photos or videos to a campaign can come with implicit bias. For instance, companies may unintentionally use images and videos of heterosexual White individuals while excluding Black, Indigenous, and people of color, along with those of different body types and abilities.

VI. WHAT SKILLS ARE NEEDED IN DIGITAL MARKETING?

You need to be skillful in writing content along with communication skills to effectively tell your product's story to your consumer base. Data analytics skills are important for understanding how well your marketing campaigns are performing and where they can be improved. Finally, social media and other online skills are a must.

VII. THE BOTTOM LINE

Some of the world's biggest advertising campaigns were executed through traditional means. The Marlboro Man was very popular in print while Wendy's wowed individuals with its "Where's the beef?" tagline. But changes in the way people consume media forced companies to shift their focus. Digital marketing is now just as big, if not bigger, than traditional advertising and marketing tools. This includes the algorithms used in digital marketing campaigns. When used properly, they can help avoid implicit bias. The main thing to keep in mind is that as technology continues to change, you can also expect digital marketing to evolve.

VIII. CONCLUSION AND SUGGESTIONS

People are investing more money in online content, and businesses who find it difficult to incorporate this fact into their advertising plan must swiftly adapt. The amount of time people spend online each year increases, and as a result, the role that digital platforms play in their lives also increases. The promotion of digital media is the primary goal of digital India. Because customers may utilize digital platforms from anywhere in the world at any time, businesses must switch from traditional to digital marketing strategies.

Digital channel in marketing has become essential part of strategy of many companies. Nowadays, even for small business owner there is a very cheap and efficient way to market his/her products or services. Digital marketing has no boundaries. Company can use any devices such as smartphones, tablets, laptops, televisions, game consoles, digital billboards, and media such as social media, SEO (search engine optimization), videos, content, e-mail and lot more to promote company itself and its products and services. Digital marketing may succeed more if it considers user needs as a top priority. Just like "Rome was not built in a day," so, digital marketing results won't also come without attempt, without trial (and error). The watchwords "test, learn and evolve" should be at the heart of all digital marketing initiatives. Companies should create innovative customer experiences and specific strategies for media to identify the best path for driving up digital marketing performance.

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Cloud Base Data Storage with Data Integrity

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ABSTRACT

Cloud computing has been envisioned as the de-facto solution to the rising storage costs of IT Enterprises. With the high costs of data storage devices as well as the rapid rate at which data is being generated it proves costly for enterprises or individual users to frequently update their hardware. Cloud storage moves the user's data to large data centres, which are remotely located, on which user does not have any control. However, this unique feature of the cloud poses many new security challenges which need to be clearly understood and resolved. One of the important concerns that need to be addressed is to assure the customer of the integrity i.e. correctness of the data in the cloud. This paper provides a scheme which gives a proof of data integrity in the cloud which the customer can employ to check the correctness of the data in the cloud. To support efficient handling of multiple auditing tasks, and further explore the technique of bilinear aggregate signature to extend that main result into a multi-user setting, where TPA can perform multiple auditing tasks simultaneously. Extensive security and performance analysis show that the proposed schemes are highly efficient and provably secure.

Keywords: aggregate, cloud, CSP, paradigm, TPA

I. INTRODUCTION

Cloud computing has been envisioned as the next-generation information technology (IT) architecture for enterprises, due to its long list of unprecedented advantages in the IT history: on-demand self-service, ubiquitous network access, location independent resource pooling, rapid resource elasticity, usage-based pricing and transference of risk.

One fundamental aspect of this paradigm shifting is that data are being centralized or outsourced to the cloud. From users' perspective, including both individuals and IT enterprises, storing data remotely to the cloud in a flexible on-demand manner brings appealing benefits: relief of the burden for storage management, universal data access with location independence, and avoidance of capital expenditure on hardware, software, and personnel maintenances, etc.,

Since cloud service providers (CSP) are separate administrative entities, data outsourcing is actually relinquishing user's ultimate control over the fate of their data. As a result, the correctness of the data in the cloud is being put at risk due to the following reasons. First of all, although the infrastructures under the cloud

are much more powerful and reliable than personal computing devices, they are still facing the broad range of both internal and external threats for data integrity.

Second, there do exist various motivations for CSP to behave unfaithfully toward the cloud users regarding their outsourced data status. The task of allowing a third party auditor (TPA), on behalf of the cloud client, to verify the integrity of the dynamic data stored in the cloud. With the establishment of privacy-preserving public auditing, the TPA may concurrently handle multiple auditing upon different users' delegation. The individual auditing of these tasks for the TPA can be tedious and very inefficient.

II. STATEMENT OF THE PROBLEM

It ensures the integrity of data stored in the cloud computing. The introduction of TPA eliminates the involvement of the client through the auditing of whether the users data stored in the cloud is indeed intact, which can be important in achieving economies of scale for Cloud Computing. The problem of providing simultaneous public audit ability and data dynamics for remote data integrity check in cloud storage.

To ensure cloud data storage security, it is critical to enable a TPA to evaluate the service quality from an objective and independent perspective. Public audit ability also allows clients to delegate the integrity verification tasks to TPA while they themselves can be unreliable or not be able to commit necessary computation resources performing continuous verifications. Another major concern is on construction of verification protocols that can accommodate dynamic data files.

III. OBJECTIVE OF THE PAPER

Providing simultaneous public audit ability and data dynamics for remote data integrity check in Cloud Computing. The paper construction is deliberately designed to meet these two important goals while efficiency being kept closely in mind. To achieve efficient data dynamics, this work improves the existing proof of storage models by manipulating the classic Merkle Hash Tree construction for block tag authentication.

To support efficient handling of multiple auditing tasks, this work further explore the technique of bilinear aggregate signature to extend the main result into a multiuser setting, where TPA can perform multiple auditing tasks simultaneously. Extensive security and performance analysis show that the proposed scheme is highly efficient and provably secure.

1. It motivate the public auditing system of data storage security in Cloud Computing, and propose a protocol supporting for fully dynamic data operations, especially to support block insertion, which is missing in most existing schemes.
2. Extend the scheme to support scalable and efficient public auditing in Cloud Computing. In particular, the scheme achieves batch auditing where multiple delegated auditing tasks from different users can be performed simultaneously by the TPA.

It proves the security of the proposed construction and justifies the performance of the scheme through concrete implementation and comparisons with the state-of-the-art.

IV. LITERATURE REVIEW

➤ **"Data security in cloud computing and outsourced databases"**

Authors introduce a model for provable data possession (PDP) that allows a client that has stored data at an untrusted server to verify that the server possesses the original data without retrieving it. The model generates probabilistic proofs of possession by sampling random sets of blocks from the server, which drastically reduces I/O costs. The client maintains a constant amount of metadata to verify the proof. The challenge/response protocol transmits a small, constant amount of data, which minimizes network communication. The main method being used is homomorphic encryption. The method proposed here provides a cheating detection mechanism to verify computational results from previous algorithm iterations. Matrix vector multiplication is used to design a batch result verification mechanism.

➤ **"Enhancing data and privacy security in mobile cloud through quantum cryptography"**

Authors have proposed a security model for mobile cloud computing based on quantum cryptography. BB84 Quantum Key Distribution protocol and Near Field Communication (NFC) technology has been used. The working and key generation process is shown in the figure and table above.

➤ **"A comprehensive evaluation of cryptographic algorithms in cloud computing,"**

Authors have used three different algorithms namely AES (Advance Encryption Standard), RSA and MD5 (Message Digest 5) and mapped them. The experimental evaluation is done on different input sizes: 2kb, 5kb, 20kb, and 50kb. They found that AES and MD5 uses the least time and memory usage is also low.

➤ **"Efficient privacy preserving integrity checking model for cloud data storage security"**

Authors have proposed a scheme that is able to detect the corrupted data by an active adversary. Their auditing protocol uses digital signature algorithm in association with certificates. The proposed scheme is very much effective in privacy preserving.

➤ **"A short review on data security and privacy issues in cloud computing"**

Authors have presented a review and literature analysis of various papers about the data security. Authors have focused on issues like data confidentiality, data integrity, data availability and data privacy. Methods like provable data possession, third party auditing and public auditing have been used to provide data security. While using the above mentioned methods to provide data security various issues are found. To provide data integrity PDP and auditing schemes are used that lifts the issues like time complexity, data management, computational complexity and trust. To provide data confidentiality methods being used are encryption, layer based security and concealment of data. This give rise to issues like key count cost, time and computational complexity and large size data.

➤ **"Ensuring data storage security in cloud computing based on hybrid encryption schemes,"**

Authors have proposed a hybrid encryption scheme to secure the data at rest. This scheme provides a mechanism of securing the stored data. No specific methods are discussed by the authors to secure the data

during data transfer. An algebraic summation method is used for key generation. An attacker can easily break the system if small prime numbers are used and it becomes slow and complex if large prime numbers are used.

➤ **"Scheme for ensuring data security on cloud data storage in a semi-trusted third party auditor,"**

The authors have used ECC and AES algorithms to secure data and prevent leakage in the cloud. AES encryption is used during auditing so that the third party auditor will not be able to get the original content of data. ECC encryption is used during the transmission of data and it prevents the attack like Man In The Middle (MITM) attack. The proposed scheme consists of four algorithms, namely, KeyGen, MetaGen, SigGen and Verify Proof. KeyGen is run by the client and the third party auditor (TPA) to configure the scheme. Client uses MetaGen to generate metadata using SHA-256 during auditing so as to ensure data integrity. SigGen is used by the client to generate signature or tag for authentication. Verify Proof is used to generate a proof of data storage correctness by the TPA to verify the received file from the cloud server.

V. REQUIREMENT ANALYSIS

Requirement Analysis and Input Output Specification

Requirement analysis is a software engineering task that bridges the gap between system level requirement engineering and software analysis design. The job of requirement analysis is to understand the specific requirement that must be achieved to build high quality software. The customer is too told at the same time what is technically possible and what plans he had to left under this software. Software requirement analysis is divided into five areas of efforts. These are the problem recognition, synthesis, modeling, specification, review. It is also important to review the 'software scope' in order to estimate the planning estimates.

Requirement analysis consists of two parts:

1. User Requirements
2. System Requirements
 - a. Functional Requirements
 - b. Non-functional Requirements

VI. TECHNOLOGY USED

• Apache Tomcat

ExerTran uses Apache Tomcat to dynamically generate web pages. The current system uses Tomcat 5. In a standard, or original, Tomcat installation, a web application, or *webapp* would be stored in the *webapps* directory of the Tomcat installation in a directory whose name defines the application's name. Instead of this the application directory is kept within the ExerTran directory structure and this directory is linked to Tomcat via an entry in the context file that is created for each coursework application: the context file tells Tomcat all about the application and this file is created and installed when a build of the coursework is performed.

- **Java Development Kit (JDK)**

The Java Development Kit (JDK) provides the foundation upon which all applications that are targeted toward the Java platform are built. The JDK includes a variety of tools and utilities that perform a variety of tasks, which include compiling source code into bytecode, packaging applications, spinning up Java virtual machines (JVMs) and managing the runtime environment of Java applications.

- **MySQL**

MySQL is an Oracle-backed open source relational database management system ([RDBMS](#)) based on Structured Query Language ([SQL](#)). MySQL runs on virtually all platforms, including [Linux](#), [UNIX](#) and [Windows](#). Although it can be used in a wide range of applications, MySQL is most often associated with web applications and online publishing.

MySQL is an important component of an open source enterprise stack called [LAMP](#). LAMP is a web development platform that uses Linux as the operating system, [Apache](#) as the web server, MySQL as the relational database management system and [PHP](#) as the object-oriented scripting language. (Sometimes [Perl](#) or [Python](#) is used instead of PHP.)

Originally conceived by the Swedish company MySQL AB, MySQL was acquired by Sun Microsystems in 2008 and then by Oracle when it bought Sun in 2010. Developers can use MySQL under the GNU General Public License ([GPL](#)), but enterprises must obtain a commercial license from Oracle.

Today, MySQL is the RDBMS behind many of the top websites in the world and countless corporate and consumer-facing web-based applications, including Facebook, Twitter and YouTube.

- **Cloud Storage**

Cloud storage is a service model in which data is maintained, managed, backed up remotely and made available to users over a network (typically the Internet). Users generally pay for their cloud data storage on a per-consumption, monthly rate. Although the per-gigabyte cost has been radically driven down, cloud storage providers have added operating expenses that can make the technology more expensive than users bargained for. Cloud security continues to be a concern among users. Providers have tried to deal with those fears by building security capabilities, such as encryption and authentication, into their services.

There are three main cloud-based storage architecture models: public, private and hybrid.

Public cloud storage services provide a multi-tenant storage environment that is most suited for unstructured data. Data is stored in global data centers with storage data spread across multiple regions or continents. Customers generally pay on a per-use basis similar to the utility payment model. This market sector is dominated by Amazon Simple Storage Service ([S3](#)), [Amazon Glacier](#) for cold storage, [Google Cloud Storage](#), [Google Cloud Storage Near line](#) for cold data and [Microsoft Azure](#).

Private cloud, or on-premises, storage services provide a dedicated environment protected behind an organization's firewall. Private clouds are appropriate for users who need customization and more control over their data.

Hybrid cloud is a mix of private cloud and third-party public cloud services with orchestration between the platforms for management. The model offers businesses flexibility and more data deployment options. An organization might, for example, store actively used and structured data in an on-premises cloud, and unstructured and archival data in a public cloud. In recent years, a greater number of customers have adopted

the hybrid cloud model. Despite its benefits, a hybrid cloud presents technical, business and management challenges. For example, private workloads must access and interact with public cloud storage providers, so compatibility and solid network connectivity are very important factors. An enterprise-level cloud storage system should be scalable to suit current needs, accessible from anywhere and application-agnostic.

Cloud storage is based on a virtualized infrastructure with accessible interfaces, near-instant elasticity and scalability, multi-tenancy and metered resources. Cloud-based data is stored in logical pools across disparate, commodity servers located on premises or in a data center managed by a third-party cloud provider. Using the RESTful API, an object storage protocol stores a file and its associated metadata as a single object and assigns it an ID number. When content needs to be retrieved, the user presents the ID to the system and the content is assembled with all its metadata, authentication and security.

In recent years, object storage vendors have added file system functions and capabilities to their object storage software and hardware largely because object storage was not being adopted fast enough. All backup applications use the object storage protocol, which is one of the reasons customers first tried backing up their data to the cloud.

VII. SYSTEM DESIGN

- **Proposed system**

Cloud Base Data Storage with Data Integrity paper is a web based application which is used for helping users to share their files and photograph on cloud to secure then. Also user can view and download whenever they want.

- **List of modular description**

There are 2 Modules are used in this paper like,

- User
- Admin

User

- New Registration: Create registration for new user.
- Update Login Details: Update all personal details and upload profile picture.
- Photos Sharing: Upload, View photos.
- Messaging: Write message to friends.
- Change Password: User can change the password.

Admin

The admin helps the admin to do work on database and handle the database of all the users also maintain the security of the database and files of the users.

VIII. CASE DIAGRAM

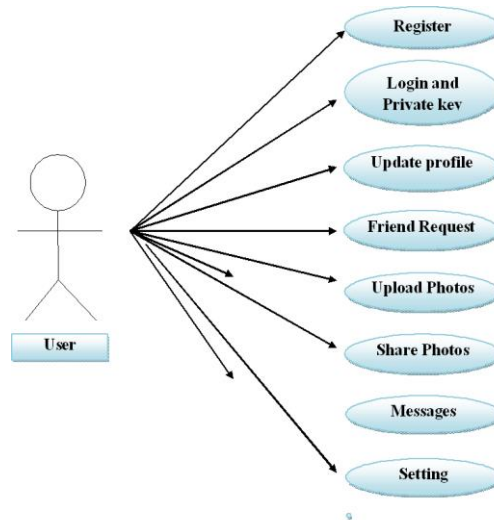


Figure 1: Case Diagram

IX. TEST SPECIFICATION

Testing is a process of executing a program with the interest of finding an error. A good test is one that has high probability of finding the yet undiscovered error. Testing should systematically uncover different classes of errors in a minimum amount of time with a minimum amount of efforts.

Two classes of inputs are provided to test the process

1. A software configuration that includes a software requirement specification, a design specification and source code.
2. A software configuration that includes a test plan and procedure, any testing tool and test cases and their expected results.

Testing is divided into several distinct operations.

Strategic approach of software testing

- a. Unit Testing
- b. Integration Testing
- c. Validation Testing
- d. Recovery Testing
- e. Security Testing
- f. Stress Testing
- g. Black Box Testing
- h. Test Data Output

X. RESULTS

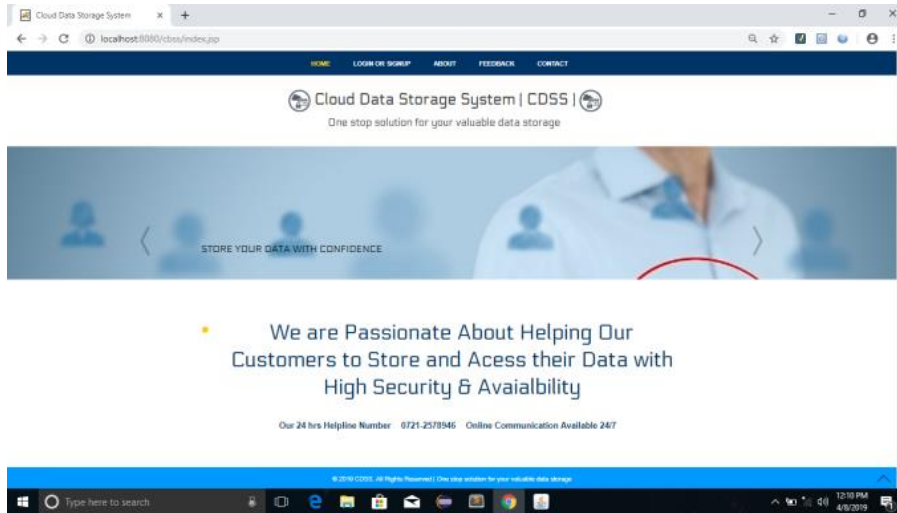


Figure 2: Home Page

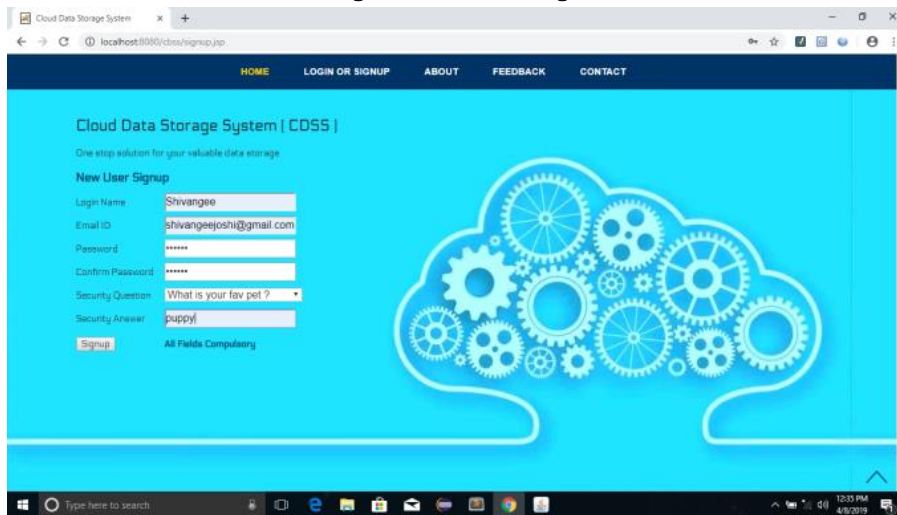


Figure 3: New Registration Page

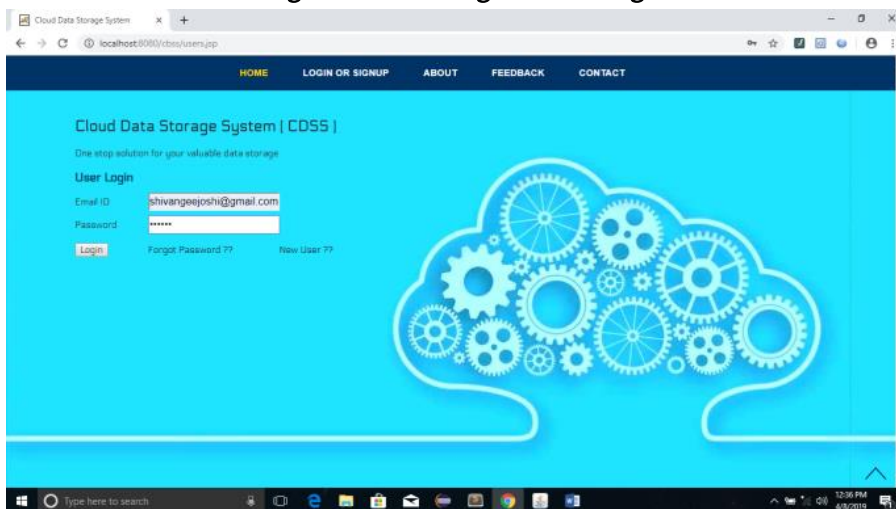


Figure 4: User Login Page



Figure 5: Profile & Profile Picture Updating Page

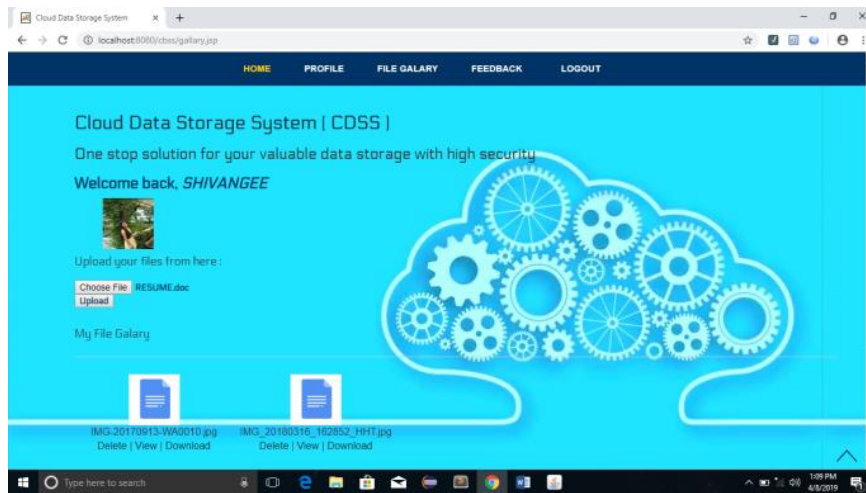


Figure 6: File Upload Page

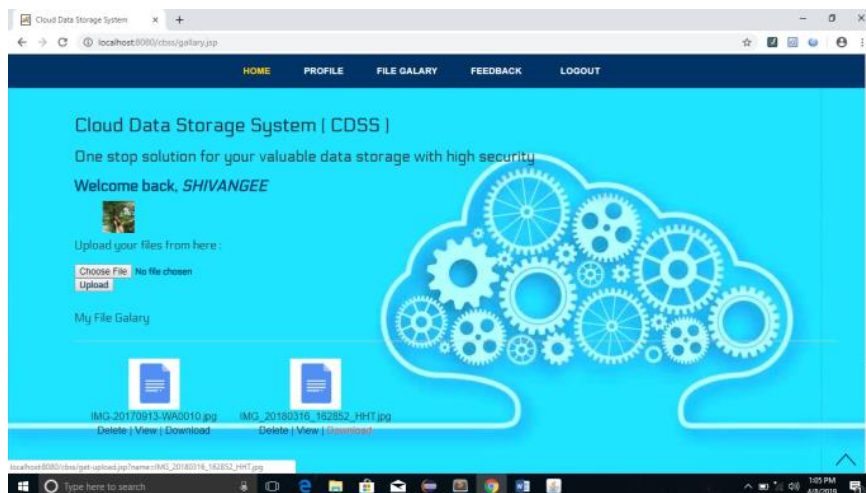


Figure 7: Selecting File Download

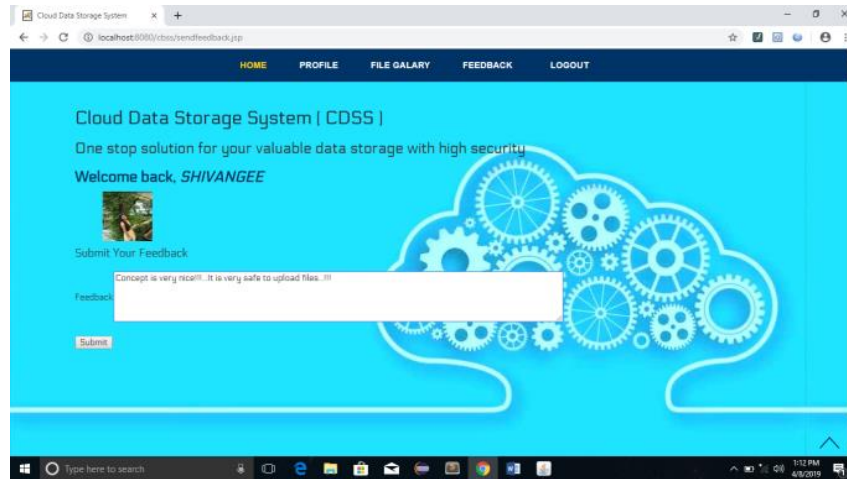


Figure 8: User Feedback Page



Figure 9: Change Password Page

XI. CONCLUSION

When a resource constrained mobile device stores its data on the cloud, there is always a big concern of whether the cloud service provider stores the files correctly or not. Security is the main concern in mobile cloud computing. The proposed mechanism provides a security mechanism for securing the data in mobile cloud computing with the help of DES algorithm and hash function.

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Block Chain Technology and its application

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ABSTRACT

A block chain is peer to peer distributed ledger technology which is an enabled, decentralized, encrypted distributed ledger technology, records of cryptocurrency, transaction verify, everyone owns info not stored in one entity, everyone have copy of data, access to all the transaction one entered not tampered.

Keywords: Decentralization, Transparency, Immutability, time saving, centralization, verification.

I. INTRODUCTION

Introduction of Block Chain:

Block chain was developed by a group of individuals under the concept of distributed computing has been around since 1990s, then 2009 Nakamoto developed bit-coin and introduced the notion of block chain to use decentralized and distributed ledger, the deployment of crypto currency in practical application related 2011-2012, Currency and digital payments 2012-2013, blockchain has emerged in various applications with further developments, 2017-2018.the goal of block chain is to allow digital information to be recorded and distributed, but not edited, in this way ,a blockchain is the foundation for immutable ledgers, or records of transactions that cannot be altered, deleted ,or destroyed.

This is why blockchains are also known as a distributed ledger technology (DLT),First proposed as a research project in 1991,the block chain concept predated its first widespread application in use: Bit coin ,in 2009.In the years since ,the use of blockchains has exploded via the creation of various crypto currencies, decentralized finance (DeFi) applications ,non fungible tokens (NFTs),and smart contracts. to make a decentralized, publicly accessible ledger for recording digital transactions.

Bit coin is the first and most prevalent crypto currency launched, in view of the block chain network, a chain of records stored in the form of blocks, which are typically controlled by no single authority makes it difficult or impossible to change, hack or cheat the system, a digital ledger of transactions.

A block chain network can track orders payments, accounts, and production and much more, members share a single view of the truth.

II. WORK OF BLOCK CHAIN

1. **As each transaction occurs, it is recorded as a “Block of Data”:** The data block can record the record the information of you choice: who, what, when where, such as the temperature of food shipment.
2. **Each block is connected to the ones before and after it:** These blocks from a chain of data, the blocks confirm the exact time and sequence of transactions, and the blocks link securely together to prevent any block from being altered or a block being inserted between two existing blocks.
3. **Transactions are together in an irreversible chain: a blockchain**

Example:

- 1) A wants to send the money to B.
- 2) The transaction is represented online as a ‘block’.
- 3) The block is broadcast to every party in the network.
- 4) Those in the network approve the transaction is valid.
- 5) The block then can be added to the chain, which provides an indelible and transparent record of transaction.
- 6) The money moves from A to B.

III. TYPES OF BLOCKCHAIN TECHNOLOGY

1) **Public BlockChain:**

These blockchains are completely open to following the idea of decentralization, they don't have any restrictions, anyone having a computer and internet can participate in the network.

2) **Private BlockChain:**

These blockchains are not as decentralized as the public blockchain only selected nodes can participate in the process making it more secure then the others.

3) **Consortium BlockChain:**

It is a creative approach that solves the needs of the organization .this blockchain validates the transaction and also initiates or receives transactions, it is also known as Federated blockchain.

4) **Hybrid BlockChain:**

It is the mixed content of the private and public blockchain, where some part is controlled by some organization and other makes are made visible as a public blockchain.

IV. APPLICATIONS OF BLOCKCHAIN TECHNOLOGY

- 1) Money Transfers
- 2) Financial Exchange
- 3) Lending
- 4) Insurance

- 5) Secure Personal Information
- 6) Voting
- 7) Real Estate
- 8) Virtual currency
- 9) Secure sharing of Medical Records
- 10) Supply chain and logistic monitoring
- 11) Original Content Creation
- 12) Payment and transfers
- 13) Health care
- 14) Real Estate
- 15) Bit coin
- 16) Internet of things

V. METHODOLOGY OF BLOCKCHAIN TECHNOLOGY

Blockchain technology is a way is a safe and secure for the financial transaction of virtual values. Like bit coins. For softy of transaction HASH codes plays important role.

This technology stores values digitally, which Enables peer to peer transactions to internet without interruption of any other third party.

For every transaction of the digital currency, there is need of private key, which is generated for every transaction, this is nothing but for squaring and indentifying ownership of digital currency.

Suppose, someone is buying a some digital currency like bitcoin, the transaction is processed, private key should match with starting of transaction. If this both key matched then only digital currency will be transferred, if not match then transaction will decline.

VI. ADVANTAGES OF BLOCKCHAIN TECHNOLOGY

- 1) **Open:** one of the major advantage of blockchain technology is that it is accessable to all means any one can become a participant in the contribution to blockchain technology.
- 2) **Verifiable:** Blockchain technology is used to store information in a decentralized manner so everyone can verify the correctness of the information by using zero-knowledge.
- 3) **Permanent:** Records or information which is store using blockchain technology is permanent means one needs not worry about losing the data,
- 4) **Tighter Security:** Blockchain uses hashing techniques to store each transaction on a block that is connected to each other so it has tighter security.
- 5) **Efficiency:** Blockchain removes any third party intervention between transactions and removes the mistakes making the system efficient and faster. Settlement is made easier and smooth.
- 6) **Cost Reduction:** As blockchain needs no third man it reduces the cost for the businesses and gives trust to the other partner.

VII. DISADVANTAGES OF BLOCKCHAIN TECHNOLOGY

- 1) **Scalability:** It is one of the biggest drawbacks of blockchain technology as it can not be scaled due to the fixed size of the block for storing information.
- 2) **Energy Consuming:** For verifying any transactions a lot of energy is used so it becomes a problem according to the survey it is considered that 0.3 percent of the world's electricity had been used by 2018 in the verifications of transactions done using blockchain technology.
- 3) **Time-Consuming:** To add the next block in the chain miners need to compute none values many times so this is a time consuming process and needs to be speed up to be used for industrial purposes.
- 4) **Legal Formalities:** In some countries, the use of blockchain technology applications is banned like cryptocurrency due to some environmental issues.
- 5) **Storage:** Blockchain databases are stored on all the nodes of the networks creates an issues with the storage, increasing number of transactions will require more storage.

VIII. CONCLUSION OF BLOCKCHAIN TECHNOLOGY

Today, the world has found applications of blockchain technology in several industries, where the trust without the involvement of a cauterized authority is desired. So welcome to the world of blockchain.

Blockchain technology is only going to grow in the fields of business, finance, law , medicine, and real estate. Whether you're an experienced blockchain developer, or you're aspiring to brake into this exciting industry, enrolling in our blockchain certification training programme will help individuals with all levels of experience to learn blockchain developer techniques and strategies.

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Information Technology and Its Impact on Environment and Human Health

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ABSTRACT

Information technology is the largest source of number of useful information and guidelines for the present days. Technology is highly developed and playing vital role in each and every field. Now a days, without smartphone, the daily human life is not regularized. Present study deals with the advantages and disadvantages of Information technology and its impact on environment and human health.

KEY WORDS: - Information Technology, Environment, Human Health

I. INTRODUCTION

Now a days, the most of the most of the information required in routine work, study material can be easily available on internet and every can get it even if on their smart phone which is due to the fast growth/development of information technology. The ministry of environment and forest and government of India have created environment information system. The number of different centers are set up in different organizations for information collection, storage and work towards the environment.

II. DISCUSSION

In present study here we are discussing the impact of information technology mainly on 1) Role of technology in environment and 2) Role of technology in human health

1) Role of Technology in Environment:

Information Technology provides a useful information of atmospheric phenomena like monsoon, ozone layer depletion, inversion phenomena, smog etc. We are able to discover many new reserves of oils, minerals and many information with the help of information generated by remote sensing satellites. Different geographical maps containing a digital information on a number of aspects like a water resources, industrial growth, human settlements, road network, soil type, forest land, crop land or grass land etc. to see the present position in the

forest areas. Satellite images provides as actual information about various physical and biological resources and changes in atmosphere. It also provides information to some extent about their degradation.

2) Role of Technology in Human Health:

In present days the new disease and virus is seen in last two to three years. Information technology is playing a major role in bioinformatics, genome sequencing, biotechnology, genetic engineering, online medical transcription and in maintaining DTA database for a better human health. It also helps in identifying several diseases, infected areas which are prone to some vector born disease like Malaria and Schistosomiasis etc.

The newly develop DNA bar coding, DNA finger printing, different type of color sonography, plastic surgeries, forensic science and number of new inventions which play the important role in developing medical technology and human health. Recently a new American Company M- Square started home medical transcription system under which a medical online service can be started from home. In our country the company like Tata 1mg, pharm easy also provides the same facility. But it is necessary to be careful about misuse of technology specially in children like playing games, unsafe apps and vulgar information through you tube.

III. CONCLUSION

As we can see, in present days the information technology is rapidly growing in each and every sector of development especially in the environment and human life with increasing applications and providing new sources with an effective role in education, management and planning in each and every field. It also becoming most useful in government officials for day to day information and data storage. So, it is essential for we people to become ecofriendly with information technology and its current developed technology.

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Study of Need Green Accounting for Sustainable Development

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ABSTRACT

Green accounting is a framework for integrating environmental concerns into economic decision-making, with the aim of promoting sustainable development. This research paper examines the challenges of implementing green accounting in the context of sustainable development. The paper highlights the need for reliable environmental data, the difficulty of assigning monetary values to environmental impacts, and the importance of international cooperation and coordination. Despite these challenges, the paper argues that green accounting can provide numerous benefits, including improved resource management, reduced environmental impacts, and increased transparency and accountability in decision-making. The paper concludes that there is a need for continued research and development of green accounting frameworks to support sustainable development.

Keywords: Green accounting, Sustainable growth, role of green accounting, Environment

Data Collection Method Used for Research:

This research depends on secondary data like newspapers, books, magazines, reports, and websites.

OBJECTIVE:-

1. To examine the concept of green accounting and its potential as a framework for integrating environmental concerns into economic decision-making.
2. To identify and analyze the challenges associated with implementing green accounting in the context of sustainable development, including the lack of reliable environmental data, the difficulty of assigning monetary values to environmental impacts, and the need for international cooperation and coordination.
3. To assess the potential benefits of green accounting for sustainable development, including improved resource management, reduced environmental impacts, and increased transparency and accountability in decision-making.
4. To identify areas where further research and development of green accounting frameworks are required in order to fully realize the potential of green accounting for sustainable development.
5. Overall, the research paper aims to provide a comprehensive understanding of the challenges and opportunities associated with green accounting for sustainable development, and to identify strategies and recommendations for overcoming these challenges and supporting the transition to a more sustainable future.

I. INTRODUCTION

Green Accounting is an emerging concept that has gained significant attention in recent years as a framework for integrating environmental concerns into economic decision-making. The concept of green accounting is rooted in the belief that sustainable development can only be achieved through the integration of environmental, social, and economic considerations. It recognizes that economic growth and environmental protection are not mutually exclusive, and that sustainable development requires a balance between the two.

The implementation of green accounting requires the identification and measurement of the environmental impacts of economic activities. This includes the identification of both positive and negative environmental impacts, as well as the development of methodologies for assigning monetary values to these impacts. By integrating environmental considerations into economic decision-making, green accounting can help to ensure that natural resources are used in a sustainable manner, promote more efficient use of resources, and ultimately support the transition to a more sustainable future.

However, the implementation of green accounting is not without its challenges. One of the major challenges associated with green accounting is the lack of reliable environmental data. In order to implement green accounting effectively, it is important to have access to accurate and comprehensive environmental data. Another challenge is the difficulty of assigning monetary values to environmental impacts, which is a complex and contentious issue. Finally, effective green accounting frameworks require international cooperation and coordination, which can be challenging in a world where there is significant geopolitical tension.

Despite these challenges, green accounting has significant potential to support sustainable development. By accurately measuring and reporting on environmental impacts, green accounting can help to identify areas where improvements can be made, promote the development of more environmentally sustainable practices and technologies, and ultimately reduce environmental impacts over time. Furthermore, green accounting can also promote increased transparency and accountability in decision-making, which can help to ensure that decision-makers are aware of the environmental consequences of their actions.

In conclusion, the implementation of green accounting is essential for achieving sustainable development. By integrating environmental considerations into economic decision-making, green accounting can help to promote a more sustainable use of natural resources, reduce environmental impacts, and support the transition to a more sustainable future.

II. REVIEW OF LITERATURE

Green accounting is a system of accounting that takes into consideration the impact of economic activities on the environment. It aims to provide a comprehensive picture of the economic, environmental, and social costs and benefits of various activities, allowing policymakers and businesses to make informed decisions about sustainable development.

There have been numerous studies on the subject of green accounting, and many of these studies have focused on its potential benefits and challenges. Here are some key findings from the literature:

Green accounting can help businesses and governments make informed decisions about sustainability. By providing a more comprehensive picture of the costs and benefits of various economic activities, green

accounting can help decision-makers make better choices about resource use, waste reduction, and other sustainability-related issues.

There are challenges associated with implementing green accounting. For example, it can be difficult to measure the environmental impact of economic activities, and there may be disagreements over how to assign value to environmental resources.

Green accounting can be used to promote sustainable development in a number of ways. For example, it can be used to encourage businesses to adopt sustainable practices, to promote the development of renewable energy sources, and to support the conservation of natural resources.

There is a need for standardized methods and guidelines for green accounting. Without consistent methods and guidelines, it can be difficult to compare the environmental impact of different economic activities or to track progress toward sustainability goals.

Overall, the literature suggests that green accounting has the potential to be a valuable tool for promoting sustainable development, but that there are also challenges associated with its implementation. As such, there is a need for further research and collaboration to develop standardized methods and guidelines for green accounting that can be widely adopted by businesses and governments.

III. GREEN ACCOUNTING FOR SUSTAINABLE DEVELOPMENT

Green accounting is an accounting method that takes into account environmental impacts and natural resource use in addition to financial considerations. It is a tool that enables the measurement, management, and reporting of environmental and social costs and benefits of economic activity. It aims to help decision-makers make more informed and sustainable decisions by providing a more comprehensive view of the costs and benefits of economic activities.

Green accounting for sustainable development is a framework for integrating environmental and social factors into national accounts and economic decision-making. It seeks to capture the true costs and benefits of economic activity by accounting for the impacts on natural resources, the environment, and human well-being. The purpose of green accounting is to provide decision-makers with a more complete picture of the economic, environmental, and social impacts of their decisions.

The concept of green accounting originated in the early 1990s, in response to growing concerns about environmental degradation and the limitations of traditional accounting methods in capturing the full extent of the impacts of economic activity. It has since evolved into a comprehensive framework that includes a range of tools and methods for measuring, managing, and reporting environmental and social impacts.

Green accounting for sustainable development has several key components. One of these is the valuation of natural resources, which involves estimating the economic value of natural resources such as forests, minerals, and water. This is important because natural resources are often treated as free goods, and their depletion or degradation is not reflected in traditional economic accounts. By valuing natural resources, green accounting helps to ensure that their depletion or degradation is accounted for in economic decision-making.

Another component of green accounting is the measurement of environmental costs and benefits. This involves assessing the environmental impacts of economic activity, such as greenhouse gas emissions, air and water pollution, and land use changes. By quantifying these impacts in monetary terms, green accounting provides

decision-makers with a more complete picture of the costs and benefits of economic activity, including the hidden costs of environmental damage.

IV. CONCLUSION

In conclusion, Green Accounting for Sustainable Development is a critical framework that integrates environmental and social factors into economic decision-making. It aims to capture the true costs and benefits of economic activity by accounting for the impacts on natural resources, the environment, and human well-being.

One of the key components of Green Accounting is the valuation of natural resources, which helps to ensure that their depletion or degradation is accounted for in economic decision-making. Additionally, the measurement of environmental costs and benefits quantifies the impacts of economic activity, including hidden costs of environmental damage.

Green Accounting also involves the development of metrics and indicators for measuring environmental and social performance, which can be used to track progress towards sustainability goals. This allows decision-makers to identify areas for improvement and measure progress over time.

Furthermore, the integration of environmental and social considerations into economic decision-making through Green Accounting can result in better decision-making and more sustainable outcomes. It allows for the use of policy instruments such as taxes, subsidies, and regulations to internalize environmental and social costs, and the incorporation of sustainability criteria into investment and procurement decisions.

Overall, the integration of Green Accounting into economic decision-making is essential for achieving sustainable development goals and securing a sustainable future. It provides decision-makers with a more complete picture of the costs and benefits of economic activity, enabling them to make more informed and sustainable decisions. It helps to ensure that economic development is carried out in an environmentally sustainable and socially responsible manner, while maintaining the well-being of future generations. Therefore, the continued use and improvement of Green Accounting is crucial for achieving a sustainable future.

Green accounting also involves the development of indicators and metrics for measuring environmental and social performance. These metrics can include measures of resource use, emissions, waste generation, and social impacts. By tracking these metrics over time, decision-makers can identify areas for improvement and measure progress towards sustainability goals.

Finally, green accounting involves the integration of environmental and social considerations into economic decision-making. This can include the use of policy instruments such as taxes, subsidies, and regulations to internalize environmental and social costs, and the incorporation of sustainability criteria into investment and procurement decisions.

Green accounting for sustainable development has several benefits. First, it provides decision-makers with a more complete picture of the costs and benefits of economic activity, enabling them to make more informed and sustainable decisions. Second, it helps to ensure that the depletion and degradation of natural resources are accounted for in economic decision-making, reducing the risk of environmental damage and ensuring that future generations have access to the resources they need. Third, it enables the tracking of progress towards sustainability goals, allowing decision-makers to identify areas for improvement and measure progress over time.

In conclusion, green accounting for sustainable development is a framework for integrating environmental and social factors into economic decision-making. It provides decision-makers with a more complete picture of the costs and benefits of economic activity, enabling them to make more informed and sustainable decisions. It helps to ensure that the depletion and degradation of natural resources are accounted for in economic decision-making, reducing the risk of environmental damage and ensuring that future generations have access to the resources they need. Finally, it enables the tracking of progress towards sustainability goals, allowing decision-makers to identify areas for improvement and measure progress over time.

V. SUGGESTIONS

Here are some suggestions for the implementation of Green Accounting for Sustainable Development:

1. Develop national-level green accounting frameworks: Governments should develop comprehensive frameworks for green accounting at the national level to ensure that economic decision-making is based on a complete picture of the costs and benefits of economic activity.
2. Enhance capacity building: Governments should invest in capacity building to ensure that decision-makers have the skills and knowledge necessary to implement green accounting frameworks effectively.
3. Encourage private sector participation: The private sector should be encouraged to participate in green accounting initiatives by providing incentives for companies that adopt sustainable practices and penalizing those that do not.
4. Develop sustainability reporting standards: Governments and other stakeholders should work together to develop sustainability reporting standards that require companies to report on their environmental and social impacts, as well as their financial performance.
5. Incorporate environmental and social considerations into investment decisions: Financial institutions should be encouraged to incorporate environmental and social considerations into their investment decisions by including sustainability criteria in their investment analysis.
6. Promote public awareness: Governments should promote public awareness of the importance of green accounting for sustainable development to encourage support for sustainability initiatives and to increase public pressure on decision-makers to act in a sustainable manner.
7. By implementing these suggestions, we can ensure that Green Accounting for Sustainable Development is used effectively and contributes to the achievement of sustainability goals.

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IR, NMR Spectral Analysis of Newly Synthesized Lactose Containing Heterocyclic Compounds

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ABSTRACT

The IR spectroscopy theory utilizes the concept that molecules tend to absorb specific frequencies of light that are characteristic of the corresponding structure of the molecules. It is an essential tool for the structural analysis of newly synthesized compound. Infrared spectroscopy is the measurement of the interaction of infrared radiation with matter by absorption, emission, or reflection. It is used to study and identify chemical substances or functional groups. It is the spectroscopy that deals with the infrared region of the electromagnetic spectrum that is light with a longer wavelength and lower frequency than visible light. It covers a range of techniques, mostly based on absorption spectroscopy. Many nuclei have spin, and all nuclei are electrically charged, according to the NMR principle. An energy transfer from the base energy to a higher energy level is achievable when an external magnetic field is supplied. Nuclear Magnetic Resonance (NMR) spectroscopy is an analytical chemistry technique used in quality control and research for determining the content and purity of a sample as well as its molecular structure.

Novel 4-aryl-5-p-tolylimino-3-hepta-O-benzoyl- β -D-lactosylimino-1, 2, 4-dithiazolidines (hydrochlorides) have been synthesized by the interaction of several 1-hepta-O-benzoyl- β -D-lactosyl-3-aryl thiocarbamides with N-p-tolyl-S-chloro isothiocarbamoyl chloride. The newly synthesized compounds have been characterized by analytical and IR, ¹H NMR. The polarimetric studies of the title compounds have been carried out.

Keywords: - IR, ¹H NMR spectroscopy, 1, 2, 4-dithiazolidines etc.

I. INTRODUCTION

Disaccharides & Polysaccharides are important bio macromolecules with numerous beneficial functions and a wide range of industrial applications. Functions and properties of Disaccharides & Polysaccharides are closely related to their structural features. Infrared (IR) spectroscopy is a well-established technique which has been widely applied in polysaccharide structural analysis. In this paper, the principle of IR and interpretation of polysaccharide IR spectrum are briefly introduced. Classical applications of IR spectroscopy in polysaccharide structural elucidation are reviewed from qualitative and quantitative aspects. Some advanced IR techniques including integrating with mass spectrometry (MS), microscopy and computational chemistry are introduced and their applications are emphasized. These emerging techniques can considerably expand application scope

of IR, thus exert a more important effect on carbohydrate characterization. Overall, this review seeks to provide a comprehensive insight to applications of IR spectroscopy in polysaccharide structural analysis and highlights the importance of advanced IR-integrating techniques.

Fundamentals of near-infrared spectroscopy in the study of carbohydrates, as well as the application of partial least squares regression (PLSR) and principal component analysis (PCA), as the most useful chemo metric techniques involved in carbohydrate analysis. The theoretical aspects and practical applications starting from simple to complex carbohydrates mixtures are covered.

For example, NMR can quantitatively analyze mixtures containing known compounds. For unknown compounds, NMR can either be used to match against spectral libraries or to infer the basic structure directly. Once the basic structure is known, NMR can be used to determine molecular conformation in solution as well as studying physical properties at the molecular level such as conformational exchange, phase changes, solubility, and diffusion. In order to achieve the desired results, a variety of NMR techniques are available.

II. RESULTS AND DISCUSSION

Herein, we report the synthesis of various 4-aryl-5-*p*-tolylimino-3-hepta-*O*-benzoyl- β -D-lactosylimino-1, 2, 4-dithiazolidines (hydrochlorides) by interaction of several 1-hepta-*O*-benzoyl- β -D-lactosyl-3-aryl thiocarbamides with *N*-*p*-tolyl-*S*-chloro isothiocarbamoyl chloride. All products were crystallized from ethanol before recording the physical data. The purity of compounds was checked by TLC. The spectral analyses IR, ¹H NMR of the product were observed. Optical rotation of the product was also recorded.

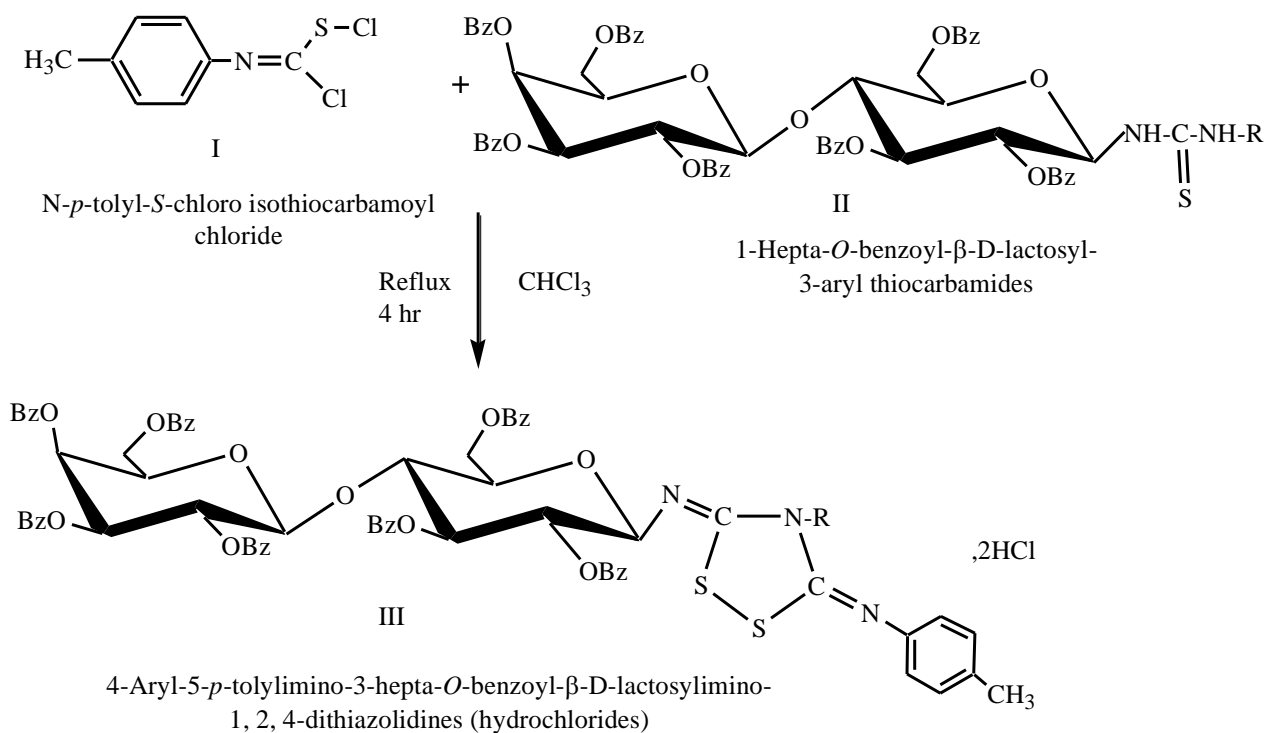
III. EXPERIMENTAL

MATERIAL AND METHODS

The identities of these new *N*-lactocides have been established by the use of ¹H NMR spectral study. ¹H NMR measurements were performed on a Bruker DRX (300MHz FT NMR) NMR spectrometer in CDCl₃ solution with TMS as internal reference ¹H NMR spectra of new *N*-lactosides do contain some well resolved signals, including those of aromatic protons at δ 7.45-6.9ppm, lactosyl protons at δ 5.35-3.77 ppm, acetyl proton at δ 2.45-1.97 ppm, methyl protons at (Ar-CH₃) δ 1.263 ppm & other protons that are influenced by specific functionality. Similarly influence of structural features on chemical shift & coupling constant was illustrated by NMR spectra. In this way applications of NMR spectroscopy used for studies of carbohydrate are briefly considered.

Experiment No. 1: Synthesis of 4-aryl-5-*p*-tolylimino-3-hepta-*O*-benzoyl- β -D-lactosylimino-1, 2, 4-dithiazolidine (hydrochlorides) (IIIa)

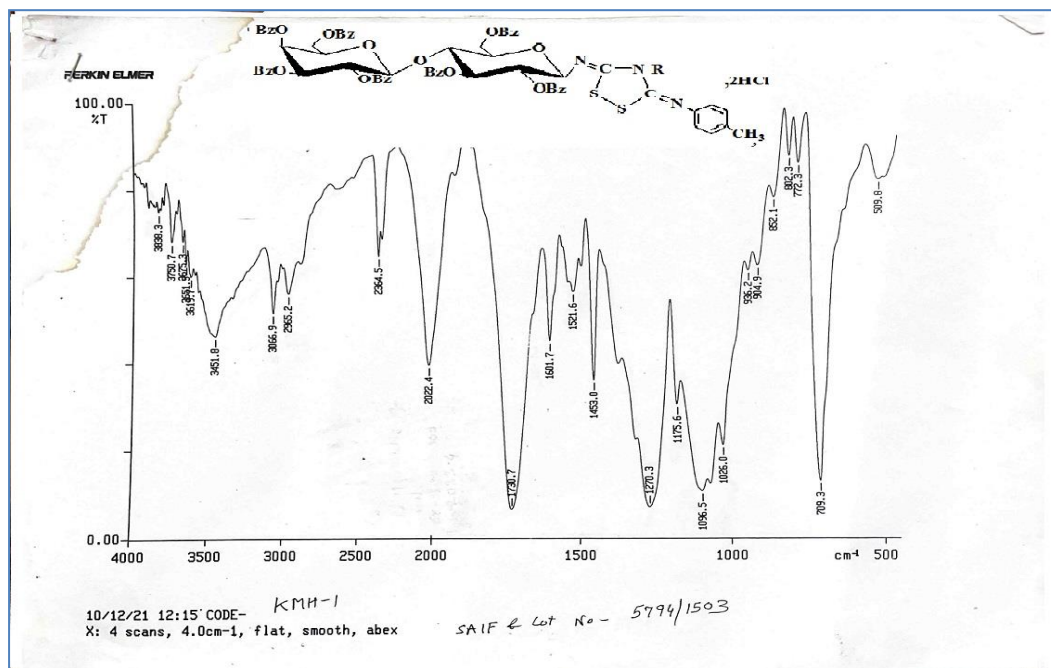
To chloroform solution of *N*-*p*-tolyl *S*-chloro isothiocarbamoyl chloride (0.002M, 0.298g in 15 mL) was added chloroform solution of 1-hepta-*O*-benzoyl- β -D-lactosyl-3-aryl thiocarbamide (0.002M, 2.408g in 20mL) and the reaction mixture was refluxed over boiling water bath for 4 hr. during which evolution of HCl was noticed. The progress of reaction was monitored by TLC. After refluxing, the solvent was distilled off under reduced pressure and sticky mass obtained as residue was triturated several times with petroleum ether (60-80°C). A pale yellow solid was obtained. It was purified by chloroform-petroleum ether



The Infrared spectral¹⁻¹⁶ analysis of the product distinctly showed bands due to Ar. C-H str., Ali. C-H str, C=O str., C=Nstr., C-N str., C-S str., S-S str., and bands due to characteristic of lactose unit.

Table 1.1: IR Spectral analysis of 4-phenyl-5-*p*-tolylimino-3-hepta-*O*-benzoyl- β -D-lactosylimino-1,2,4-dithiazolidine (hydrochlorides) (IIIa)

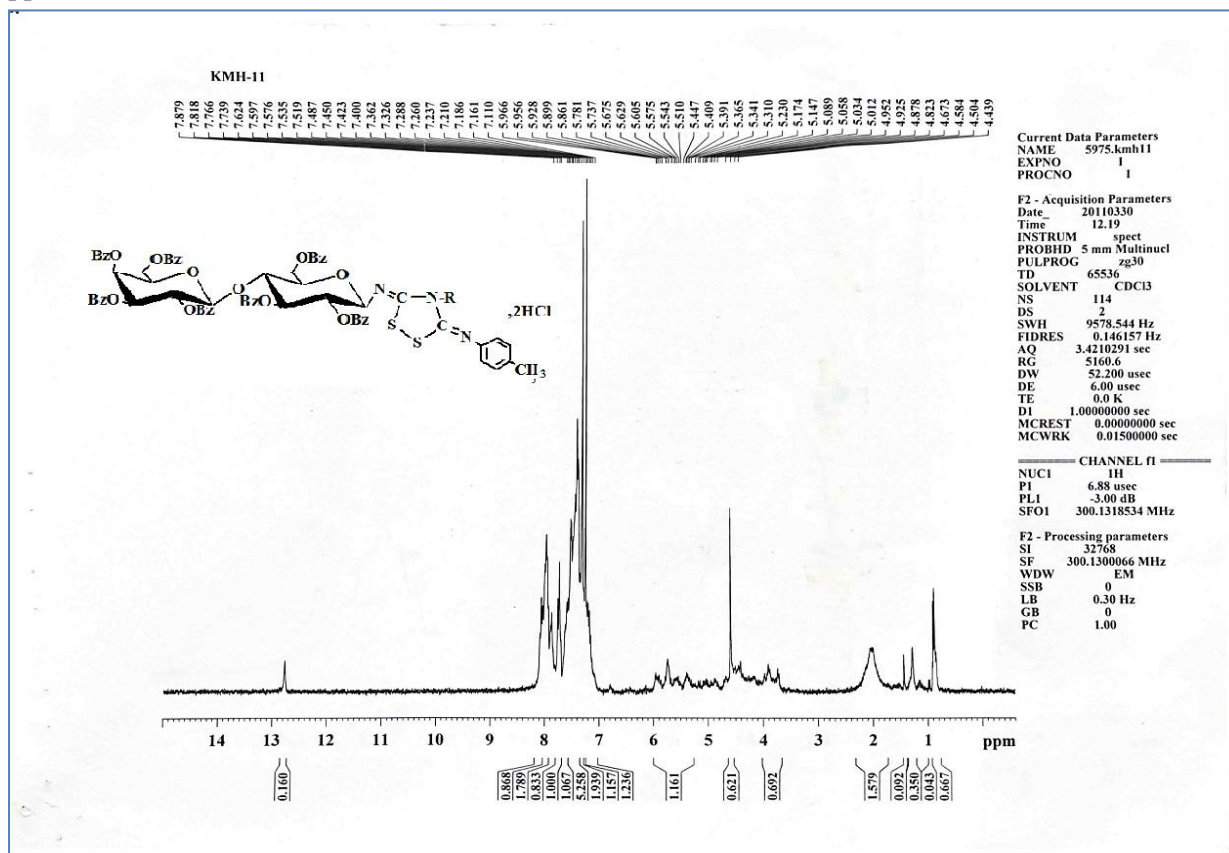
Absorption observed (cm ⁻¹)	Assignment	Absorption expected (cm ⁻¹)
3066.9	Ar-H stretching	3080-3020 ^{9b, 10b}
2963.2	Ali. C-H stretching	2980-2920 ^{10a}
1730.7	C=O stretching	1730-1715 ^{14, 9c, 10c}
1631.7	C=N stretching	1689-1471 ^{10,13-14}
1270.3	C-N stretching	1400-1280 ^{10f}
1755.6	C-O stretching	1300-1041 ^{10d, 12}
1026, 936.2	characteristic of β - D- lactosyl ring	1100-1000 and 910-900 ^{12,15-16}
709.3	C-S stretching	800-680 ^{8b, 10h}



¹H NMR spectral analysis:

The ¹H NMR spectrum^{10, 14, 17-24} display the signals due to aromatic protons, lactosyl protons¹⁸⁻²⁴.

The NMR spectrum of IIIa displayed the signals due to aromatic protons at δ 8.13-7.12 ppm^{5, 14d,2-23} (44H, m, 7COC₆H₅, C₆H₅, C₆H₄) lactosyl protons at δ 6.19-3.71 ppm (14H, m), and methyl protons (Ar-CH₃) δ 2.321ppm¹⁵⁻¹⁸ (3H, s, CH₃).



IV. CONCLUSION

In this research work, the characterizations of newly synthesized products were established on the basis of IR, ¹H NMR, spectral studies. Various lactose containing Heterocyclic Compounds were synthesized and yield of product ranged from 60-75%.

V. ACKNOWLEDGEMENT

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A Comprehensive Review on Dynamics of Block Chain Technology and its Applications

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ABSTRACT

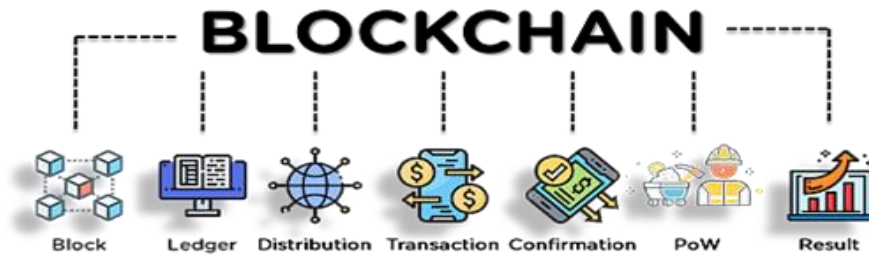
Block chain is an encrypted, distributed database that records data or it is digital ledger of any transaction, contracts that needs to be independently recorded. Block chain is the new paradigm, which is for distributing time-stamped digital records. It is a decentralized technology managed by cluster of computers. The decentralized, immutable, secure and transparent nature of block chain technology makes it so fascinating for all researchers. Block chain technology is a trending research area with wider challenges in almost all fields of applications. The paper aims to narrate the importance of this technology for the future, its advantages and its wide applications in various fields. Block chain application list include financial services, government services, health care, cryptography, commercial applications, entertainments and educational sectors etc.

Keywords: Block chain, transparency, distributed, and decentralized

I. INTRODUCTION

Firstly, let us understand the words block and chain. Block refers to a pack of sequence increasing list of digital records. The given blocks of digital records are linked as a linear chain and security is provided using cryptographic hash functions like SHA-256 and are time stamped [1]. Actually, a block chain is a type of data structure that provides secure and valid achievement of distributed agreement of digital ledger. A block, which is a pack of data, is processed using mining techniques for fitting the data as a block and is secured. To the new block that is formed, a hash of the previous block is included and therefore forming a chronologically ordered chain from the first block to the new block. This process repeats with new added blocks and the network is thus maintained.

Block chain technology adapts a distributed environment and the only trust is the consensus among the participants of the network. A transaction on the block chain is immutable, which means that no one in the network can edit it after it was recorded - there are no exceptions. Although if you make a mistake unintentionally, it is impossible to correct or delete it. In order to repair the issue, a new transaction should be created, that will reference the incorrect entry in the database. All recorded data are made visible thus making the entire process transparent. Moreover, block chain is a decentralized digital network as centralized systems suffers from single point of failure due to technical errors and security attacks [2].

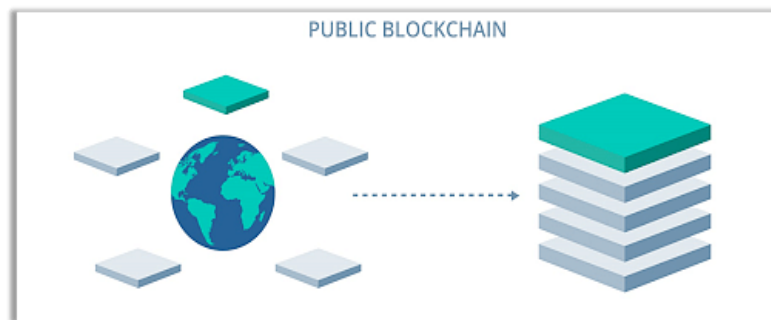


II. 3TYPES OF BLOCK CHAIN

There are majorly four types of Block chain.

1. Public Block chain

It is an unpermitted distributed ledger on which anybody can join and conduct transactions. It is a non-restrictive form of the ledger in which each peer has a copy. This also means that anyone with an internet connection can access the public block chain.



This user has access to historical and contemporary records and the ability to perform mining operations. These complex computations must be performed to verify transactions and add them to the ledger. On the block chain network, no valid record or transaction may be altered. Because the source code is usually open, anybody can check the transactions, uncover problems, and suggest fixes.

Advantages of Public Block chain:

- Trustable: Public Block chain nodes do not need to know or trust each other because the proof-of-work procedure ensures no fraudulent transactions.
- Secure: A public network can have as many participants or nodes as it wants, making it a secure network. The higher the network's size, the more records are distributed, and the more difficult it is for hackers to hack the all network.
- Open and Transparent: The data on a public block chain is transparent to all member nodes. Every authorized node has a copy of the block chain records or digital ledger.

Disadvantages of Public Block chain:

- Lower TPS: The number of transactions per second in a public block chain is extremely low. This is because it is a large network with many nodes, which take time to verify a transaction and do proof-of-work.

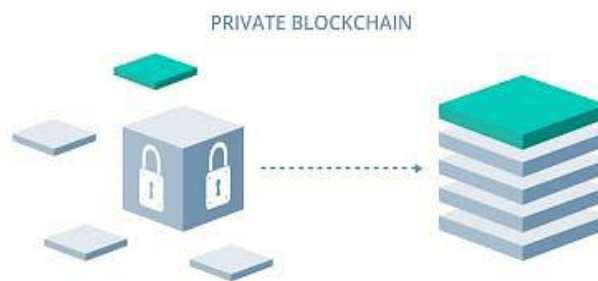
- Scalability Issues: Its transactions are processed and completed slowly. This harms scalability. Because the more we try to expand the network's size, the slower it will become.
- High Energy Consumption: The proof-of-work device is expensive and requires lots of energy. Technology will undoubtedly need to develop energy-efficient consensus methods.

Uses of Public Block chain:

- Voting: Governments can use a public block chain to vote, ensuring openness and trust.
- Fundraising: Businesses or initiatives can use the public Block chain to improve transparency and trust.

2. Private Block chain

A block chain network operates in a private context, such as a restricted network, or is controlled by a single identity. While it has a similar peer-to-peer connection and decentralization to a public block chain network, this Block chain is far smaller.



They are often run on a small network within a firm or organization rather than open to anybody who wants to contribute processing power. Permission block chains and business block chains are two more terms for them.

Advantages of Private Block chain:

- Speed: Private Block chain transactions are faster. because this private block network has a smaller number of nodes, which shortens the time it takes to verify a transaction.
- Scalability: You can tailor the size of your private block chain to meet your specific requirements. This makes private block chains particularly scalable since they allow companies to easily raise or decrease their network size.

Disadvantages of Private Block chain:

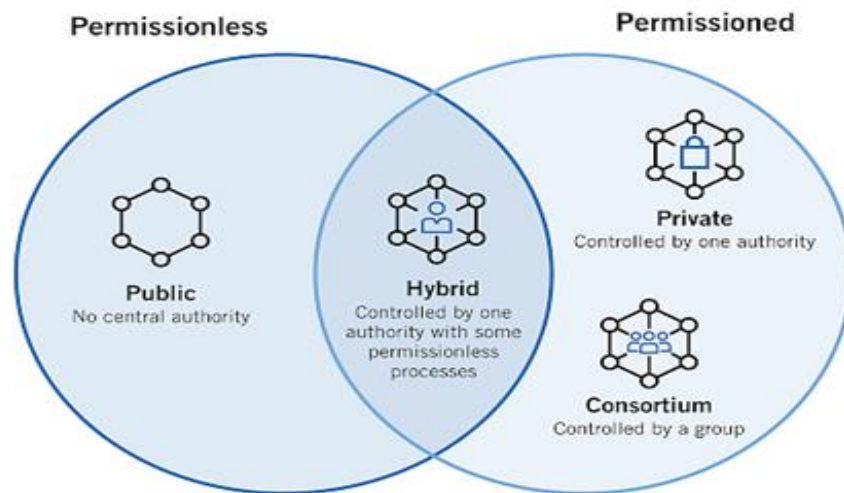
- Trust Building: In a private network, there are fewer participants than in a private network.
- Lower Security: A private block chain network has fewer nodes or members, so it is more vulnerable to a security compromise.
- Centralization: Private Block chains are limited in that they require a central Identity and Access Management (IAM) system to function. This system provides full administrative and monitoring capabilities.

Uses of Private Block chain:

- Supply Chain Management: A private block chain can be used to manage a company's supply chain.
- Asset Ownership: A private block chain can be used to track and verify assets.
- Internal Voting: Internal voting is also possible with a private block chain.

3. Hybrid Block chain

Organizations who expect the best of both worlds use a hybrid block chain, which combines the features of both private and public block chains. It enables enterprises to construct a private, permission-based system alongside a public, permission less system, allowing them to choose who has access to certain Block chain data and what data is made public.



In a hybrid block chain, transactions and records are typically not made public, but they can be validated if necessary by granting access via a smart contract.

Advantages of Hybrid Block chain –

- Secure: Hybrid block chain operates within a closed environment, preventing outside hackers from launching a 51 percent attack on the network.
- Cost-Effective: It also safeguards privacy while allowing third-party contact. Transactions are inexpensive and quick and scale better than a public block chain network.

Disadvantages of Hybrid Block chain:

- Lack of Transparency: Because information can be hidden, this type of block chain isn't completely transparent.
- Less Incentive: Upgrading can be difficult, and users have no incentive to participate in or contribute to the network.

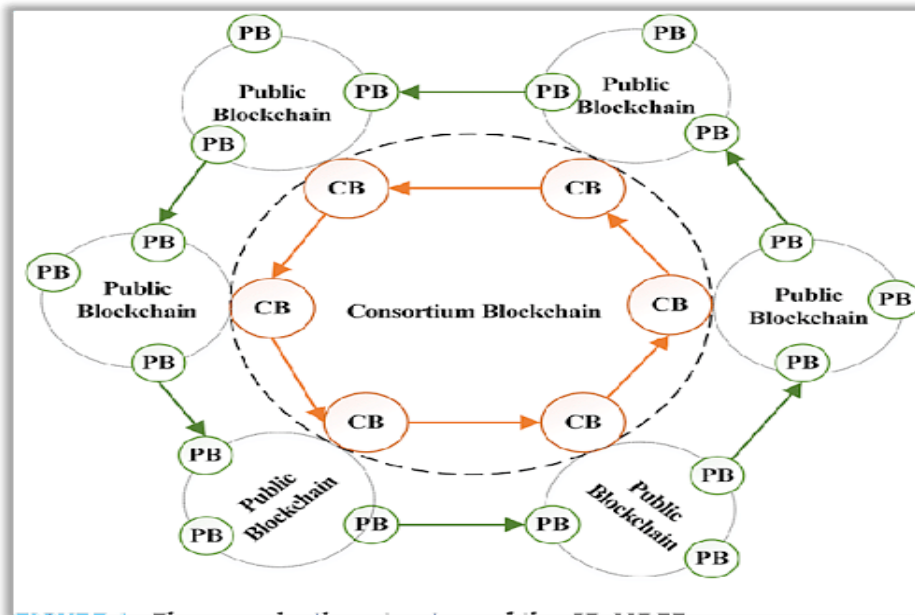
Uses of Hybrid Block chain:

- Real Estate: Real-estate companies can use hybrid networks to run their systems and offer information to the public.
- Retail: The hybrid network can also help retailers streamline their processes.

- Highly Regulated Markets: Hybrid block chains are also well suited to highly regulated areas like the banking sector.

4. Consortium Block chain

The same hybrid block chain has both private and public block chain features, a Consortium block chain, also known as a federated block chain, does. However, it differs because it involves various organizational members working together on a decentralized network.



Predetermined nodes control the consensus methods in a consortium block chain. It has a validator node responsible for initiating, receiving, and validating transactions. Transactions can be initiated or received by member nodes.

Advantages of Consortium block chain.

- Secure: A consortium block chain is more secure, scalable, and efficient than a public block chain network. It, like private and mixed block chains, has access controls.

Disadvantages of Consortium Block chain.

- Lack of Transparency: The consortium block chain has a lower degree of transparency. If a member node is infiltrated, it can still be hacked, and the Block chain's rules can render the network inoperable.

Uses of Consortium Block chain:

- Banking and Payments: A consortium can be formed by a group of banks working together. They have control over which nodes will validate transactions.
- Research: A consortium block chain can be employed to share research data and outcomes.
- Food Tracking: It is also apt for food tracking [3].

III. APPLICATION OF BLOCK CHAIN TECHNOLOGY IN VARIOUS FIELDS

- **Finance:** Block chain technology is being used for fund transfers at domestic and international level. International level financial services are more beneficial as it is decentralized in nature on comparing to domestic one which is more of centralized. Block chain in financial services such as banking sector is believed to be power consuming and uses very less resources for ledger generation, maintenance and storage [4]. The decentralized nature of block chain makes it more secure and recoverable. Moreover, the current practice for fund transfer process at international level is time consuming and has high risks. Use of block chain in fund transfer makes the process immediate secure and transparent.
- **Energy Sector:** Block chain technology is used in energy sectors for the purpose of billing, sales and marketing, grid management and automation control and for providing security [5].
- **Urban development:** It is being used in developing smart city projects on addressing the issues like fraud, liability, and unskilled service providers [6].
- **Property and its Rights:** Block chain systems could be used to track legal ownership of a property. The smart contract system and decentralized nature of the technology may aid in “rewriting the basic tenets of property law, constitutional rights, and even judicial enforcement of law” [7].
- **Education and Innovation:** Various proposals have been made in using block chain technology in education field. The idea is to record the continuous process of education across various Universities. This includes learner’s activity, record of innovative creations, marks scored, course completion details, certificate distribution and other management activities [8]
- **Media and Entertainment:** Another use case of block chain is “Intellectual property protection for digital media”, for preserving transaction trails and content **Internet of Things (IoT):** The Internet of Things (IoT) is the connecting of smart gadgets over the internet. The storage of IoT data in shared block chain ledgers allows all parties to track the provenance of components throughout the device's lifetime. Providing this information to regulatory bodies, shippers, manufacturers, and other interested parties is secure, simple, and cost effective [9]. The Internet of Things (IoT) is being utilized to track the level of safety of key machines as well as their maintenance. IoT enabled block chain provides a tamper free ledger of operational data and the resulting maintenance. Modification histories, and provide tamper detection for digital image management and distribution [10].
- **Health and Food safety:** The well-being of a human is taken care by health and food safety and supply chain department. Use of block chain in health care ensures transparency of medical data, improves clinical trial process on imparting secure access methods to data [11]. It improves the system of food chain supply and drug chain supply with resilient methods. This technology also helps people to claim for medical insurance and on the other hand handles false claims [12].
- **Transportation:** Transportation could be made block chain based which include vehicle information management including speed control, goods transportation and management, intelligently managing the road traffic and managing taxi hiring systems [13].
- **Business services:** Use of block chain in business services encourages in building unbreakable smart contracts and allows to store digitally permanent, audit-able records in cloud storage that show stakeholders the state of the product at each value-added step. Electronic voting in business sector is possible with block chain technology [14]. We know that, the product in a market is manufactured using

various components from different suppliers. Supply chain communication could be securely established using block chain.

- **Voting:** Block chain can be used to create secure and transparent voting systems, where each vote is recorded on the block chain and cannot be tampered with. Overall, block chain technology has the potential to transform many industries by increasing transparency, security, and efficiency [15].
- **Smart Contracts:** Block chain can enable the creation of smart contracts, which are self-executing contracts with the terms of the agreement directly written into lines of code. This allows for secure and automated transactions without intermediaries.
- **Digital Identity:** Block chain can help create secure and decentralized digital identity systems, where individuals have control over their personal information and can choose what data they want to share with whom [16].

IV. CONCLUSION

The properties of block chain technology makes it to apply for almost all real time applications and thus making all smart process today a smarter one. The potential of block chain is realized both at academic and industry level. Many block chain techniques are being proposed and is being standardized. But, apart from standardization it is necessary to test the block chain techniques based on various sectors. Therefore testing algorithms are required for block chain techniques. Though block chain is decentralized, it is centralized for a particular organization. It is necessary to make block chain technology fully decentralized. To improve the field of big data analytics, it should be enabled with block chain techniques[5]. Block chain technique proposed should apply a common standard across the various sector of an organization. The research should also focus on the direction that whether block chain implementation will be supportive or affect an organization. Smart city technologies and IoT controlled applications will be more effective, secure and avail transparent operation and maintenance if incorporated with block chain Block chain technology could be applied for handling satellite data communication. Thus this study provides a broader view of emerging block chain technology.

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Impact of ICT on Environment: Relationship between ICT and Ecology

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ABSTRACT

The impact of information and communication technology (ICT) on the environment is a complex and much debated topic. ICT can have both positive and negative effects on the environment. Although ICT tools and equipment can be used to improve energy efficiency, which reduces carbon dioxide emissions and environmental pollution, the production and use of ICT equipment can become a significant source of emissions. Many ICT devices also contain non-renewable and recyclable components that can cause significant environmental damage. Therefore, one can ask, does ICT improve the quality of the environment in countries with different income levels? To answer this question, this study investigated the environmental effects of ICT in three groups of high, medium and low countries from 2005 to 2019 using the generalized method of moments (GMM). The ICT Development Index (IDI) was used as a measure of ICT development. Empirical results showed that the use of ICT reduced total carbon dioxide emissions, CO₂ emissions due to solid fuel consumption, CO₂ emission damages, particle emission damage and energy consumption in the studied countries. Therefore, it was established that information and communication technology generally has a negative (beneficial) effect on the deterioration of the environment in these countries. Considering this environmental degradation and pollution from ICT, it is recommended that governments achieve their energy consumption and emission targets by promoting the use of ICT in the environmental sector and the implementation of green ICT projects.

Keywords: ICT, environment, ICT tools, pollution, development, degradation, energy

I. INTRODUCTION

Due to the remarkably rapid development of information and communication technology (ICT) in recent years, the digitization of the economy is expected to accelerate in the coming decades. This development and the intensification of environmental problems such as climate change highlight the need to further investigate the possible environmental effects of ICT. While the amount of greenhouse gas (GHG) emission of ICT-related products or activities during their life cycle is an important issue (Freitag et al., 2021), the ability of ICT to reduce and resist energy consumption is also important. increasing energy costs (Wong and Schuchard, 2011).

Indeed, some ICT-based solutions introduced in recent decades have been able to reduce greenhouse gas emissions in some sectors, which has had a positive impact on the environment. For example, using email instead of physical mail reduced paper and fuel consumption. In addition, ICT allows all transactions to be completed online without a physical trip. ICT has also provided a platform for automated and intelligent solutions in the fields of power generation, agriculture, etc., which tend to reduce greenhouse gas emissions (Bekaroo et al., 2016). Today, the world is facing several major environmental crises, some of which appear to be irreversible. Identifying the factors that increase or decrease these environmental damages is necessary to save the planet and humanity from the consequences of these crises. Considering the many environmental and energy problems that the world is facing today, and the possible positive and negative effects of ICT on the environment, we tried in this study to examine in detail the general environmental impact of ICT. The innovation of this study was the analysis of 30 countries from three different income groups and time periods (2005-2019), including high, middle and low countries. In addition, the effects of a combination of variables including population variables, industrial value added and GDP, and ICT development index on several groups of environmental components (ie, carbon dioxide [CO₂] emissions, solid CO₂ emissions) are recruited. fuel consumption, CO₂ losses, energy consumption and particulate emissions) were investigated separately in five different equations using the generalized method of moments (GMM). There are different views and theories about the role of ICT in changes in environmental energy consumption and emissions, some of which are discussed in the next section together with available empirical evidence. The third section introduces the research model and analysis method, followed by empirical conclusions. Literature Review ICT has had a revolutionary effect in countless economic, social and environmental dimensions, transforming the world into an information society. The relationship of information and communication technology with the environment is a complex and multidimensional issue. ICT can have both positive and negative effects on environmental sustainability. ICT provides communities with an effective tool to protect the environment. It also gives people the opportunity to reduce the need for natural resources and the amount of waste released into the environment. However, the development, production and distribution of ICT devices and equipment require significant energy and resources, and since these devices tend to have a short lifespan, ICT development has also increased the amount of electronic waste. to the environment

II. REVIEW OF LITERATURE

While the amount of greenhouse gas (GHG) emission of ICT-related products or activities during their life cycle is an important issue (Freitag et al., 2021), the ability of ICT to reduce and resist energy consumption is also important. increasing energy costs (Wong and Schuchard, 2011).

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III. AIM

The aim of the thesis is to provide new information about the environmental effects of ICT, to explore the possibilities of ICT in promoting environmental sustainability, and to consider the possibilities for assessing the environmental effects of ICT and their challenges. In doing so, my aim is to promote discussion in the ICT community and among politicians and decision-makers about the environmental impacts of ICT now and in the future, and the ways in which ICT can contribute and participate in sustainability. in developing the assessment methodology.

IV. METHODS

A thorough on-line and offline search procedure was applied for the acquisition of evidence in this systematic qualitative study. An analysis of the paper was systematically done through online databases: PubMed, Google Scholar, and Google Advance Search.

V. RELATIONSHIP BETWEEN ICT AND ENERGY COST AND CONSUMPTION

The use of ICT can benefit or harm the energy sector in a number of ways. The development of ICT affects energy consumption in two ways: 1) ICT reduces energy consumption by providing a platform for wireless data exchange. For example, in the field of education, it allows students to use distance learning services. In the business world, ICT enables most purchases and transactions to be completed online or electronically, greatly reducing the need for physical transportation. 2) ICT increases energy consumption by increasing the use of electronic devices. Indeed, electronic devices will constitute a large proportion of total energy consumption in the future (Wang and Han, 2016). ICT can also make technologies more energy efficient to combat climate change. For example, it has the ability to minimize energy losses and improve the efficiency of energy production, storage and distribution systems. Information and communication technology can also be used to reduce energy consumption in the construction and transportation sectors, with the ultimate goal of mitigating the effects of climate change (Asia Disaster Preparedness Center, 2013). ICT can have a significant environmental impact in relation to climate change. This technology can help improve energy efficiency in buildings and the transportation sector through dematerialization and remote work. ICT also enables the creation of smart grids with better monitoring and control capabilities that reduce energy loss, improve work efficiency, improve the quality of energy supply, improve energy consumption management, improve energy source management and reduce greenhouse gas emissions. In relation to buildings, ICT can be used to create intelligent systems for automatic control of lighting, heating and cooling equipment and to measure the energy efficiency of buildings (Houghton, 2010). Bastida et al (2019) report from the literature on the impact of ICT on the environmental impact of energy consumption that ICT has a positive impact on reducing electricity consumption, improving energy efficiency and reducing greenhouse gas emissions in the European Union. . The results of this study showed a positive impact of ICT on household energy consumption patterns and ultimately on greenhouse gas emissions in the electricity generation sector. Schulte et al. (201) on the relationship between ICT and total energy demand concluded that there is a negative relationship between these factors. After examining the relative demand for electricity and non-electricity, these researchers

reported that while there is no significant relationship between ICT use and electricity demand, non-electricity demand decreases significantly as ICT use increases. . Based on these results, decisions can be made about replacing and supplementing electricity and fuels. Since fuel consumption causes air pollution, while electricity consumption causes much less or no pollution, the negative relationship between ICT and non-electrical demand is beneficial for the environment. Han et al. (2016) on the role of ICT in China confirmed a significant negative impact of ICT on short-term energy consumption in that country. According to these researchers, ICT-based wireless data exchange capabilities have changed newspaper reading and business travel habits, leading to better energy conservation. ICT provides a platform for online shopping, remote communication, video conferencing and virtual meetings and conferences, which reduces the need for travel and thus energy consumption in the transport sector.

VI. RELATIONSHIP BETWEEN ICT AND ECOLOGY AND AGRICULTURE

Regarding the effects of ICT on ecology and agriculture, a study by Yilmaz et al (2019) showed that ICT has a positive (reducing) effect on deforestation. Information and communication technology can benefit forestry in many ways, for example by facilitating the mapping and monitoring of forest threats and hazards, and by preventing illegal logging and fires. Bonvois et al. (201), these researchers provided an integrated framework for the design and evaluation of an ICT-based optimization service environment at the three levels of hardware, infrastructure, and information, and presented such an optimization service for urban waste collection at the city level. The negative environmental impacts of ICT include the use of non-renewable and environmentally harmful resources such as lead and mercury, and pollution caused by the disposal of electronic and non-electronic waste. Another negative environmental impact of ICT is the increase in the use of paper in small printers (Rodhain and Fallery, 2013). Also, incineration of ICT equipment together with other waste can cause the release of hazardous compounds such as bromine dioxins and furans. Another environmental problem with ICT devices and equipment is that many cannot be easily recycled (European Union, 2021). In fact, improper recycling of these devices can be a major source of environmental pollution in developing countries (Williams, 2011). ICT has had a significant positive impact on improving agricultural processes. For example, ICT provides farmers with the knowledge and information they need to produce higher-value crops, reduce production costs, increase sales prices and use less herbicides and pesticides. Farmers can also use ICT to get better climate, natural resources and other information related to agriculture (Das and Kabir, 2016). ICT can also benefit agricultural marketing in two ways: 1) provide real-time information on market demand, 2) provide long-term marketing information to facilitate planning. For example, mobile phones have become a convenient tool for gaining market knowledge and insights. Previous studies in the field have shown that ICT-based market information services improve the efficiency of agricultural markets (Kamande and Nafula, 2016). Although most of the above studies have focused on the role of ICT in environmental development and mitigating environmental damage in this area, several articles have shown how ICT has harmed the environment by accelerating the emission of greenhouse gases and energy consumption. However, this article assumes that the implementation of ICT-based innovations and policies can have a positive impact on the environment.

VII. RESULTS AND DISCUSSION

Based on a review of existing research and a case study of online journals, it was concluded that the stage of production and use of ICT solutions plays a decisive role in their environmental protection. The use phase becomes increasingly critical, as production becomes more efficient and environmentally friendly. Similarly, improving energy efficiency can increase the importance of production in terms of overall environmental impact, especially for small equipment. A longer lifetime of the device would reduce the environmental impact of production during its life cycle. User behavior and location have been found to have a significant impact on the environmental impact of certain ICT solutions and thus determine their potential impact on environmental sustainability. The total operating time of the device, the location (and thus the electrical combination), the lifetime of the device and the end of life treatment affect the importance of the use or production phase and the overall environmental impact of the ICT product. User behavior is also important when comparing ICT solutions with their traditional counterparts.

VIII. RESEARCH ON FUTURE

Research on Futures is research in which possible, probable and recommended futures are identified, proposed and analyzed through systematic and explicit thinking about alternative futures (Bell and Olick 1989; Bell 2003). Futures research seeks to discover future possibilities, prepare for the unpredictable, and increase people's control over the future by understanding how certain futures can be achieved or avoided (Bell and Olick 1989; Bell 2003). One of the key concepts for future research is the scenario (Börjeson et al. 2006). A scenario can be defined as a description of a possible future situation, which may not be a complete picture of the future, but which would nevertheless highlight the main elements and highlight the key factors and 8 important factors of future development. A scenario can include a description of the development path leading to this situation (Kosow and Gaßner 2008).

IX. CONCLUSION

In recent years, the spread of information and communication technology has improved significantly in most countries of the world, regardless of income level. The increase in the spread of information and communication technologies creates interesting challenges and opportunities in economic, social and energy dimensions, but it is also important to study the role of ICT in reducing or increasing emissions. To investigate this role, this study examined the impact of the ICT Development Index (IDI) on five environmental variables in three groups of high, medium and low countries from 2005 to 2019. The results of the panel estimation of the GMM -model showed that the positive effect of IDI on the reduction of environmental damage in the studied countries. In other words, this index has a negative impact on their countries' total CO₂ emissions, CO₂ emissions from solid fuel consumption, CO₂ emission damage, particle emission damage and energy consumption. These findings are consistent with Zhou et al. (2019), Bastida et al., (2019) and Haini (2021), but they contradict Arushanyan et al., (201), Amri et al. (2019) and Avom et al. (2020). This difference may be due to differences in the countries studied or the time periods studied. Another reason for this difference can be the destructive environmental impact of the spread of information and communication technology in countries

where this process is combined with inefficient energy use, high dependence on fossil fuels and excessive electricity consumption. Information and communication technology can indirectly affect the emissions of carbon dioxide and other pollutants by influencing the level of energy consumption.

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A Study on Security and Privacy Challenges in the Internet of Things

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ABSTRACT

Wireless communication is used to remotely control devices in IoT systems, making them vulnerable to attacks from hackers and cybercriminals. IoT devices collect vast amounts of personal and sensitive data, which can be accessed by unauthorized entities, facing the problems of privacy and security. In recent year "Internet of Things" is research attention for wireless network. The term IoT stands for "Internet of Things", referring to the interconnectivity of objects to the internet, allowing them to access it. The potential for IoT is vast, with billions of devices, people, and services able to exchange information and useful data in various locations worldwide.

IoT used in healthcare, homes automation, business, company, military purpose, for wireless communication and control the environments. In IoT "things" are connected to web each device has unique ID for verification. In future electronic devices will be smart which can be communicating with other devices and other system. IoT required very accurate and consistence, integrate data for accessing system and control the system. The Internet of Things (IoT) has brought to light a number of security and privacy issues that need to be addressed. Security and privacy are the main concerns in IoT, and they require attention to areas such as identification, verification, authentication, and device diversity for real protection.

In this paper, the vision of IoT, existing security threats and open challenges, as well as security requirements in the domain of IoT are discussed, with basic issues identified in relation to the safety and privacy of IoT.

Keywords: Internet of things, Information security, security & Privacy in IoT, verification & identification

Introduction

I. INTRODUCTION

IoT means "Internet of things" "the object is connected to internet and accesses it. In IoT everywhere. Billions of devices, people & services to be interconnected for exchange information and useful data.

IoT means "The internet of things" means interconnection of thing-to-thing to internet that is also called as networks of sensors. which are embedded with sensor, software, electronics devices and network connectivity that help to retrieve and exchange the information In IoT there is advanced connectivity among the electronic device and system. In that all things are connected to the internet with strong connectivity that gives machine-

to-machine relation means they can exchange the information, and they can communicate without human interaction or without human instruction.

The overall IoT context will consist of billions of individuals, individual devices, and services that can interconnect to exchange data and useful information [1].

Because of quick headways in portable correspondence, Wireless Sensor Networks (WSNs) and Radio Frequency Identification (RFID) advancement, things and systems in IoT can possibly work together with each other whenever, anyplace and in any structure There are numerous conceivable application territories on account of these brilliant things or articles. The major IoT target is simply the arrangement of shrewd situations and cognizant/self-sufficient gadgets: keen vehicle, savvy things, brilliant urban areas, savvy wellbeing, shrewd living, etc As far as business, IoT speaks to the enormous possibility for various sorts of associations, including IoT applications and specialist co-ops, IoT stage suppliers and integrators, telecom administrators and programming sellers Many vertical segments are expected to experience a double-digit growth in upcoming years. Among the most prospective vertical application domains are consumer electronics, automotive industries, and healthcare, as well as intelligent buildings and utilities. With the rapid increase in IoT application use, several security and privacy issues are observed. When nearly everything will be connected to each other, this issue will only become more pronounced, and constant exposure will literally reveal additional security flaws and weaknesses. Such limitations may subsequently be exploited by hackers, and in a statistical sense all exposed flaws and weaknesses may be abused in an environment with billions of devices [9]. Be that as it may, without strong security set up, assaults and glitches in the IoT may exceed any of its advantages.

Scalability factors and various restrictions on device capabilities also mean that traditional cryptography mechanisms, security protocols, and protection mechanisms are unavailable or insufficient [11]. The baseline security must be robust and the security architecture must be designed for long system life cycles (>20 years), something indeed challenging. Dealing with large device populations further makes it understandable that some devices will be compromised. Therefore, new methodologies and technologies ought to be developed to meet IoT requirements in terms of security, privacy and reliability [12].

The rest of the paper is organized as follows. In section this section introduction and overview of the IoT. In section II vision of IoT, section III application of IOT in various areas. Section fourth identifies some of the IoT security challenges and describes the security requirements in the IoT. Finally, in section and the paper is concluded.

II. THE VISION OF IOT

The IoT vision is to revolutionize the Internet, to create networks of billions of wireless identifiable objects and devices, communicating with each different anytime, anyplace, with anything and each person using any service. The growing greater processing competencies of RFID technologies, wireless sensor networks (WSNs) and storage potential at decrease cost may create a pretty decentralized frequent pool of resources interconnected by a dynamic gadget of networks Through IoT architecture, intelligent middleware will be capable of creating dynamic maps of the physical world within the digital/virtual sphere by applying high temporal and spatial resolution and combining the characteristics of ubiquitous sensor networks and other identifiable things. Figure 1 shows the symbiotic interaction among the real/physical, digital, and virtual worlds with society [14].

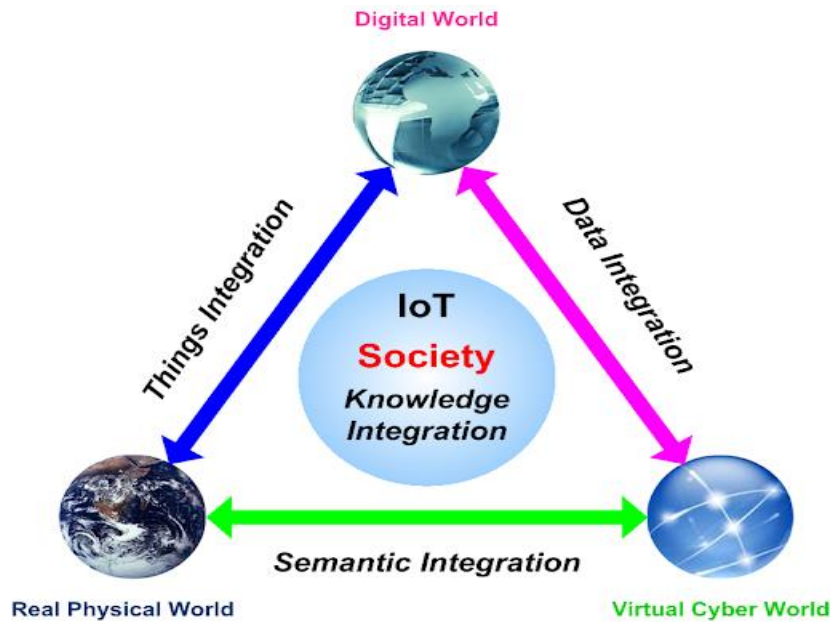


Fig 2. Internet of Things –a symbiotic interaction among the real/physical, the digital, virtual words & society [13]

In fact, communications in the IoT will take place not only between devices however additionally, between humans and their environment as introduced in Figure 2. All man or woman objects of our everyday existence such as people, vehicles, computers, books, TVs, cell phones, clothes, food, medicine, passports, luggage, etc., will have at least one special identification allowing them to correspond with one another.

Besides, since these articles can detect the earth, they will have the capacity to confirm personalities and speak with each other, with the end goal that they will have the option to trade data furthermore, become implies for getting unpredictability, and may regularly empower autonomic reactions to troublesome situations without human contribution

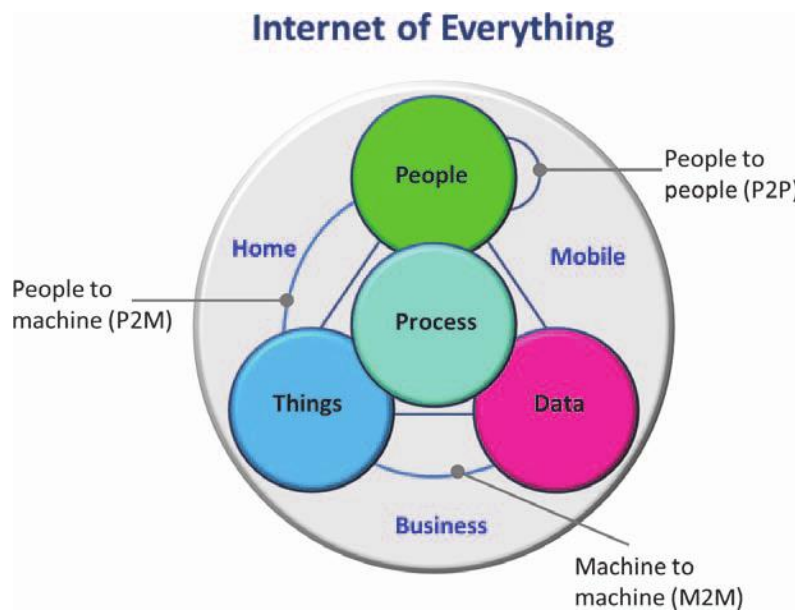


Fig. 2. Internet of Everything [17]

III. APPLICATION OF IOT IN VARIOUS AREAS

The primary goal of IoT are simply the arrangement of a keen domain and hesitant autonomous gadgets, for example, savvy living, brilliant things, shrewd wellbeing, and keen urban communities among others The applications of IoT in various areas example industries, medical field, and in home automation are discussed in the following section.

1. IoT in Industries

The IoT has given a sensible opportunity to amass enormous present-day structures and applications in an adroit IoT transportation system, the endorsed individual can screen the Existing territory and improvement of a vehicle. The affirmed individual can in like manner predict its future zone and road traffic. In the earlier stage, the term IoT was used to remember one of the kind items with RFID. Up to this point, the researchers relate the term IoT with sensors, Global Positioning System (GPS) devices, mobile phones, and actuators. The affirmation and organizations of new IoT developments mainly depend on the insurance of data likewise, the security of information. The IoT licenses various things to be related, followed and checked so significant information likewise, private data assembled, therefore. In IoT condition, the security affirmation is an inexorably essential issue when stood out from traditional frameworks since the amounts of attacks on IoT are high.

2. Personal & Social Domain

The applications falling in this category permit users to interact with their surroundings (home and work) or with other people to maintain and build social relationships [2]. IoT application in smart cars smart homes smart cities for security purpose. IoT gadgets are a piece of the bigger idea of home mechanization, which can incorporate lighting, warming and cooling, media and security frameworks. Long haul advantages could incorporate vitality investment funds via naturally guaranteeing lights and hardware is killed

3. IoT in Medical

The Internet of things day by day use in medical & health care sector both doctor & patient example Thermometer, ECG, ultrasound also tracking patient for his health.

Kaa is an open-source IoT middleware stage for overseeing, gathering, breaking down, and following up on each part of correspondences between associated devices. Kaa offers a scope of pluggable elements that permit building killer applications for purchasing items in days rather than weeks. Out of the box, Kaa is perfect with basically any present-day customer object or microchip — smart TVs, brilliant home appliances, HVAC frameworks, wearable, and smaller scale PC boards [13].

4. IoT in Education system

In recent days, many schools and colleges used advance technology for their working. when we use advanced technology in education system automatically improve the quality of education in schools and colleges. Education is need of an hour in education system consists three main components which are students, faculties and parents, these three components perform important role in education system without their communication the system will become fail. Implementation of IoT in student's attendance smart teaching, smart Library

management using IoT, display information on notice boards and class room management. This system improves the quality of education standardized management.

5. IoT in Smart Cities

Savvy city is another incredible utilization of IoT producing interest among total populace. Keen reconnaissance, robotized transportation, more intelligent vitality the board frameworks, water conveyance, urban security and ecological checking all are instances of web of things applications for savvy urban communities.

IoT will take care of serious issues looked by the individuals living in urban communities like contamination, traffic blockage and deficiency of vitality supplies and so on. Items like cell correspondence empowered Smart Belly garbage will send alarms to city administrations when a container should be purged.

By introducing sensors and utilizing web applications, residents can discover free accessible stopping openings over the city. Additionally, the sensors can recognize meter altering issues, general breakdowns and any establishment issues in the power framework.

IV. KEY CAHLLENGES FOR SECURITY AND PRIVACY OF IOT

We will continue with a presence where people are by all account not the only data creators anyway the things that are furnished with appropriate fragments will make data. As needs be, this decade is foreseen to see the ascent of related gadgets that are not cell telephones and don't require human control. Along these lines, we need a critical structure for impeccable convenience. Specialized issues of IoT join Energy, Wireless correspondence, Scalability, Security, etc. Here are some security related issues in IoT.

Object Identification:

Validation in IoT is perhaps the best issue because of the quantity of gadgets. Confirmation for each and every contraption is definitely not a solitary occupation to wrap up. On account of the components of speedy figuring and essentialness profitability, considering private key cryptographic natives, various security strategies have been proposed

Authentication

Verification in IoT is probably the best issue because of the quantity of gadgets. Confirmation for each and every contraption is certifiably not a solitary occupation to wrap up. In light of the components of snappy computation and essentialness profitability, considering private key cryptographic natives, various security strategies have been proposed.

Data Management

Conspicuous evidence of billions of gadgets and their sending can be seen as an essential issue in IoT. As showed by estimations, constantly 2020 in excess of 50 billion gadgets will be related with the web. Managing the gadgets and their sending will be inconvenient despite for IPv6. There is strategies that can be used for conspicuous verification of the things in IoT. Some of them are Bar code recognizable proof, vision-based item distinguishing proof, etc. RFID and NFC developments are used for separating purposes.

Heterogeneity

The greatest security and protection issue is by a long shot the problem of device heterogeneity. Issues should be handled appropriately to make IoT more secure and robust. Administering hundreds of distinctive sorts of devices with each has their own security problems and necessities. Each object should be handled contrastingly which makes it hard to apply a single resolution to all. It will be an extreme assignment to secure each sort of the device from various kinds of incidents. It makes it harder to supervise the items. Every device imparts and works distinctively when contrasted with other objects. Device heterogeneity can influence numerous different perspectives also, for example, trouble in combination, security, and distinguishing proof and so on [15].

Data Secrecy & encryption

The sensor devices perform autonomous detecting or estimations and exchange information to the data handling unit over the transmission framework. It is vital that the sensor devices ought to have legal encryption instrument to ensure the information uprightness at the data preparing unit. A large number of devices associated with the web. So it would be hard to distinguish if any unapproved device associates with a current system and capture the critical data during an exchange over the internet. So confidentiality can be considered as the greatest test for the sake of security [16].

Bulk Data

Data is the essential factor in Internet of Things. IoT associates different machines with cloud server farms, in the cloud all devices are associated with cloud models and stores and recover a huge amount of information and data to cloud data centres. It would be tough to deal with all data centres as they are composed in dispersed condition and furthermore hard to deal with and keep up server farms in the request to store critical and private information [17].

Objects Safety and security

The IoT comprises of a huge number of perception objects that spread over a few geographic zones; it is important to keep the intruder's access to the items that may make physical harm them or may change their operation [14].

Connectivity of Internet

Web of Things partner's different keen gadgets through the Internet, and it gives an office to concentrated checking and control of related gear. Along these lines, Internet of Things is only possible with the help of persistent web administrations and in the event that there is any issue, at that point it should in a flash be settled else it welcomes progressively extreme issue in the framework without the help of dynamic gadget.

Data Collection

One of the biggest privacy concerns with IoT is the vast amount of data that is collected by devices. This data can include personal information such as name, address, and credit card details, as well as behavioural data such as location, browsing history, and search queries. To protect privacy, IoT devices should only collect data that is necessary for their intended purpose. Organizations should also be transparent about the data they collect and how it will be used.

Data Sharing

Another privacy concern with IoT is the sharing of data between devices and organizations. Third-party organizations may gain access to personal information without the knowledge or consent of the user. To address this issue, IoT devices should be designed to limit data sharing and to provide users with control over the sharing of their data. Organizations should also have clear policies for data sharing and obtain user consent before sharing any personal information.

Security

Security is a critical aspect of IoT privacy. If IoT devices are not adequately secured, hackers can gain access to personal information, including sensitive data such as financial information and medical records. To protect privacy, IoT devices should be designed with robust security features, including data encryption, access control, and authentication.

User Control

User control is an essential aspect of IoT privacy. Users should have control over the data collected by IoT devices, including the ability to delete or modify their data. IoT devices should also provide users with clear and concise information about how their data is collected, used, and shared.

Transparency

Transparency is key to ensuring IoT privacy. Organizations should be transparent about the data they collect, how it will be used, and who it will be shared with. IoT devices should also be designed to provide users with clear and concise information about data collection, usage, and sharing.

V. SECURITY REQUIREMENT FOR IOT

IoT has gotten one of the most critical components of things to come to the Internet with a tremendous effect on public activity and Business Environment. As talked about in section-3 a bigger number of IoT applications and administrations are progressively powerless against assaults or data burglary. To verify IoT against such assaults, trend setting innovation is required in a few regions.

All the more explicitly, verification, classification, and information honesty are the key issues identified with IoT security. Verification is important for making an association between two gadgets and the trading of some open and private keys through the hub to forestall information robbery. Secrecy guarantees that the information inside an IoT gadget is avoided unapproved elements.

Information uprightness forestalls any man-in-the-center alteration to information by guaranteeing that the information landing at the collector, the hub is in unaltered structure and stays as transmitted by the sender.

Vermesan and Friess [7] discussed security and privacy framework requirements in dealing with IoT security challenges, as follows:

Authentication and Authorization

Authentication and authorization are crucial security requirements for IoT. These mechanisms ensure that only authorized users can access IoT devices and data. Authentication verifies the identity of users, while

authorization ensures that they have the necessary permissions to access the data. Authentication and authorization can be implemented using techniques such as usernames and passwords, biometric authentication, and multi-factor authentication.

Data Encryption

Data encryption is another vital security requirement for IoT. It ensures that data transmitted and stored by IoT devices is protected from unauthorized access. Encryption converts plain text into cipher text, making it unreadable without the decryption key. Data encryption can be implemented using encryption algorithms such as Advanced Encryption Standard (AES) and RSA.

Secure Communication

Secure communication is essential to ensure that data transmitted between IoT devices and other systems is protected from interception and tampering. Secure communication can be implemented using protocols such as Transport Layer Security (TLS), Secure Sockets Layer (SSL), and Virtual Private Network (VPN).

Secure Firmware Updates

IoT devices require firmware updates to fix bugs and security vulnerabilities. Secure firmware updates ensure that the updates are genuine and not malicious. Secure firmware updates can be implemented using techniques such as code signing and secure boot.

Secure Storage

IoT devices store sensitive data such as user credentials, personal information, and device configurations. Secure storage ensures that this data is protected from unauthorized access. Secure storage can be implemented using techniques such as data encryption, access control, and tamper detection.

Device Management

Device management is critical to ensure the security of IoT devices. It involves activities such as device registration, device configuration, and device monitoring. Device management ensures that only authorized devices are connected to the network and that devices are configured with the necessary security settings.

Physical Security

Physical security is essential to protect IoT devices from theft and tampering. Physical security involves measures such as securing devices with locks and alarms, monitoring access to devices, and ensuring that devices are stored in secure locations.

- Lightweight and symmetric solutions to support resource constrained devices.
- Lightweight key management systems to enable the establishment of trust relationships and distribution of encryption materials using minimum communication and processing resources, consistent with the resource constrained nature of many IoT devices.
- Cryptographic techniques that enable protected data to be stored processed and shared, without the information content being accessible to other parties.

- Techniques to support (“ Privacy by Design”) concepts, including data identification, authentication and anonymity.
- Keeping information as local as possible using decentralized computing and key management. • Prevention of location privacy and personal information inference that individuals may wish to keep private by observing IoT-related exchanges.

VI. CONCLUSION

The fundamental objective of this paper was to give an important study of the most significant parts of IoT with specific concentrate on the vision and security challenges associated with the Internet of Things. The vision of IoT will permit individuals and things to be associated whenever, anyplace, with anything furthermore, anybody, in a perfect world utilizing any way organize and any administrations. IoT target creating smart environment autonomous devices. Smart city transports smart schools for student tracking study. Challenges facing in security and privacy in IoT.

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Car Accident Detecting and Recording System

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ABSTRACT

We developed such a system that accidents are detected, and it will automatically message hospitals for ambulances, police stations, and rescue squads. Vehicles were meant for transportation purposes, and it was a transition from animals to machines. There are around 1.4 billion cars in the world, and according to the Government of India, approximately 1.5 lakh people die on Indian roads out of 1130 accidents and 422 accidental deaths per accident. This work on artificial intelligence and machine learning (AI ML) The system records factors in the car such as engine temperature, speed of the car, fuel economy, fuel level, level of coolant, rear and front camera recording, etc. This technology is inspired by black boxes in aircraft. It will also detect accidents and take the necessary steps to save the lives of those in the car.

Keywords: AI ML, speed, fuel economy, detector, accident, car recorder.

I. INTRODUCTION

A vehicle is a mechanism that moves people or stuff from one location to another, typically over land. Examples include cars, bicycles, trucks, and buses. These were meant to help people, and they helped but also became the cause of death for many people. The usage of vehicles has increased over the past decade. Approximately 1.3 billion people die per year in the world. And here we came with research to reduce the death rate in road accidents. This will help injured people in accidents save their lives. In many cases, all over the world, people who are witnesses to that particular accident cannot provide injured people with aid. ^[1,2,3] The car recorder system is a bit similar to the black box in an airplane and keeps records as mentioned above and detects accidents as mentioned above. Its shape is a box, and it can easily be installed in cars. It can also work with more technologies differently, such as ESS (Emergency Stop Signal), Autopilot mode, etc. In the future, it can also be installed in trucks and tractors. It will work when an accident takes place and airbags get deployed with the help of crash sensors, and that's where we get our input. Here we will have to understand that if any of the inputs are high, our system will be activated. The user will have to give the number of his family in case an accident has occurred and any victim's families will be informed. When the system is activated, it will send messages to the police, ambulance, rescue squad, and the two individuals mentioned above. The message "ACCIDENT DETECTED AT ----- LOCATION" will appear. The GPS Module will be used

by the system to add a location to the message. This process will follow many processes mentioned in the discussion. It will keep records like a black box.

II. RELATED WORKS

In this system of accident detection, Crash sensors, a GSM module, a GPS module, an Arduino Uno, and a radio wave emitter are used to detect accidents and emit signals to the police, ambulance, rescue team, and the victim's family ^[1,2,3]. When the system detects an accident, it sends a message via GSM Module^[1,2,3]. If a network is present, it will emit a radio wave signal via a radio wave emitter. Taking factors of the network into consideration, we used radio wave technology and the concept of LoRaWAN (Long Range Wide Area Network). It is used to enable the long range without wired data transmission.

In the car recorder system, it will record all the factors such that it will record only factors before 30 minutes of the accident and will record for 10 minutes after. The queue structure follows the FIFO (first in, first out) rule. And taking its safe position into consideration, it will be installed at the centre of the car and coated with a layer of metal to avoid damage to it, like the concept of a black box.

III. METHODOLOGY

In this system, the components are as follows:

1. **Arduino UNO** ^[1,2,3]: It is used as a microcontroller in the system and controls its functioning. It has a set of digital and analog input and output pins. It is programmable via the Arduino IDE (Integrated Development Environment).



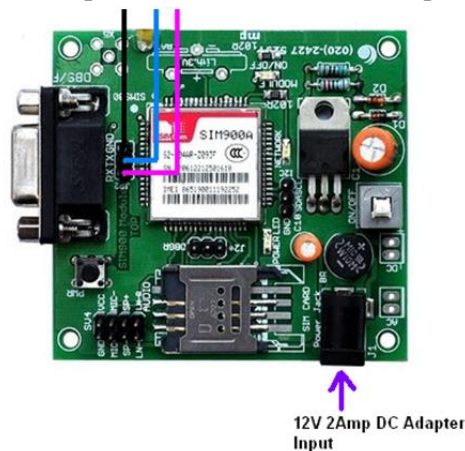
2. **Crash sensors**:- Crash sensors are the sensors that are used in the airbag system in cars. They detect collisions and convert them into signals in microseconds. We are going to use it to detect accidents, as they are already installed in cars.



3. **GPS Module** ^[1,2,3]:- GPS is the global positioning system; it makes use of satellites to send the signal. It is used to get the position of an accident spot. We are going to use a NEO-6M GPS module in it.



4. **GSM Module**^[1,2,3]:- GSM Module is Global System for Mobile communication . It transmits the message in form of sms to requiredpeoples such as police, ambulance, rescue squad and victim's family.



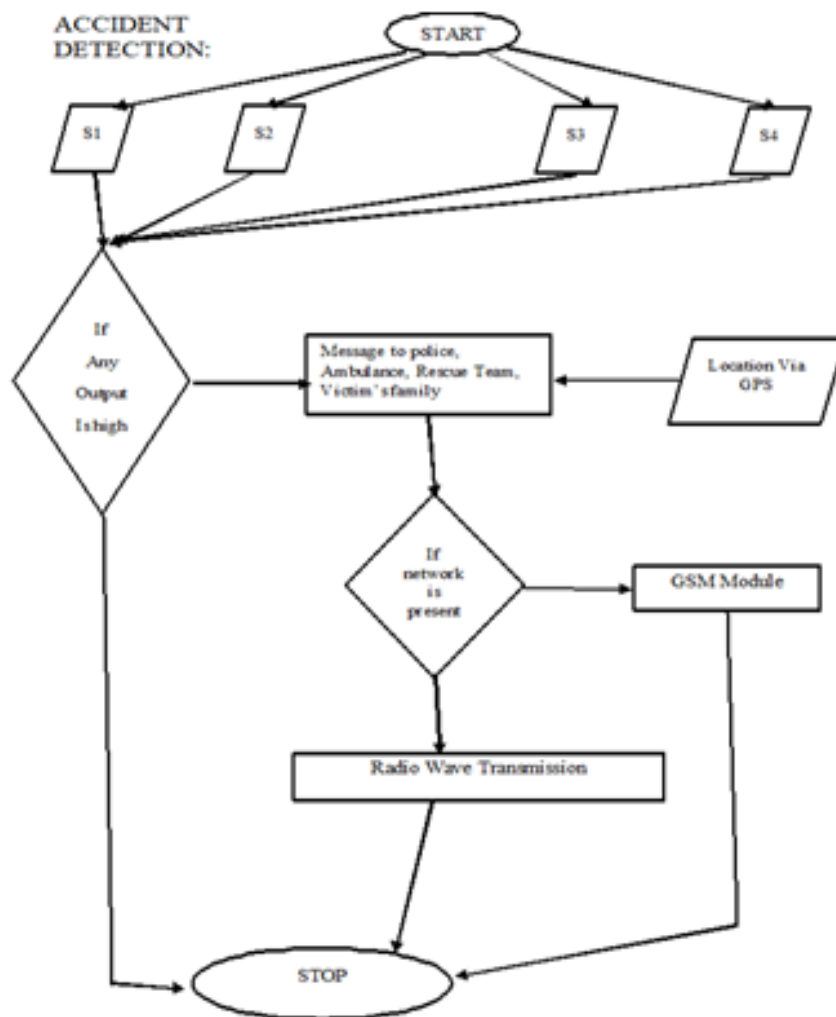
5. **Radio Wave Emitter**:- A radio wave is released by the transmitter and then cached by the receiver. To receive and transmit radio waves, it requires an antenna. It emits radio waves and transfers signals through the air in electromagnetic form.

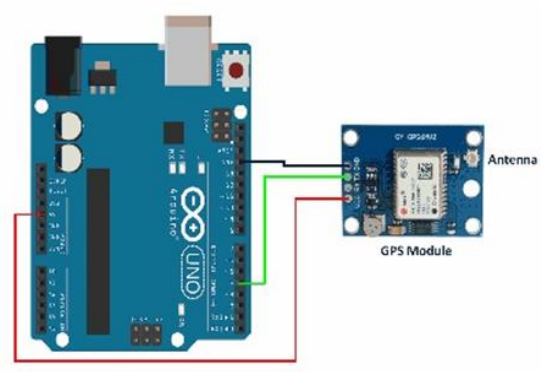
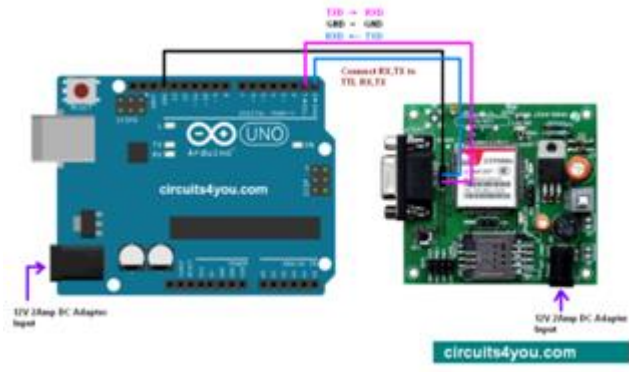
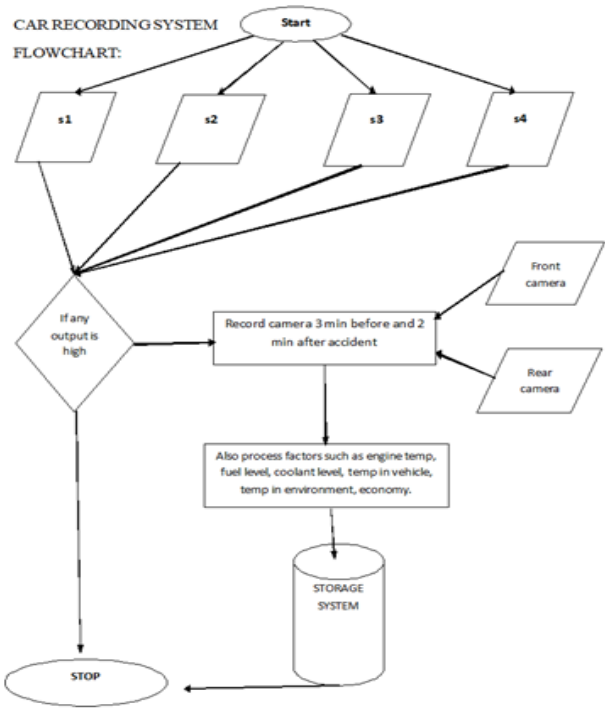


IV. DISSCUSSION

In this system, our prime focus is to reduce the death rate in the whole world. Where the death rate due to accidents all over the world is 1.3 billion per year, we can reduce this rate by some number. This system works when an accident is detected, and then people who are critically injured will be helped. To avoid accidents,

there are many systems in existence, such as the ESS (Emergency Stop Signal) system, etc. Many drawbacks of this system are avoided, such as connectivity in mountains ^[1, 3]. What we can do is install a radio signal transmitter, and when the system will not be in range, meaning when the system is not connected to a WAN (wide area network), it will use radio waves to transmit signals and send the last location when it was in the network, and it will record factors in the car as said above to get clarity about factors responsible for accidents, and using that data and AIML (artificial intelligence machine learning), we can reduce the chances of accident. It will be useful in critical situations where no one is available to assist and many people are critically injured. False reporting is not possible in this system because it takes input from crash sensors which help airbag to open i.e. when airbag is opened.





V. CONCLUSION

A car recorder and accident detection system will help people save their lives. It's a safe system that will help people. In accident conditions, it will send a message to the ambulance, police, rescue squad, and family of the victim with a live location. GPS Module will get the exact geographic location, and GSM Module will help convey a message; if GSM Module fails, it will transmit radio signals [1, 2, 3]. As an ambulance arrives, it will

provide aid, police will manage traffic and many other conditions, and in critical situations, if the ambulance is late or in the mountains, if a car crashes in the valley or is in danger, the rescue squad will assist. It is cost-efficient and cheaper than the lives of victims.

VI. FUTURE SCOPE

All across the world 1.3 billion people die due to road accident. To reduce number of deaths this system is used. It will inform ambulance, police, rescue team, victim's family as soon as accident occur and hence death due to accidents can be prevented. We can use it's collection of data to prevent accident with help of AI ML in future and data will be recorded by using car recording system.

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Cloud Computing and its Security Challenges

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ABSTRACT

The technology of cloud computing has been rapidly growing and gaining popularity worldwide. This technology utilizes the power of internet-based computing to provide on-demand access to data, information, and other resources to the user via their computer or device. Cloud computing is a new concept that enables the sharing of virtual resources for data storage and access. This technology has been widely adopted by various industries including healthcare, banking, and education due to its efficiency and cost-effectiveness. Some of the most popular examples of cloud computing are Yahoo and Gmail. Cloud computing operates on a pay-as-you-use model, which makes it ideal for managing bandwidth, data movement, transactions, and storage information.

Keywords— Cloud Computing, Security of cloud.

I. INTRODUCTION

Cloud computing is a widely used term for describing an internet-accessible platform that offers hosting and storage services to users. It can be classified as public, private, or hybrid based on the type of usage. The term word Cloud Computing has emerged recently and is not is widespread use. Of the several definitions which are available, one of the simplest is, “a network solution for providing inexpensive, reliable, easy and simple access to IT resources” [26]. Cloud Computing is not considered as application oriented but service oriented. This service oriented nature of Cloud Computing not only reduces the overhead of infrastructure and cost of ownership but also provides flexibility and improved performance to the end user [27].

With the increasing popularity of cloud-based systems, the focus has been on consistency, safety, privacy, and cost-effectiveness in cloud design. The resource requirements for cloud applications can vary based on the type of services demanded, including heavy computation, large storage, high-volume network usage, and more. Despite the numerous benefits offered by cloud computing, there are also some concerns related to privacy and security, especially with regards to client information placement, accessibility, and protection. In simple terms, cloud computing allows for the storage, management, and processing of data on remote servers hosted on the internet.

II. CHALLENGES FACE IN CLOUD COMPUTING

- **Security:** One of the biggest challenges in cloud computing is security. Research paper writing involves handling sensitive information, and it's critical to ensure that data is secure and protected from unauthorized access. Cloud computing providers must implement robust security measures to safeguard data from cyber threats such as hacking, malware, and data breaches.
- **Data privacy:** Data privacy is another significant challenge in cloud computing. Research paper writing requires the collection and storage of sensitive information, which must be protected from unauthorized access. Cloud computing providers must implement measures to ensure data privacy and confidentiality while allowing researchers to access and collaborate on data.
- **Availability:** The availability of cloud computing services is also a challenge for research paper writing. Researchers need access to cloud computing services around the clock to ensure that they can work on their research papers at any time. Cloud computing providers must ensure that their services are always available and that there are no downtimes that could impact research work.
- **Data integration:** Integrating data from different sources is a critical component of research paper writing. Cloud computing providers must offer tools and services that make it easy for researchers to integrate data from various sources, ensuring that the data is accurate, reliable, and up-to-date.
- **Cost:** Cloud computing can be expensive, particularly for research work that requires extensive computing resources. Cloud computing providers must offer affordable and flexible pricing models that cater to the needs of researchers, enabling them to access the resources they need without breaking the bank.

III. DEPLOYING CLOUD SERVICES

The deployment of cloud services typically involves the following steps:

- **Planning:** This involves identifying the computing resources needed to support the business operations, determining the cloud service provider that will be used, and creating a deployment plan.
- **Provisioning:** This involves setting up the necessary infrastructure, including servers, storage, and networking components, to support the cloud services.
- **Configuration:** This involves configuring the cloud services to meet the specific needs of the business, including setting up user accounts, security settings, and access controls.
- **Integration:** This involves integrating the cloud services with other applications and systems that the business uses.
- **Testing:** This involves testing the cloud services to ensure that they are working as expected, including testing for scalability, availability, and security.
- **Deployment:** This involves deploying the cloud services to production, making them available to end-users.

Benefits of Deploying Cloud Services

The deployment of cloud services offers several benefits to businesses, including:

- **Scalability:** Cloud services can be scaled up or down as needed, allowing businesses to quickly adjust to changing demand.
- **Cost-effectiveness:** Cloud services are typically more cost-effective than on-premises solutions, as businesses only pay for the resources they use.
- **Flexibility:** Cloud services are flexible and can be accessed from anywhere with an internet connection, allowing businesses to work from anywhere.
- **Reliability:** Cloud services are designed to be highly available and reliable, with built-in redundancy and failover capabilities.

IV. CHALLENGES IN DEPLOYING CLOUD SERVICES

The deployment of cloud services can also present several challenges for businesses, including:

- **Security:** Cloud services can pose security risks, including data breaches and unauthorized access to data.
- **Compliance:** Cloud services must comply with various regulatory requirements, such as HIPAA and GDPR, which can be challenging for businesses.
- **Integration:** Integrating cloud services with existing systems and applications can be complex and require specialized skills.
- **Performance:** Cloud services may experience performance issues, particularly during periods of high demand.

V. CONCLUSION

Cloud computing is a rapidly growing technology that is gaining popularity in various fields like testing & development, big data analytics, and file storage. Although many organizations are implementing cloud services to stay competitive, there is always a risk of data breaching. Organizations that use cloud services are more susceptible to data breaches than those that don't. Malware injection is also a major problem in cloud services as attackers can easily steal sensitive data from organizations. Despite the risks, cloud companies offer many benefits to businesses seeking a competitive edge in today's economy. However, the biggest concern about cloud computing is the lack of privacy and security. Companies share critical data with each other, making data leakage and theft an undeniable fact. Therefore, every company must have reliable security measures to protect their client's data when implementing cloud technology. Although many clouds have firewalls and intrusion prevention, they may not be tailored to meet the clients' specific system requirements.

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A Survey on Defensive Measures to Secure Machine Learning Systems

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ABSTRACT

In recent years, Machine learning is being used in various systems in wide variety of applications like Healthcare, Image processing, Computer Vision, Classifications, etc. Machine learning have shown that it can solve complex problem easily more efficiently than human beings. But through wide research it is found that security of ML systems can be compromise by various attacks. This survey aims to analyse various defence mechanisms and measures which can protect the complete machine learning pipeline against various attacks. We are categorizing them depending on position of attacks in machine learning pipeline. This paper will focus on all aspects of ML security at various stages from training phase to testing phase instead of focusing on one type of security countermeasure.

Keywords— Artificial Intelligence Security, Machine Learning Security, Poisoning attacks, backdoor attacks, adversarial attacks, Security Attacks in ML

I. INTRODUCTION

Machine Learning that comes under computational algorithm used to mimic human learning and decision capacities deduced from its environment are being widely used in various domains like computer vision, engineering, banking and finance, entertainment industry, smart mobile and web applications, biomedical and healthcare applications. With increase of accumulation of huge amount of data and with emergence of concept of big data, various data mining and machine learning techniques have been developed for pattern recognition, future predictions, decision making along with other application tasks. Machine learning is based on concept of mimicking human beings' way of learning things along with sensory input processing to achieve a particular task.

Machine Learning (ML) can be described as ability to learn without programmed explicitly. ML algorithms learn how to perform certain task based on input data given to the algorithm and perform same task when presented with new data. ML model is trained on training data which include multitude of features which is called as Learning Phase. Then ML model is tested by presenting new data to the model and it should give correct result as per learning phase. This phase is called as Testing Phase. Using metrics like accuracy to predict correct result as per learning, and precision, performance of ML model is measured. The accuracy can depend

on factors like quantity of training data, ML Algorithm used, feature selection, feature extraction method used and hyper parameters.

This survey focuses on following points:

1. ML models and various defences that can be used at various positions of ML pipeline instead of just focusing on one stage.
2. Defence mechanisms are divided based on location as well as training or testing phase and categorize them in a well formatted manner.

II. APPLICATIONS OF MACHINE LEARNING

In recent decade, research in Machine Learning algorithms and its models have drastically increased and various approaches has been proposed. As of now, ML is being used in almost all the domains which include computer vision, prediction, market analysis, semantic analysis, NLP, healthcare, Information management systems, Network security, medical diagnosis and Healthcare sectors [1].

Object detection and recognition and its processing are using ML/DL in computer vision domain. For application which operates for prediction are using ML for classification purpose of documents, images and faces. Image analysis and segmentation is used for medical diagnosis. For security of various systems, ML is being used in IDS and for anomaly detection along with network intrusion and privacy aware systems to provide security to various applications. DoS attacks can be predicted using machine learning approaches. ML is used commonly in semantic analysis, NLP and information retrieval. K-NN and SVM are used to recognize hand gestures. Text classification can be done using linear classification, ANN and SVM effectively. Recommender systems have been built using ML in both bioinformatics and mobile advertisement domain. In Network Security, ML is used for IDPS, Endpoint protection which include malware classification and detection, access control and authentication detection. Process anomaly detection and fraud detection can be done by processing behaviors using ML models. User behavior can be observed using ML models which include keystroke dynamics detection and breaking human interaction proofs. ML can provide security to application by providing detections of malicious URL, phishing and spam [2].

ML in Healthcare is recent emerging domain of ML application. Large data is being generated by healthcare information systems with the introduction of electronic health records so it becomes complex to analyze, process and mine useful information using traditional methods. ML helps to analyze this data and provide insights to doctors or other stakeholders in healthcare. Prognosis meaning predicting expected future outcomes of the disease in clinical environment can be done using ML models. ML can be used for diagnosis purposes by analyzing EHRs on regular basis of the patients. Healthcare domain uses MRI, CT, Ultrasound scans to diagnose diseases. Image analysis along with ML can be used on these scans to effectively diagnose a disease. Extensive research is being conducted on application of ML which monitors patient's health in continuous manner with the help of wearable devices having sensors [3].

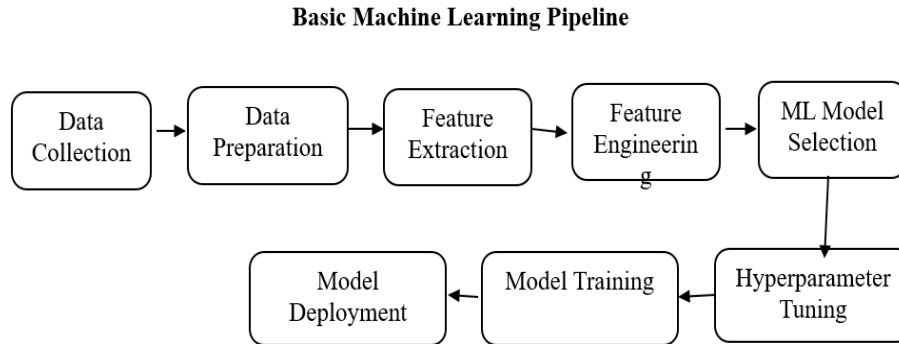


Fig. 1: Basic Stages of ML model

Fig.1 shows various stages of generic ML model. First data relevant to application is collected at one place. This collected data can be dirty or noisy so it needs some preparations and cleaning before giving it to the ML model. Data preparation stage cleans the data, pre-process it and prepare it for the feature extraction. In feature extraction stage, important or significant features are selected and extracted out of the prepared data. Features which impact the model's outcome are selected here. Then addition and removal of various features or creation of artificial features can be done in feature engineering stage. There are various types of ML models so based on the application and input features, best approach model is selected and trained on input data. To increase the performance of ML model, we can adjust the hyper-parameters. After successful training and then testing of model on new data, it is deployed in the real-world application.

III. SECURITY OF ML SYSTEMS

Despite its application in wide domains, research in security of Machine Learning Models is comparatively less. There are different components of a general ML Model which includes Raw data, Datasets (training, validation and test), Learning algorithms, Evaluation methods, ML model itself, Output of the model, etc. All of these components are prone to risks from an attacker. ML model can be at a risk from attackers and there are various types of attacks which can be performed [3].

Broadly, Machine learning system has two major stages:

1. **Training Stage:** training input data is fed to model as input and model is trained using this data using some algorithm.
2. **Testing Stage:** train ed model is presented with new data called test data to see if model is performing as per expectations.

Attacker can attack at both of these major stages to gain sensitive information. Machine Learning system is vulnerable to various stages and points throughout its pipeline. Data poisoning and backdoor attacks can be done on training data to misled the model. Model's output can be compromised by model theft and recovery of training data from model's output. Various adversarial attacks can craft to misled the model output the test input data. Through these examples, it is evident that ML model itself are vulnerable at many points. In this research survey, I am to give a details category wise classification of these attacks and vulnerabilities of ML pipeline.

IV. GOAL OF ATTACKER

Goal or Aim of an Attacker can be presented in three aspects i.e., Violation of Security, Specificity of attack and Influence of Attacks [4] [5].

Violation of Security: There are three major violations that an attacker can cause: Integrity violation in which intrusive points can be classified as normal to avoid detection without compromising system functionalities; Availability violation in which attacker causes so many false errors that system functionality becomes unavailable to legitimate users of the systems; Privacy violation comprises leaking of sensitive private information to attacker.

Specificity of Attack: An attack can be a targeted attack which focuses to cause harm to a set of samples or points or it can be indiscriminate attack which is more flexible attack focusing on a general class of samples or any sample.

Influence of Attack: It can be of two types: Causative attack which influence training data of model and alter the training process; Exploratory attack discover information about training data using techniques like probing.

V. VULNERABILITIES AT VARIOUS STAGES OF MACHINE LEARNING SYSTEM IN HEALTHCARE DOMAIN

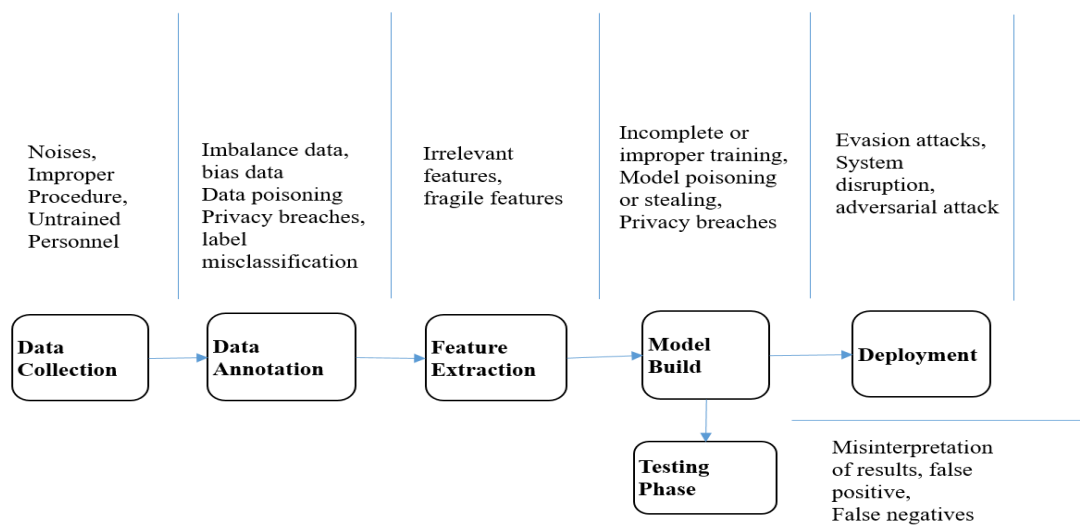


Fig. 2: Healthcare Machine Learning Pipeline and Vulnerabilities at various stages

The fig. 2 shows example of various vulnerabilities at different stages of machine learning pipeline in healthcare domain. This will illustrate how a ML model is vulnerable at various stages. At Data collection stage, there are vulnerabilities which include noises, dirty data, missing data, improper procedure, untrained personnel, etc. Imbalance data, biased data, data poisoning, privacy breaches, label misclassification and label leakages are few vulnerabilities at data annotation stage of ML system in healthcare [2]. During feature extraction, there can be fragile features or irrelevant features and knowledge of feature selection algorithms or features set can help attacker. While training the model using training input data, input data is vulnerable to data poisoning attack or there can be backdoor which can help an attacker to gain access to the model. Model poisoning or stealing attack can cause model to misclassify. Evasion attacks, system disruption, network issues, adversarial attacks can be done at test data or model's output.

As given in our example ML Pipeline, ML attacks can happen at various phases of ML lifecycle. Here we are categorizing attacks into two main categories: 1. Attacks during training phase and 2. Attacks during Testing Phase and Model's Output.

1. Attacks during Training Phase
 - A. Poisoning training data
 - B. Backdoor in Training data
2. Attacks during Testing Phase and Model's Output
 - A. Adversarial Attacks
 - i. Having Knowledge of system
 - ii. Without any knowledge of system
 - B. Model Extraction Attack
 - C. Stealing Hyper Parameters
 - D. Training input data recovery
 - i. Model Inversion
 - ii. Data Membership

VI. DEFENSIVE MEACHNISMS FOR ML-PIPELINE

This section refers to various countermeasures proposed to secure the machine learning pipeline at various stages against various attacks. This paper categorizes the defenses in five sub-sections which are analyzed and summarized in this section. The categorization is as follow

1. Poisoning Attack Defense
2. Backdoor Attack Defense
3. Adversarial Attack Defense
4. Model Stealing Attack Defense
5. Sensitive Data Protection

1. Poisoning Attack Defense

An attacker can manipulate the training input data or inject malicious data as training input data which will compromise ML model. Poisoning attacks can lead to serious consequences, such as biased predictions, degraded accuracy, and compromised security.

Machine learning systems have become ubiquitous in many domains like healthcare, computer vision, speech, etc. These systems rely on training input data to learn patterns and make predictions. However, Attacker can manipulate this input data to lower performance of the system or to confuse the system or to make system bias as per attacker's desired output. Poisoning attacks can be targeted or untargeted and can lead to serious consequences, such as biased predictions, degraded accuracy, and compromised security.

We divide this into three categories: data-centric, model-centric, and hybrid approaches.

1.1 Data-Centric Methods:

Data-centric methods detect and remove the malicious data from input training data of the model. These approaches [7] [8] [9] include:

Data sanitization: This approach involves preprocessing the training data to remove or neutralize malicious samples. Various techniques have been proposed, such as clustering-based methods, outlier detection, and density-based methods.

Data diversity: This approach involves creating training input data which have huge diversity among the data. This can reduce the effect of malicious data injection. Techniques such as ensemble learning, data augmentation, and adversarial training fall into this category.

1.2 Model-Centric Methods:

Model-centric methods focus on designing robust models that can resist poisoning attacks. These approaches include:

Robust optimization: This approach involves creating ML model such that there will be huge gap between defender and attacker. Robustness of the model system is increased in this method. Various techniques such as adversarial training, regularization, and optimization-based methods fall into this category.

Model selection: This approach involves selecting models that are less susceptible to poisoning attacks. Techniques such as robust decision trees, random forests, and gradient boosting fall into this category.

1.3 Hybrid Methods:

These methods are combination of first and second methods which will provide a more comprehensive defense against poisoning attacks. These approaches include:

Ensemble learning: In this method, we train different ML models on different input training data and then combine these models. Different methods like stacking, boosting, bagging, etc. comes under this category.

Defense distillation: This approach involves training a robust model that can detect poisoned data and using it to distill a simpler model that is more efficient and less susceptible to attacks.

ANTIDOTE is a technique proposed by Rubinstein et al. [10] which uses an anomaly detector to defend against poisoning attack by finding outliers in turn improving robustness of the ML model. But this approach mainly focuses on binary classification. Another Approach by Biggio et al. [11] uses bagging classifiers and ensemble method to reduce outliers and to secure against poisoning attack. There are two applications namely, Spam filtering and web-based IDS which have used this approach to defend against poisoning attack.

Game Theory can be used to create a SVM which analyses conflicts between attacker and learner. Zhang and Ahu [12] have created distributed SVM which predicts outcome of learner which in turn prevent updates which are wrong and prevent data poisoning. But this approach is expensive in terms of computation power.

Robust linear regression method given by Liu et al. [13] uses matrix factorization (low-rank) and then PCA Regression which prunes poisoned samples. TRIM is a defensive mechanism presented by Jagielski et al. [14] estimate regression parameters iteratively then remove and isolate doubtful poisonous samples with the use of trimmed loss function.

Open Research Challenges:

Despite the progress in defending against poisoning attacks, several open research challenges remain. These challenges include:

Adversary-aware defenses: Current defenses assume that the attacker follows a specific strategy, which may not be realistic in practice. Therefore, developing defenses that can handle unknown or adaptive attacks is an important research direction.

Scalability and efficiency: Many defenses are computationally expensive or require a large amount of memory. So there is need to develop efficient and scalable defenses.

2. Backdoor Attack Defense

One of the biggest attacks performed on ML model is backdoor attack. These attacks compromise the security and integrity of the system. It involves the insertion of a hidden trigger into a machine learning model during the training phase. This trigger can then be activated during the inference phase to cause the model to output incorrect results or perform malicious actions. Therefore, it is crucial to develop effective defenses against backdoor attacks. We categorize these defenses into four groups: training data, model architecture, detection & prevention.

Many defense mechanisms are there which addresses ML backdoor attack. These defenses can be classified into four groups: training data defenses, model architecture defenses, detection defenses, and prevention defenses. Training data defenses involve modifying the training data to prevent backdoor attacks. Model architecture defenses involve designing the machine learning model to be resistant to backdoor attacks. Detection defenses involve detecting backdoor attacks during the inference phase. Prevention defenses involve preventing backdoor attacks from occurring in the first place.

We identified several defenses [15][16] against backdoor attacks in machine learning systems. Training data defenses include techniques such as data sanitization, data augmentation, and outlier detection. Model architecture defenses include methods such as randomized smoothing, feature squeezing, and defensive distillation. Detection defenses include approaches such as input reconstruction, model interpretation, and output comparison. Prevention defenses include techniques such as adversarial training, regularization, and anomaly detection.

Chen et al. [17] gave an approach which can detect poisonous training input data along with activation clustering technique which can be performed under various backdoor scenarios. Liu et al. [18] use 3 approaches to protect model against trojans. This model requires more computational overhead and can be used for Deep Learning systems. STRIP is a run time trojan detection method proposed by Gao et al. [19]

While there has been significant progress in defenses against backdoor attacks, these defenses are not perfect and can have limitations. For example, training data defenses may not be effective against attacks that are specifically designed to evade such defenses. Model architecture defenses may not be practical for certain types of machine learning models or may require additional computational resources. Detection defenses may have high false positive rates, leading to unnecessary interventions.

3. Adversarial Attack Defense

These attacks are very popular and one of the major attacks that is performed on ML model. These attacks can manipulate behavior of ML model which leads to incorrect or malicious outputs. In recent years, researchers have proposed various defenses against adversarial attacks.

Adversarial attacks can have serious consequences, such as misinterpretation of road sign or incorrect medical diagnosis. Therefore, it is important to develop effective countermeasures that will provide protection from these attacks.

There are many defense methods presented in [20] which provide protection against adversarial attacks. One category of defenses is based on adversarial training, where adversarial examples are generated while training

and then model is trained using these examples. Other defenses include input preprocessing techniques, such as denoising and feature squeezing, and post-processing techniques, such as ensemble methods and detection-based approaches. In addition, there are defenses based on model verification, such as randomized smoothing and certified defenses.

We identified several white box and black box defenses against adversarial attacks. In white box approach attacker knows the model completely and on the other hand, in black-box approach attacker has limited or no information of the model. Adversarial training is a widely used white-box defense, which involves training the model using adversarial examples generated during training. Other white-box defenses include gradient masking, where the model's gradients are modified to prevent adversarial perturbations, and defensive distillation, where the model is trained using softened outputs from another model.

Black-box defenses include input preprocessing techniques, such as feature squeezing and input transformations, and detection-based approaches, such as outlier detection and anomaly detection. Model verification techniques, such as randomized smoothing and certified defenses, can also be used as black-box defenses.

Earlier in Models which do not use neural network approaches like game theory [21], feature detection [22], malicious pdf detection [23] and SecureDroid [24] were used to defend the system against adversarial attacks.

For neural network-based model, we can further categorize algorithms in two types i.e., complete defense technique and detection only technique [25]. First identified correct label whereas second identifies if input instance is adversarial or not. There are various complete defense approaches. Goodfellow et al. [26] gave defense called FGSM which is based on adversarial training, Saddle point formulation method [27], input transformations approach [28] and MagNet [29] which detects adversarial example using detector network.

While there have been significant advances in defenses against adversarial attacks, these defenses are not foolproof and can have limitations. For example, adversarial training can only mitigate attacks within a certain distance from the original input, and detection-based approaches may not work well for attacks with small perturbations. In addition, some defenses may be computationally expensive or require additional training data.

4. Model Stealing Attack Defense

In model stealing attack, attacker attempts to steal a machine learning model trained by another entity which compromise security, privacy and owner's rights of the model. Therefore, it is important to develop effective defenses against this type of attack. In recent years, researchers have proposed various defenses against model stealing.

Several defenses have been proposed [30][31] to mitigate model stealing attacks. One category of defenses is based on watermarking techniques, where a watermark is embedded into the model during training. The watermark can be used to detect if the model has been stolen. Other defenses include model obfuscation, where the model is modified to make it harder to understand; model splitting, where split the model and train separately and then combine output approach is followed.

We identified several theoretical and practical approaches to defend against model stealing attacks. Watermarking-based defenses include methods such as Digital Fingerprinting, Secret Watermarking, and Adversarial Watermarking. Model obfuscation defenses include techniques such as Deep Obfuscation, Model Pruning, and Function-Preserving Encryption. Model splitting defenses include methods such as Progressive Learning and Distributed Learning.

A Method which injects deceptive noises in confidence information which in turn mislead the attacker is proposed by Lee et. Al. [32]. If attacker send huge number of queries, then attack can succeed and this is the disadvantage of this method. Hanzlik et al. [33] presented MLCapsule framework which allows a model to be run on user's side in turn protecting user's own privacy and server will protect the intellectual property rights. In this method, encryption is required which becomes computational overhead.

While there have been significant advances in defenses against model stealing attacks, these defenses are not foolproof and can have limitations. In addition, some defenses may be computationally expensive or require additional training data.

5. Sensitive Data Protection

Machine learning is an essential tool for organizations and companies looking to utilize data to improve their products and services. However, this reliance on data comes with risks, particularly with regards to the privacy of sensitive training data. If this data falls into the wrong hands, it can be used for malicious purposes, leading to a significant loss of trust in the organization.

To address these concerns, privacy-protected machine learning techniques [34][35] have been developed to protect sensitive training data from recovery. we will discuss various techniques that can be used to protect sensitive data.

Differential Privacy

When presence or absence of any particular training data does not affect model's outputs then it is called as differential privacy technique. This is achieved by adding noise to the training data, ensuring that any data that is sensitive or identifiable cannot be recovered by malicious actors. Privacy budget parameter controls the noise amount that should be added, which determines the amount of information that can be leaked without compromising sensitive data's privacy.

One of the primary merits of this approach is that it can be applied to existing machine learning models without requiring any significant modifications. However, model's accuracy is reduced as a result of noise addition. Additionally, ensuring that the privacy budget is correctly set is essential to guarantee that the data remains secure.

Homomorphic Encryption

It encrypts the data while still allowing computations to be performed on it. This means that sensitive training data can be encrypted before being sent to a third-party for analysis, preventing any unauthorized access to the data. Additionally, homomorphic encryption also allows for the secure sharing of models, enabling multiple organizations to collaborate on machine learning projects without risking data breaches.

While homomorphic encryption can provide robust security to sensitive data, it comes with some significant drawbacks. Firstly, it requires significant computational power to perform encryption and decryption, leading to slower training times. Additionally, the use of homomorphic encryption can also reduce model's accuracy due to the need for additional computational resources.

Federated Learning

It allows multiple organizations to collaborate on machine learning projects while keeping their data private. This is achieved by each organization training a model on their data, and the models are then combined to create a final model. This approach ensures that sensitive data is kept secure while allowing multiple organizations to benefit from the insights generated by the machine learning model.

Federated learning has several advantages over other privacy-protected machine learning techniques. Firstly, it allows for the secure sharing of models without requiring any modifications to the underlying algorithms. Additionally, federated learning can lead to significant improvements in the accuracy of the model, as it enables the use of more diverse datasets.

There are various cryptography-based approaches which can protect sensitive data. Abadi et al. [36] presented differential privacy-based method which achieves privacy, complexity, model quality and efficiency. Phong et al. [37] proposed privacy preserving distributed learning framework but it can reveal sensitive data to server.

Another privacy preserving distributed framework is presented by Shokri and Shmatikov [38] where parallel stochastic gradient descent can be executed. Federated Learning framework-based multi-party computation is proposed by Bonawitz et al. [39] which performs a secure aggregation to provide security and privacy.

VII. RECOMMENDATIONS

1. ML models are susceptible to different attacks. The existing defense mechanisms are not sufficient to adhere security & privacy of ML systems.
2. This Survey will guide researcher through various security defense mechanisms to provide privacy and security to ML system at various stages of its pipeline.
3. There is need of robust and computationally fast privacy preserving defensive mechanisms for ML systems and this survey will help research to design such system.

VIII. FUTURE SCOPE

Research is being conducted on Machine Learning extensively. Following are some future directions regarding this:

- **Attack in real scenarios:** Most of attacks proposed are done in simulating environment and major part of the research of security of Machine Learning algorithms is done using simulating environment. But conditions and setups in real world can impact these algorithms and security attacks differently that is why there is need of conducting research in real world scenarios.
- **Security for ML Models:** Security of ML Models are to be focused more in research so as to provide a robust and secure ML Models which can directly be implemented in various applications.
- **Privacy preserving ML Models:** With increased attention to ML application, there is need of focus on privacy-aware or privacy-preserving architecture and approaches of Machine Learning Models. There are several privacies related issues like access control, protection of model's parameters from service providers, protecting sensitive information from third parties, etc. There is need of improving efficiency of cryptographic approaches in ML.

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A Study on Security Challenges in Machine Learning

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ABSTRACT

In recent years, Machine learning is being used in various systems in wide variety of applications like Healthcare, Image processing, Computer Vision, Classifications, etc. Machine learning have shown that it can solve complex problem-solving abilities very similar to human beings and above them also. But various research proves vulnerability of ML Models in terms of different security attacks to ML systems. These attacks are hard to detect because they can hide in data at various stages of machine learning pipeline without being detected. This survey aims to analyse various security attacks on machine learning and categorize them depending on position of attacks in machine learning pipeline. This paper will focus on all aspects of machine learning security at various stages from training phase to testing phase. Machine Learning pipeline, Aims of Attacker, different attacks are considered in this paper.

Keywords— Artificial Intelligence Security, Machine Learning Security, Poisoning attacks, backdoor attacks, adversarial attacks, Security Attacks in ML

I. INTRODUCTION

Machine Learning that comes under computational algorithm used to mimic human learning and decision capacities deduced from its environment are being widely used in various domains like computer vision, engineering, banking and finance, entertainment industry, smart mobile and web applications, biomedical and healthcare applications. With increase of accumulation of huge amount of data and with emergence of concept of big data, various data mining and machine learning techniques have been developed for pattern recognition, future predictions, decision making along with other application tasks. Machine learning is based on concept of mimicking human beings' way of learning things along with sensory input processing to achieve a particular task.

Machine Learning (ML) can be described as ability to learn without programmed explicitly. ML algorithms learn how to perform certain task based on input data given to the algorithm and perform same task when presented with new data. ML model is trained on training data which include multitude of features which is called as Learning Phase. Then ML model is tested by presenting new data to the model and it should give correct result as per learning phase. This phase is called as Testing Phase. Using metrics like accuracy to predict correct result as per learning, and precision, performance of ML model is measured. The accuracy can depend

on factors like quantity of training data, ML Algorithm used, feature selection, feature extraction method used and hyper parameters.

This survey focuses on following points:

1. This paper focuses on security attacks at various positions of machine learning pipeline instead of focusing on one stage.
2. This paper divides the security attacks based on location as well as training or testing phase.

II. MACHINE LEARNING & IT'S APPLICATIONS

In recent decade, research in Machine Learning algorithms and its models have drastically increased and various approaches has been proposed. As of now, ML is being used in almost all the domains which include computer vision, prediction, market analysis, semantic analysis, NLP, healthcare, Information management systems, Network security, medical diagnosis and Healthcare sectors [1].

Object detection and recognition and its processing are using ML/DL in computer vision domain. For application which operates for prediction are using ML for classification purpose of documents, images and faces. Image analysis and segmentation is used for medical diagnosis. For security of various systems, ML is being used in IDS and for anomaly detection along with network intrusion and privacy aware systems to provide security to various applications. DoS attacks can be predicted using machine learning approaches. ML is used commonly in semantic analysis, NLP and information retrieval. K-NN and SVM are used to recognize hand gestures. Text classification can be done using linear classification, ANN and SVM effectively. Recommender systems have been built using ML in both bioinformatics and mobile advertisement domain. In Network Security, ML is used for IDPS, Endpoint protection which include malware classification and detection, access control and authentication detection. Process anomaly detection and fraud detection can be done by processing behaviors using ML models. User behavior can be observed using ML models which include keystroke dynamics detection and breaking human interaction proofs. ML can provide security to application by providing detections of malicious URL, phishing and spam [2].

ML in Healthcare is recent emerging domain of ML application. Large data is being generated by healthcare information systems with the introduction of electronic health records so it becomes complex to analyze, process and mine useful information using traditional methods. ML helps to analyze this data and provide insights to doctors or other stakeholders in healthcare. Prognosis meaning predicting expected future outcomes of the disease in clinical environment can be done using ML models. ML can be used for diagnosis purposes by analyzing EHRs on regular basis of the patients. Healthcare domain uses MRI, CT, Ultrasound scans to diseases detection. Image analysis along with ML can be used on these scans to effectively diagnose a disease. Extensive research is being conducted on use cases of Machine Learning in healthcare domain where continuous health analysis is done with the help of wearable devices and sensors can be achieved [4].

Basic Machine Learning Pipeline

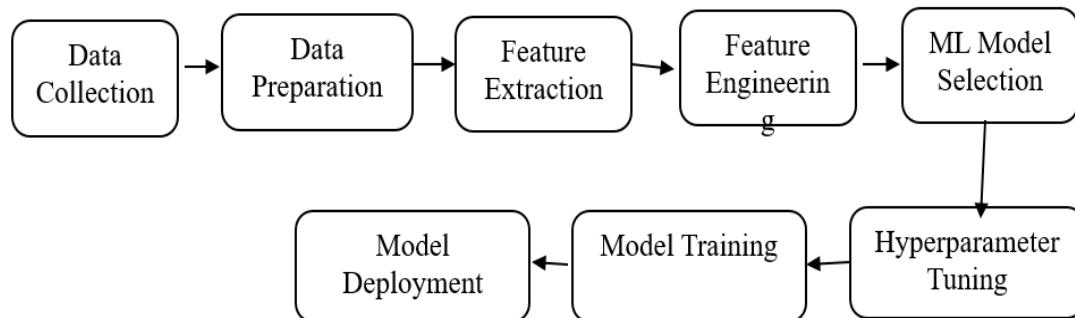


Fig. 1: Basic Stages of a Typical ML System

Fig. 1 shows basic stages of a typical ML system. First relevant data regarding application is collected at one place. This collected data can be dirty or noisy so it needs some preparations and cleaning before giving it to the ML model. Data preparation stage cleans the data, pre-process it and prepare it for the feature extraction. In feature extraction stage, important or significant features are selected and extracted out of the prepared data. Features which impact the model's outcome are selected here. Then addition and removal of various features or creation of artificial features can be done in feature engineering stage. There are various types of ML models so based on the application and input features, best approach model is taken and trained on input data. Hyper parameter tuning is performed which tune the input parameters to increase the performance. After successful training and then testing of model on new data, it is deployed in the real-world application.

III. AIMS OF AN ATTACKER

An Attacker can have number of aims for which attacker is exploiting the vulnerability of the model. The Aims can be divided majorly as Violation of Security, Specificity and Attacks by Influence [5] [6].

Violation of Security: There are three major violations that an attacker can cause: Integrity violation in which intrusive points can be classified as normal to avoid detection without compromising system functionalities; Availability violation in which attacker causes so many false errors that system functionality becomes unavailable to legitimate users of the systems; Privacy violation comprises leaking of sensitive private information to attacker.

Specificity of Attack: An attack can be a targeted attack which focuses to cause harm to a set of samples or points or it can be indiscriminate attack which is more flexible attack focusing on a general class of samples or any sample.

Attacks by Influence: It can be of two types: Causative attack which influence training data of model and alter the training process; Exploratory attack discover information about training data using techniques like probing.

IV. ATTACKS ON MACHINE LEARNING & MITIGATIONS

Data collection stage, there are vulnerabilities which include noises, dirty data, missing data, improper procedure, untrained personnel, etc. Imbalance data, biased data, data poisoning, privacy breaches, label misclassification and label leakages are few vulnerabilities at data annotation stage of ML system in healthcare

[3]. During feature extraction, there can be fragile features or irrelevant features and knowledge of feature selection algorithms or features set can help attacker. While training the model using training input data, input data is vulnerable to data poisoning attack or there can be backdoor which can help an attacker to gain access to the model. Model poisoning or stealing attack can cause model to misclassify. Evasion attacks, system disruption, network issues, adversarial attacks can be done at test data or model's output. The machine learning pipeline is a complex process that involves multiple stages. Each stage can have its own set of vulnerabilities that could compromise the accuracy, reliability, and privacy of ML model.

Stages of a Typical ML Model & Respective Vulnerabilities:

Collection of Relevant Data: Relevant data is collected with respect to the application which will be used for model training but it can be biased, incomplete, or of poor quality. This can lead to less accurate models and biased or wrong predictions.

Data Pre-processing: This second stage includes various tasks such as cleaning the collected data as data collected is messy and noisy; transforming the data and performing normalization on the data so that it should be ready to be analysed. Vulnerabilities in this stage include improper data cleaning, feature selection, or normalization, which can lead to incorrect model predictions.

Model Selection: Selecting the appropriate machine learning algorithm and architecture is essential to achieve optimal performance. However, vulnerabilities at this stage include selecting a model that is too simple or too complex, resulting in underfitting or overfitting.

Model Training: The model training involves feeding the data into the selected ML algorithm and training the model using inputted data. Optimization techniques can be applied to input parameters of the model to increase the performance. Vulnerabilities at this stage include insufficient data for training, using incorrect hyperparameters, or using incorrect evaluation metrics, leading to inaccurate models.

Model Evaluation: Evaluating the model's performance is necessary to ensure that it is accurate and reliable. However, vulnerabilities at this stage include evaluating the model on biased or incomplete data, using incorrect evaluation metrics, or failing to detect overfitting or underfitting.

Model Deployment: Deploying the model into a production environment can pose several risks, including cybersecurity threats, data breaches, and privacy violations. Vulnerabilities at this stage include unsecured endpoints, insufficient model monitoring, and lack of data privacy controls.

Overall, it is important to identify vulnerabilities at each stage of the machine learning pipeline and ensure that proper security defence is applied at respective stages so that it will not affect performance and security of ML system.

Various Security Attacks Performed on ML System:

Poisoning Attacks: In this attack type, data used for training is injected with some malicious data which changes the model's output. An Attacker can make model predict decided output by performing this attack which can in turn confuse the model.

Adversarial Attacks: Adversarial attacks involve adding carefully crafted noise to training input data which deceives ML Model. Using this attack, an attacker can force ML model to make incorrect predictions or classify data into the wrong category.

Model Evasion Attacks: Model evasion attacks involve exploiting vulnerabilities in the model's decision-making process to manipulate its behaviour. Using this attack, an attacker can use various techniques like gradient descent which can alter parameters or training input data to evade detection.

Inference Attacks: Inference attacks involve thorough analysis of model's output to steal sensitive data. Using this attack, an attacker can just observe and analyse output of ML model and infer sensitive information.

Methods to Mitigate Attacks on Machine Learning:

Data Sanitization: Data sanitization involves filtering out malicious data from the training dataset to prevent poisoning attacks. The data can be pre-processed, and the outlier data can be removed to prevent model bias.

Adversarial Training: Adversarial training involves training the model on both clean and adversarial data to improve its robustness against adversarial attacks.

Regularization: Regularization involves adding penalties to the model's training process to prevent overfitting and improve its generalization capabilities. Regularization can prevent model evasion attacks by reducing the model's reliance on specific inputs.

Secure Inference: Secure inference involves protecting the model's output by adding noise to the output to prevent inference attacks. Differential privacy can be used to add noise to the output without significantly affecting its accuracy.

V. CLASSIFICATION OF SECURITY THREATS

Machine Learning attacks can happen at various phases of ML lifecycle. Here we are categorizing attacks into two main categories: 1. Attacks during training phase and 2. Attacks during Testing Phase and Model's Output.

1. Attacks during Training Phase
 - A. Poisoning training data
 - B. Backdoor in Training data
2. Attacks during Testing Phase and Model's Output
 - A. Adversarial Attacks
 - i. Having Knowledge of system
 - ii. Without any knowledge of system
 - B. Model Extraction Attack
 - C. Stealing Hyper-Parameters
 - D. Sensitive training input data Recovery
 - i. Model Inversion
 - ii. Inference from membership

1. Attacks during Training Phase

A. Poisoning Training Data

Prediction or output of ML model can be misled by manipulating the training data is called as Poisoning Attack. Various research has shown that poisoning attack can degrade performance of model drastically.

Intrusion Detection-Prevention Systems (IDPS), Abnormality or malware detection system also use ML models for detection. There are many poisoning attacks proposed which targets anomaly detection system in a network.

P. Li et al. [8] adopted an edge pattern detection (EPD) algorithm which is tested against multiple ML algorithms like NB, LR and SVM used in IDSs.

There is an updating procedure as well as input procedure in every biometric system where data is updated or inputted. Attacker can take advantage of these processes to comprise the privacy and security of these systems. Biggio et al. [9] investigated adaptive biometric systems which uses verification of face with the use of PCA method. Fake faces can be injected to claim legitimacy of the fake user. This attack is improved their further research [10] in which it is assumed that user can store many templates.

Biggio et al. [11] designed an attack which targets SVM-based systems where attacker can increase testing error of classifier by injecting well-crafted training data. Gradient ascent technique is used to build malicious data. It uses optimization formulation and is able to be kernelized. B. Biggio et al. [13] presented an approach that particularly targets malware clustering used in behavioural detection systems. A poisoned sample with poisoning behaviours can be added to training data.

Learning algorithms can directly attack by poisoning attacks. H. Xiao et al. [7] performed poisoning attack on pdf malware detection which can compromise feature selection methods. Multiple features like ridge regression and LASSO can be attacked using this approach. B. Li et al. [14] designed an attack which targets systems with collaborative filtering. Attacker can go unnoticed by imitating normal user and this require complete information of the system.

Y. Wang and K. Chaudhari [16] proposed an attack which targets online learning systems where input streams are used. A better attack targeting online learning is proposed by X. Zhang and X. Zhu [17].

Cloud deployed models can be exposed to attacks on server side. Cong Liao et al. [23] proposed a study which focuses on this type of attack where attacker having access to server is able to manipulate the model and add malicious samples without being detected easily.

B. Backdoor in Training data

Backdoor can be created in training input data which is hidden in any ML model. Normal functioning of model does not get affected by backdoor. Backdoor has some triggering condition when the conditions are met backdoor gets triggered. Backdoor are stealthy and very hard to detect.

Chen et al. [27] proposes method to add backdoor with the use of data poisoning in Deep learning models. This model works effectively even if there is no knowledge of model and input data. Liao et al. [28] presented backdoor attacks which can be inserted using stealthy perturbations in convolution neural network models. Backdoor attacks on federated learning are presented by Bagdasaryan et al. [29] in which they proposed a secure privacy preserving learning framework. Tianyu Gu et al. [30] proposed a backdoor called BadNet and tested it in different real-life scenarios and concluded that backdoors reduce accuracy. Ahmed Salem et al. [31] presented backdoor attack for deep networks which is dynamic. Current backdoor detection systems cannot detect these attacks as triggers generated by these have random conditions, patterns at random locations.

In all these methods, attacker adds a backdoor to ML model then when it gets activated, it will create malicious data inputs. This malicious data is fed to model as training input on which model is trained and re-trained. Further Backdoor attacks are categorized as per Yansong Gao et al. [32] into outsourcing attack, pretrained attack, data collection attack, collaborative learning attack, post deployment attack and code poisoning attack.

2. Attacks during Testing Phase and Model's Output

A. Adversarial Attacks

Depending on the information known to the attacker, adversarial attacks can be classified in two types: known target system attack and unknown target system attack.

Flavio Luis mello [34] presented various attacks in physical word and their protective measures with respect to adversarial attacks. There are applications like Heat clocking wearables and anti-surveillance makeup, Adversarial T-shirt which can fool detection of person, eyeglasses which can fool face recognition systems in cameras, face projector approach to trick facial recognition systems, etc. Ivan Evtimov et al. [35] presented an attack which can generate perturbation with the help of images under various conditions into account. Wieland Brendel et al. [36] proposed a decision-based attacks which can be applied in real world scenarios using black-box models needing less knowledge and are easier to apply than transfer-based attacks. Nicolas Papernot et al. [38] presented practical black-box attack which require no knowledge of model or training data and attacker can control a remotely hosted DNN.

Dalvi et al. [40] proposed a study in which classifier do the wrong predictions. This problem is known as adversarial classification problem. Adversarial learning problem is introduced by Lowd and Meek [41]. Statistical machine learning can be used to attack spam filter [42]. Srndic and Laskov [44] studied classifier's performance under evasion attacks and states that there is significant drop in performance under simple attacks.

Without any system's knowledge also attacker can perform adversarial attacks. Xu et al. [45] proposed an evasion attack which can fool detection systems by finding malicious samples. Face recognition in Biometric system [48], Sign recognition attack used for roads [35], camera attack of cell phone [50] and 3D object attack [51] are some examples of this attack in real life scenarios.

B. Model Extraction Attack

Attacker can steal ML model where attacker has to observe the output labels and confidence levels along with corresponding inputs, this is called as model stealing. The idea was presented by Tramer et al. [52]. It is a black-box attack type where attacker mines knowledge and then based on obtained information, attacker re-design the model which acts similar target model. Shi et al. [53] presented model stealing method which works on black box approach where attacker use deep learning to build model form obtained predicted labels from target labels. Chandrasekaran et al. [54] proposed extraction attacks without any information.

C. Hyper parameters Stealing

Gradient of model is initialized to zero and hyper parameters are calculated by solving linear equations. This method is proposed by Wang and Gong [55] where hyper parameters of model can be stolen from algorithms like SVM, Ridge regression and neural networks. This method assumes that attacker should have the knowledge of learning algorithm, training data, etc. There is algorithm proposed by Milli et al. [56] which states that model parameters can be revealed by gradient information quickly. This method has high computational overhead.

D. Sensitive Training Input Data Recovery

Attacker can recover sensitive information of the training data by observing output and model parameters. There are two major types of attack which can perform this task: 1. Model Inversion Attack and 2. Membership Inference Attack.

Fredrikson et al. [57] first introduced Model inversion attack in which black-box access along with some knowledge of patient can be used to get genomic information. They further involved their study in [58] where same attack can be performed with the used of confidence of predictions. There are two categories of works in this attack type, first is attacks that creates actual reconstruction and second is attacks that create representative class of sensitive data which is not there in training data. [59]

Membership inference attack is introduced by Shokri et al. [60] in which attacker can calculate if some data belongs to training data or it does not belong to training data. This attack can be threat to many deep learning models [62] [63] [64].

VI. CONCLUSION

Machine learning models have become an essential tool in various applications, but they are susceptible to attacks. Attackers can make use of various vulnerabilities in machine learning models to manipulate their behavior or steal sensitive information. This paper provides a study on various threats of ML security. The ML system is vulnerable to different types of attacks at different locations based on ML Pipeline. This paper will give researchers category wise classification of attacks at different stages of ML pipeline like training phase or testing phase. We conclude that ML pipeline itself is vulnerable at various stages of its pipeline from various attacks and there is a need to design secure, privacy preserving ML system which can defend against these attacks.

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The Importance of ICT in the Higher Education System

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ABSTRACT

Information and communication technology is the mode of education that use information and communication technology to support, enhance and optimize the knowledge of students on a global level. Increasing the use of ICT in education with integrative technology has found a positive impact on student achievements and knowledge. Information and Communication Technology (ICT) includes computers, the Internet, and Electronic delivery systems such as radios, televisions, and projectors among others, and is widely used in today's education field. Using ICT tools students, faculties can access resources that are available worldwide easily to enhance their quality of education. ICT tools are important for researchers to explore their knowledge. Technology has disrupted all areas of our life and education is no different. Especially after the pandemic, more schools are looking towards online learning as a permanent teaching method along with traditional classroom teaching. But while most of the institutes have used some form of an online systematic approach to virtual learning.

Keywords:-ICT; Technology Integration; HEI (Higher Education Institutions) , ICT initiatives

I. INTRODUCTION

The Indian higher education system is the third largest in the world and offers education and training across almost all disciplines. With over 1,000 universities, 42,000+ colleges and 11,500+ stand-alone institutes, with a majority of them owned by private players, the Indian higher education system has witnessed tremendous growth since its independence.

ICT tends to expand access to education. Through ICT, learning can occur anytime and anywhere. Online course materials, for example, can be accessible 24 hours a day, seven days a week. Teleconferencing classrooms allow both learner and teacher to interact simultaneously with ease and convenience. Based on ICT, learning and teaching no longer depend exclusively on printed materials. Multiple resources are abundant on the Internet, and knowledge can be acquired through video clips, audio sounds, and visual presentations and so on. Applications of ICTs are particularly powerful and uncontroversial in higher education's research function. The paper's main objectives are to evaluate the importance of ICT in higher education and to analyse the government initiatives for the development of ICT in higher education.

"We need technology in every classroom and in every student and teacher's hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world." – David Warlick

II. REVIEW OF RELATED LITERATURE

UttamkrPegu studied “Information and communication technology in higher education in India: challenges and opportunities” (2014). The study revealed that ICT enabled education will ultimately lead to the democratization of education and it has the potential for transforming higher education in India. Mahisa, Anju studied “The role of ICT in higher education in India” (2014) .The study revealed that ICT play vital role as a strong agent for change among many educational practices.Ozdmemir and Abrevaya (2007) asserted that ICT is reducing the cost per students and expanding the enrolments and makes the provisions for employers and supports enduring learners. Lalitbushan S Waghmare, et-al (2014) studied “Role of Information and communication technology in Higher education: learners perspective in rural medical schools”. They concluded that there is a need to foresee the role of technology in education and take appropriate measures to equip the stakeholders for adequate and optimum application of the same

III. BENEFITS OF ICT IN HIGHER EDUCATION

Motivating Factor:-

The internet can act as a motivating tool for many students. Young people are very captivated by technology. Educators must capitalize on this interest excitement and enthusiasm about the Internet for the purpose of enhancing learning. For already enthusiastic learners, the internet provides them with additional learning activities not readily available in the classroom.

Fast communication:-

Every student has its own smartphone to access the internet. The internet promotes fast communication across geographical barriers. Students can join collaborative projects that involve students from different states, countries or continents. With the help of ICT tools learner can access the data over the cloud. Using internet connection students can access very fastly.

Locating Research materials:-

In HE (Higher Education) research play very important roles to enhance the quality of education.to access the resources over the internet ICT tools provide Efficiency of access. There are many resources on the internet than the school library can provide. With the help of ICT tools researcher can access the research paper, thesis, articles, news related to their topic.

Co-operative learning:-

The internet facilitates co-operative learning, encourages dialogue and creates a more engaging classroom. For example, a LISTER V for our class will allow students to get involved in class discussions through e-mails in a way not possible within four walls of the classroom.

Acquiring varied writing skills:-

If students are required to publish their work on the internet, they have to develop hypertext skills. These skills help students gain experience in non-sequential writing.

Improve Quality of Education:

- A reliable grading system to measure and assign rank to Students, Teachers, Schools and Universities
- All round development of students
- Promote educational ideas
- Continuous improvement by feedback
- Support collaboration among students, teachers and institutions

Improve Accessibility:

- Accessible anytime from anywhere to everyone
- Bring the books & another resource within reach of students
- Promote education in rural areas
- Provide online courses to students.
- 24x7 schooling system for those students who cannot attend regular schools during daytime

Reduce the cost of education

- Provide services at lower cost through online solutions
- Promote —learn yourself and —community learning via online systems, etc.
- Assist teachers in conducting the exam and offering courses material
- ICT opens the doors for girls to get education from home for e.g. online learning if social & cultural reasons are preventing them.
- ICT promotes vocational courses as well as self-paced learning for the adults
- ICT brings culturally diverse India on a common learning platform that is offered in all languages

IV. THE MOST POPULAR ICT TOOLS FOR TEACHERS AND LEARNERS**Google Form:**

A Google Form is used to collect information in the form of quizzes and surveys. Using this one can conduct tests and surveys. That's why it is very useful for teachers and students. The information we fill in Google Forms is collected and automatically connected with a spreadsheet. We can also provide an e- certificate when students qualify for a quiz.

Google Classroom:

Google Classroom is a type of virtual classroom where teachers can provide video lectures, study Material and can assign quizzes, assignments, and projects to students. We can assign time limits for assignments and quizzes. Google Classroom integrates features like Google Documents, Google slides, and Google Sheets in order to make teacher-student communication more effective. Google classroom has been used for uploading the study materials. Google Classroom helps the students to find the material related to their subjects easily and study it at home

• Google Meet:

The Google Meet will allow you to conduct HD video conferencing with up to 30 students. Now, Google Meet is fully integrated with our WIU Gmail accounts, so you can join meetings directly from the Calendar event or email invite. You also have the ability to allow for non-WIU participants. Google Meet is also the better

program if you have participants that need to call in rather than join via video because Google doesn't charge an additional call-in fee. Overall, Google is more cost-effective.

- **Any Meeting:**

Any Meeting is free with ads. It allows for meetings of up to 200 people and has essential functionality like screen sharing, VoIP and phone conferencing, and meeting recording, and it even has a follow-up functionality

- **Open Broadcaster Software (OBS):**

It is free and open-source software for recording a video lecture. This software is also useful for the live streaming of lectures. This software is also termed OBS studio. We can stream a lecture on some websites like YouTube, Facebook, and Instagram. It gives different options to record videos like face recording, recording involving PPT, etc.

V. CHALLENGES OF EDUCATION IN INDIA

Education in India faces many challenges which involve the following:

1. **ICT Infrastructure:** The major challenge before ICT is the availability of ICT infrastructure i.e. non-availability of buildings, electricity & Communication infrastructure.
2. **Quality:** Maintaining a standard of education is a big challenge. Access Due to infrastructural constraints and social issues, it becomes very harder to make education accessible to all parts of society.
3. **Cost:** The cost of education is very high for people (who belong to the lower class) and places where it is accessible. **Social & Cultural Issues:** due to Cultural diversity it is very difficult to offer education tailored to specific social segments. For example,educating the children who belong to poor families because they are forced to work and miss out on learning opportunities

VI. RECOMMENDATIONS

The quality of programs as measured by fitness for purpose should continue to grow, if the stakeholders perceive the various educational programs as meeting their needs and expectations. ICTs serve to provide the means for activities to realize the potential in human resources. Furthermore, adequate funds must be provided to initiate, develop, promote, review and implement ICT policies in the educational sector to bring about an improvement on ICT utilization, through computer apprentices courses taught in vigerian tertiary institutions. In this period of economic recession, the price of ICT equipment and materials will continue to the astronomical. It becomes highly imperative for all stakeholders of education to entice industrial establishments, politicians, big businessman and entrepreneurs, non-governmental organizations and the community at large to assist the institutions in the provision of ICT equipment and materials and well finished computer laboratories.

VII. CONCLUSION

ICT plays a vital role as a strong agent for change in many educational practices, conducting online exams, paying online fees, and accessing online books and journals. Thus ICT in Higher education improves the teaching-learning process and provides the facility of online learning to thousands to thousands of learners who

cannot avail of the benefits of higher education due to several checks, such as time, cost, geographical location, etc.

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The Future of Blockchains in Creating Decentralized Networks and Solution for Risks Associated to its Security

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ABSTRACT

One of the most economically disruptive technologies yet revolutionary innovations made in January 2009 by Satoshi Nakamoto was Bitcoin which was stiff backed by the emerging technologies such as the blockchain and smart contracts at its backend. Blockchain enabled a decentralized architecture network that is secured and transparent, compared to the current infrastructure with centralized tech giants governing over the data. The peer-to-peer transactions and shared ledger exchanges made possible using blockchain and smart contracts can resolve major problems and fuel innovations. However, it is still forwarding flaws and security issues like 51% attack, sybil attack, DDoS and censorship governance. We have discussed the future potential applications and challenges blockchain technology concept might face, as well as possible solutions and preventive measures.

Index terms: Blockchain, Smart Contracts, Decentralization, Peer-to-Peer, Ledger

I. INTRODUCTION

Bitcoin introduced Blockchain technology in 2009 which has potential to change the world. The use of a blockchain system enables an open ledger accessibility without intervention from third parties. A blockchain at core base consists of multiple interconnected blocks that hold data in a decentralized network, with each computer retaining its own version for reliability purposes throughout the database. The entire structure lacks any singular failure point due to this design feature as well.[1] Furthermore, once an entry is permanently established on it sequentially, no modifications can occur because they are immutable by nature and irreversible thereafter.

The start of a blockchain involves the creation of an inaugural block, often known as the Genesis block. This primary record captures initial transactions and also receives a unique alphanumeric identifier called a cryptographic hash that is based on its timestamp. A few examples of Secure Hashing Algorithms are SHA-256 and SHA-512 that are used in Blockchains. The blocks are added in order to form an interlinked chain where each following block uses information from the previous ones & their own hashes- to create its own distinctive code for continued sequential ordering.[5]

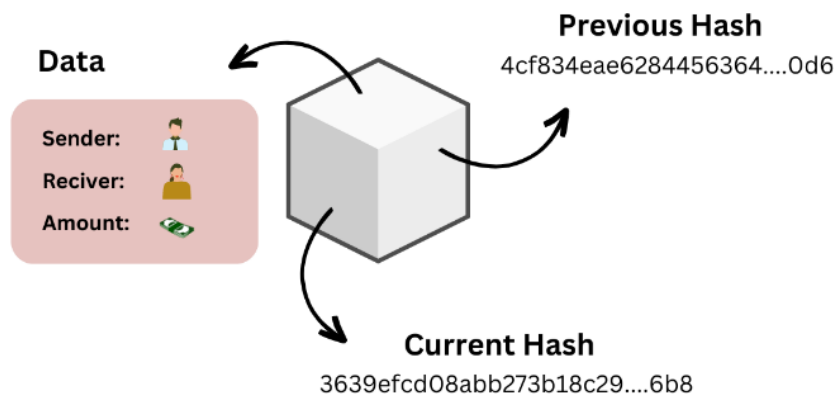


Fig.1 : A Block Contains.

A blockchain can majorly assist with building the next generation of web known as Web 3.0 at its backend. The currently in-use web 2.0 is a read, write, edit, upload, download etc. With the help of web applications hosted on a centralized server that gave rights to tech giants to rule over the data of end user of the service application which could be sold, manipulated or misused in certain unethical ways. Web 2.0 is commonly used for content creation and interaction, depicted through the current social media we use currently. On the other hand, In Web 3.0 there might not be such necessity to build such web applications that host on a centralized single server or database to store user data. Alternatively, a developer might deploy a Web 3.0 Application on decentralized Blockchain Platform which could be hosted on a peer-to-peer server.[4]

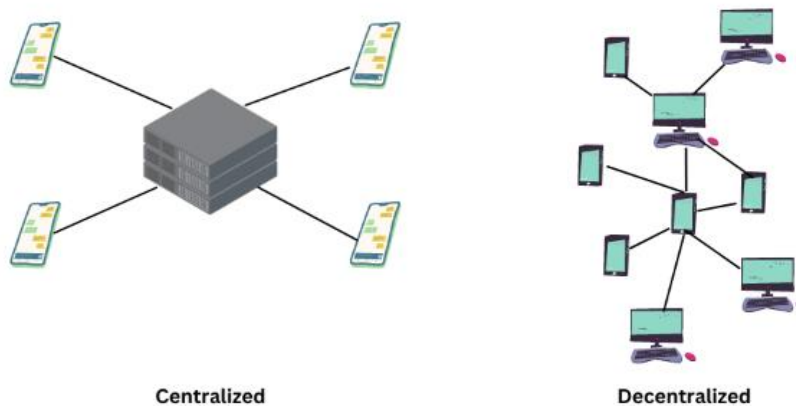


Fig 2: Centralized & Decentralized Network.

The most recent development is the introduction of smart contracts to blockchain. A Smart contract in a blockchain acts as contract just like in real life. A smart contract is a computer program used to exchange digital currency or tokens based on certain condition, commonly used for trading between two parties and stored on blockchain itself. They are preprogrammed to meet certain conditions and the end user at any node cannot change it.

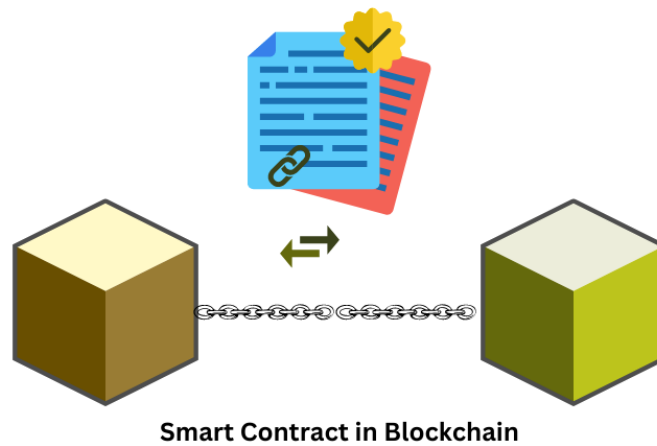


Fig 3: Smart Contract in Blockchain

Blockchain is capable of using consensus mechanisms or proof of work to provide transparency to ledger, also maintaining the integrity making intruders very tough to deploy a malware or compromise with the chain. If a hacker manages to compromise a single block by cracking the hash, it will make all following blocks invalid. We will further discuss the potential of how using this technology can improve and help in further to betterment of the society.

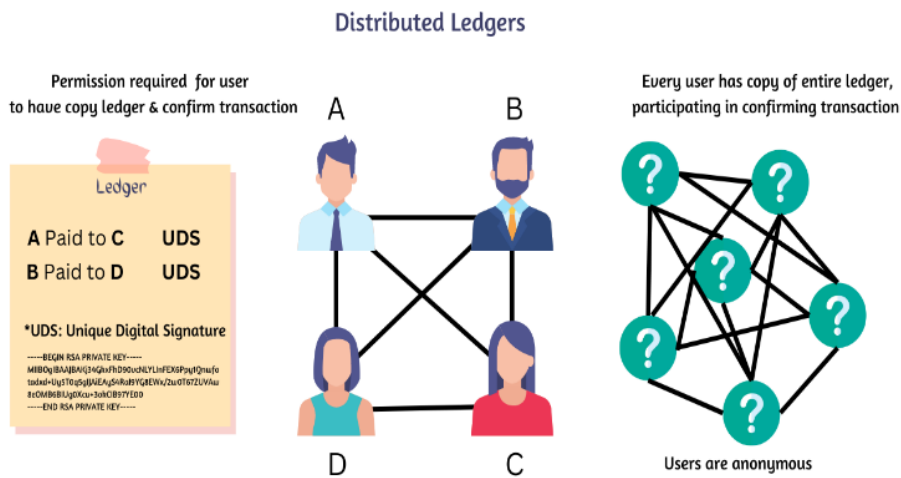


Fig 4: Distributed Ledger

II. METHODS

The end goal of this paper is to provide a brief overview of blockchains creating a better future for decentralized distributed ledger in terms of supply chains, a potential smart city that utilizes Blockchain technology in areas of developing infrastructure like healthcare, cryptocurrencies, supply chains, finance, web services, networks, and renewable energy and a free web (Web 3.0). Although the technology is not full proof it has some risks, in continuation possible solutions also have been mentioned.

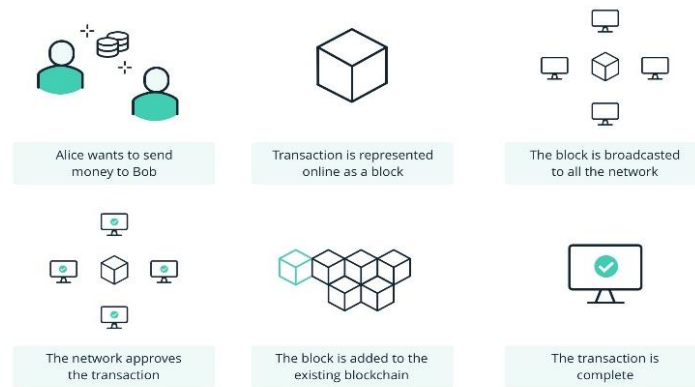


Fig 5: Working of blockchain, source: ledger.com

III. APPLICATION AND POTENTIAL

A. Green Energy Trading with Blockchain:

Blockchain could be the key to the green future. By generating renewable energy through solar power, hydro energy and windmills in resource rich areas with the help of government. The excess electricity could be transferred at the point of consumptions village and rural areas having scarcity of electricity using smart contracts evaluating units exchanged and the digital tokens used to make trusty and fair trade possible between both parties (producer and consumer) eliminating any intermediaries.

B. Trading in Game assets and NFT:

The Gaming industry is blooming undeniably in the world. With Triple A title games like CSGO individually has an active player base of 2 million players every day. These games have in-game tradable skins like NFT, allowing players to play with it inside the game. These skins have their own unique patterns allowing some of the assets to be much rarer and more different than each other, making it a valuable collectible for enthusiasts and collectors. A P2P Decentralized marketplace with smart contract can decide the price according to the demand and supply chain of these skins allowing them to profit without the need to deduct tax from a third-party marketplace, profiting in favor of both seller and buyer instead of third-party centralized marketplace who deduct 15% tax for both selling and buying.

C. Reduced Voting Frauds:

E-voting using blockchain could drastically reduce voting frauds and provide transparency to voting system while hiding the private information of the voter at the same time. Blockchain based e-voting smart-contract utilizes computer, smartphone to cast vote with use of signature algorithm to store digital signature of voter to prevent tempering after a vote is casted displaying result data publicly making sure no data is being manipulated.

D. Crowd Funding:

Smart contracts will set rules for transactions, that can be created using private blockchain technology. A smart contract is a self-executing system that uses blockchain to carry out exchange governed by its explicit terms and conditions. Smart contracts work with simple "if/when... then." statements that are written into code on a

blockchain using Solidity (a programming language similar to JS used to code blockchain applications). A network of computers executes the operations after the predetermined requirements have been met and verified. The blockchain is automatically updated once the transaction is complete. [*]

Applications of Blockchain are many more, for instance:

- Storing healthcare records
- Managing small to big supply chains
- Solving Video Piracy etc.



Fig 6: Applications.

IV. RISKS

A. 51% Attacks:

A 51% Attack is when a hacker or an organization successfully decrypts hashes of equal or more than 51% of the block in the chain, making hacker gain full control over the blockchain. Most of the time hackers target small chains due to the ease of decrypting the length of blocks inside of a chain. Usually this takes a load of computational power to calculate and crack the hash of every single block making it impossible to crack long length chains. [2]

B. Censorship Governance:

Web 3.0 with blockchain provides freedom of speech to everyone. Removal of censorship after terms and regulation of a certain central governing entity is removed, it might create chaos of arguments on the Web 3.0. A problem in peer-to-peer network starts to shine when these arguments start to become uncontrolled then we might feel a need for governing force.

C. Bugs:

A program or a code written by humans is not always error proof, sometimes a coding error might start to work in certain way where it is not intended to creating threats and loopholes in application.

D. Scalability and DDoS:

DDoS also known as distributed denial of service attack, is when a hacker uses botnet to flood network with overwhelming request with fake traffic or malwares resulting bringing whole network infrastructure down. [3]

E. Sybil attack:

The perpetrator makes multiple personas to acquire power over the network or affect its decision-making process. With control of numerous nodes in their hands, they can tamper with the consensus mechanism and cause chaos within the network's operations while excluding legitimate participants from joining. Such actions result in trust disintegration as well as compromising security and integrity standards of these networks.

In General:

Greater Utilization of computational power like CPU and GPU produces heat & the energy consumption can be intensive, which can limit the adoption of the technology. However, if a solution is proposed to these problems in further research, Blockchain can potentially revolutionize the technology behind every simple thing that we see today giving birth to a new digitalization era. Limitations of research include major limitations such as scalability, interoperability, security, and energy consumption. Scalability has the inability to process and verify transactions in a timely manner due to the growing size of the blockchain network. Interoperability makes it difficult to transfer data between different blockchains. Security is also a concern, as new security threats may arise.

V. SOLUTION TO REDUCE SECURITY RISKS**A. Carefully Designed Pre-secured DAs and smart contracts:**

Carefully developed decentralized application and smart contracts where secure coding should be the priority. Furthermore, Vulnerability checks, Development security operations, properly implemented access controls, crowd sourced bounty programs, regular audits can also improve overall results.

B. Community Voting based content removal:

Decentralization removes censorship. As before the Ruling centralized entity was the one that created rules and regulations in web 2.0, this creates a problem for other users to filter out the explicit or the content that should not be on internet. Hate Speech, Adult Content, Disturbing Images etc. To solve this a community-based voting could be carried out so the other users with similar decisions can ban or remove the uncensored content.

C. Proof-of-Authority:

Multiple layers of private blockchain systems often select the "Proof-of-Authority" (PoA) consensus method, specifically within confidential and restricted corporate settings. This method allows for the management of various duties including record keeping, access control as well as authentication. Typically, transaction data remains hidden from outsiders or unauthorized parties involved with the network operations.

D. Load Balancer and Filtered Trafficking:

The most effective way to prevent DDoS is to implement load balancers, Distributed storage techniques to store data across multiple nodes in network. Increasing Network Capacity & Employing Anti-DDoS protection services.

E. Verification Mechanisms:

Some decentralized networks can implement identity verification mechanisms, such as Proof of Work, Proof of Stake, or Proof of Identity. These mechanisms require participants to demonstrate a certain level of computational power, or identity verification before they can participate in the network. This makes it more difficult for an attacker to create multiple identities and gain control of the network nodes.

VI. FUTURE SCOPE

- **Smart cities:** Smart cities are collective integration of multiple applications enabled by blockchain, Finance, health, supply-demand chain, renewable energy, digitalized currency exchange, decentralized web, cyber security, removing the requirement of the third party, tracking world trade etc.
- Improved Anonymity of an individual.
- Improved accuracy by removing human involvement in verification.
- Cost reductions by eliminating third-party verification.
- Decentralization makes it harder to tamper with.
- Transactions are secure, private, and efficient.
- Transparent technology.
- Efficiency and speed.

VII. CONCLUSION

In the upcoming research, blockchain technology will be under scrutiny to investigate its potential extensions beyond cryptocurrency usage. Various domains such as healthcare, finance and decentralized data sharing among others shall be examined in this study for possible implementation of blockchain applications.[6] The goal is also to explore how it can benefit open science initiatives and Internet of Things projects by ensuring security and transparency while enhancing efficiency through smart contracts or distributed ledger systems.

VIII. ACKNOWLEDGMENTS

We would like to express kind gratitude to Prof. Megha Tijare from Department of BCA, Shankarlal Khandelwal College of Science, Akola and Akshay Jain from Synack Security Network helping and guiding me in this paper.

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Digital Marketing Advantages and Disadvantages

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ABSTRACT

Digital marketing is an integral part of the process of digital business transformation. It incorporates new marketing techniques that are based on information and communication technologies. For this reason, its application in practice is a prerequisite for the successful development of the business in the contemporary market conditions. The object of this paper is the digital marketing and the subject is the digital marketing advantages and disadvantages. The first purpose of this paper is to systemize the various terms for digital marketing used in the specialized literature and the Internet and to show the differences between them. The second is to present the characteristics of the main advantages and disadvantages of digital marketing. Knowing them in depth, companies will be able to develop effective digital marketing strategies that have high potential to achieve company goals and at the same time are suitable to their profile. Thereby, they will be able to determine to what extent and which tools of the whole digital marketing palette are best suited to their marketing activities.

Keywords: Digital Marketing; Technology; Advantages; Disadvantages.

I. INTRODUCTION

The emergence of new dynamic business models as a result of the globalization of markets and the rapid development of technics and technology have completely changed the environment in which the business operates, making it extremely volatile, highly competitive and uncertain. This new business reality poses serious challenges for companies. To be able to survive and achieve high economic results and competitiveness, a complete restructuring of development strategies and transition to digitalization of their activities is required. The digital technologies and the opportunities that they create are the main drivers of business and gradually shift the traditional methods, approaches and tools for performing different business activities in each functional area in the management of organizations. Their practical application allows:

- to create more opportunities for diversification and personalization of products and services;
- to achieve a higher degree of efficiency in the collection, processing, analysis and interpretation of the data needed for the implementation of various business activities;
- to create greater transparency of business processes;
- to create new diversified tools for attracting and engaging customers in order to achieve a higher level of customer loyalty;
- to improve customer service and, on that basis, to achieve a higher level of customer satisfaction;

- to increase sales revenue and profits;
- to create new business models;
- to shorten the time to market for the new products and services;
- to create prerequisites for better planning and management of the businesses;
- to improve the quality of products and services;
- to control resources more effectively;
- to create cost optimization opportunities;
- to improve production processes;
- to create more innovation;
- to create an innovative culture and increase competitiveness.

It is also important to note that the Internet environment has certain characteristics that have a very strong influence on marketing activity. Among them are:

- it provides unlimited communications space in time and space;
- has clearly defined access channels;
- provides high degree of market transparency and transparency in the actions of competitors;
- presents a wide variety of active users who are willing to bear some costs;
- provides high efficiency for clients;
- provides opportunities for extending functions and improving management systems.

In the view of the above, we can say that this turbulent technological wave has completely changed the way in which communication between companies and their real and potential customers is carried out. According to recent data, over 75% of consumers spend a significant part of their daily lives in a digital environment, and it becomes an important part of their lives, thus becoming their true friend when choosing companies, products and services. The IAB survey shows that 100% of internet users in Bulgaria have researched online for their future purchases, while in the European Union this percentage is 96%. This eloquently demonstrates the decisive role of the Internet in brand choosing. 51% of internet users in Bulgaria say that the internet helps them choose better products and services [1, 2]. All these changes in the market conditions as well as in the everyday life of consumers are leading to the formation of a new direction in marketing, namely "digital marketing".

The object of this paper is the digital marketing and the subject is the digital marketing advantages and disadvantages. The first purpose of this paper is to systemize the various terms for digital marketing used in the specialized literature and the Internet and to show the differences between them. The second is to present the characteristics of the main advantages and disadvantages of digital marketing.

II. ADVANTAGES OF DIGITAL MARKETING

The application of digital marketing allows companies to be flexible and adaptable to changes in the external environment, to build effective relationships with their customers, as well as to be more responsive to their needs and understandings. All this is achieved by the following key benefits of this type of marketing:

- High level of interactivity - creates an opportunity for interactive communication with consumers, thus more responsive to their understanding and expectations for seeking and receiving information. Interactive communication, in turn, creates opportunities to build a dynamic environment, changing

space, specific navigation, depending on the user's preferences, dynamic design, use of top-level special computer code, mobile technologies and continuous innovation. Things vary with each visit, depending on his/her skills, accumulated information in the system and knowledge of his/her interests and orientation. This in turn helps to use many non-standard and interesting ways to attract and retain the attention of consumers.

- Overcoming geographical barriers and limitations in marketing activities - digital marketing helps companies to successfully communicate with their customers, sell their products and services and find new business partners in real time anywhere in the world.
- Provides opportunities to respond more quickly and flexibly to user needs and wants.
- High degree of measurability of the achieved marketing results - very often, when conducting traditional advertising campaigns, the registered results are unclear and inaccurate and do not give an indication of whether the funds are spent efficiently whereas the results of digital campaigns are easily and accurately measurable (using modern statistical tools) and are available in real time. They allow marketers to track and analyze consumer behavior and build their profiles.
- Facilitates customer segmentation and targeting - thus achieving better targeting of advertising messages and greater effectiveness of marketing activities.
- High degree of personalization of advertising messages - thanks to collected online information for the consumers, individual offers can be created and thus adding value to them and responding to their needs and desires as precisely as possible in order to increase the consumer satisfaction.
- Creates more convenience for consumers - with the help of digital technologies, they can receive much more and better information about products and services that interest them, buy them from home and save time.
- Creates prerequisites and favorable conditions for successful development of virtual enterprises.
- Allows companies to reach more users through the use of social networks.
- Increases the traffic to the companies' websites - through the development of qualitative online advertisements, Internet publications, related to the company's activity, etc. Thus creating an engagement of the users with the thematic content provided for them. As a result, the interest in the offered products/services increases and the sales go up too.
- Facilitates communication and interaction with users - thanks to various platforms such as social networks, web applications or websites, users can ask questions and receive the information they need right away. Accordingly, companies can talk directly with their real and potential customers, build trust and get feedback on the products and services they offer .
- Facilitates the tracking and analysis of competitors' actions.
- Increases the degree of control and correction in the processes of development and implementation of various marketing activities.
- Potential for shortening the time needed to prepare and conduct marketing research.
- It requires less investment - the use of different digital tools for marketing activities requires less investment than traditional channels, therefore digital marketing has higher profitability.
- Suitable for start-ups, small and medium-sized companies - thanks to all the advantages listed here, we can say that digital marketing is very suitable for new and small companies as it provides a high degree of efficiency with small investments.

- Creates opportunities for developing new business models and strategies such as mass customization, co-creation and more.

III. DISADVANTAGES OF DIGITAL MARKETING

In order to create working marketing strategies, on the basis of information and communication techniques and technologies, companies must be well aware not only of the advantages they bring, but also of the disadvantages hiding in their application in practice.

The main disadvantages of digital marketing are:

- The use of digital marketing makes business organizations an "open book" for competitors - this is probably one of the most serious disadvantages of digital marketing, as digital marketing campaigns can be quickly and easily copied by their competitors.
- Trademarks and logos, corporate identities, can be copied and used by them to mislead consumers in order to gain market share. In addition, they can easily manipulate consumers through inaccurate information about products, services or brands, which can seriously damage the image of a company and lead to customer outflow.
- In digital marketing, you need to build relationships with a consumer who you do not see in person- this requires specific knowledge of the psychology of online consumer behavior. Very often, however, marketers do not take this into account and rely on traditional consumer psychology when designing digital marketing campaigns. This, in turn, leads to a lower efficiency since it does not take into account the particularities of consumer behavior and the relationships that are created online.
- Digital marketing campaigns can be perceived by users as unserious, if not professionally designed and properly targeted;
- The online reputation of companies can be destroyed by negative feedback - negative comments and information about products and services, and trademarks are visible and accessible to all users on the Internet, which can seriously damage the image of a company and lead to customer outflow.
- Lack of consumer trust - the fact that digital marketing campaigns involve the use of technologies that track and collect data from users on the Internet leads to privacy issues including the security of their privacy. Thereby, people take a serious distrust of this type of marketing and often refuse to participate in such events, which is one of the biggest challenges facing the development of digital marketing. For this reason, the topic of online trust and its impact on digital marketing strategies is becoming increasingly important and has been the subject of much research in the field.
- Overloading the Internet space with online advertising messages - the excess of online advertising messages in the form of banners, the continuous appearance of open and close windows, interruption of video materials and etc. can lead to consumer irritation, which will inevitably affect their attitude towards the companies.
- Digital marketing is not suitable for all types of products, services and companies - there are a number of products and services whose target audience cannot be reached and influenced by the tools offered by digital marketing. This is due to the fact that for one reason or another, these users are not online or do not trust the information they can obtain from the Internet.

- Digital marketing is highly dependent on technics and technology - this on the one hand requires serious knowledge in the field and on the other hand can lead to a number of technical errors as the information and communication tools offered by digital marketing are not without fails. It is often the case that the chosen technical solution does not work properly and results in incorrect outcomes, thereby causing the fail of the advertising campaign. Examples include broken links, slow loading or non-loading promotional messages or websites, paid advertising buttons that do not work, statistical analysis tools that do not process information correctly, and many more.
- Use of inappropriate digital tools and applications - there is a wide variety of tools and applications on the Internet and new ones are emerging every day. This makes it very difficult for the marketing professionals to choose the ones that will be most effective for the specific marketing events and will meet the needs and goals of the companies in the best possible way.
- Lack of clear criteria for choosing digital tools in marketing campaigns.
- It is very difficult to keep up-to-date information in the digital world - thanks to the dynamism that is changing the world of digital technologies, information there gets old very quickly and have to be replaced very frequently with new ones. It became a serious challenge for many companies as they do not have the necessary resources for that.
- Very often, digital marketing campaigns are developed and conducted on their own without aligning with the overall marketing strategy of the company - this usually results in the inability to achieve the intended results, lower efficiency, and misuse of funds.

IV. CONCLUSION

We definitely can say that digital marketing provides a huge arsenal of opportunities for more effective customer relationship management and competitive advantage. It greatly facilitates the activities of marketing professionals and shortens the time to develop and run marketing campaigns. It meets the needs and understandings of modern business.

The main advantages and disadvantages of digital marketing have been clarified and new ones have been added. The added advantages are: creates prerequisites and favorable conditions for successful development of virtual enterprises; increases the degree of control and correction in the processes of development and implementation of various marketing activities; suitable for start-ups, small and medium-sized companies and creates opportunities for developing new business models and strategies such as mass customization, co-creation and more.

The findings in this paper, on one hand, are a good base for future developments in the field of digital marketing, and on the other, would help companies to develop their marketing strategies and plans. But in order to work effectively and efficiently, digital marketing activities must not be considered on their own, but as dependent on the overall marketing development strategy of companies. Only then they will be able to make the most of the full potential of information and communication technologies in order to achieve.

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Comparative Study of Lexicon Based and Machine Learning Based Approaches for Sentiment Analysis

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ABSTRACT

Sentimental Analysis is the task of Natural Language Processing (NLP). Sentiment analysis is an emerging technology that aims to explore people's review, feedback, opinion toward any entity in different fields, such as product review analysis, public opinion analysis for decisions making. In this paper comparatively studied the different approaches for Sentiment Analysis and its performance to determine the sentiments of user's data.

Keywords: NLP, Sentiment Analysis, Lexicon Based, Machine Learning

I. INTRODUCTION

Sentiment analysis or opinion mining sometime use interchangeably, It is the field of NLP that analyses people's opinions, sentiments, review, feedbacks, attitudes or emotions towards any entities such as products, services, organizations, individuals, events, issues, any topics etc. for making right decision.

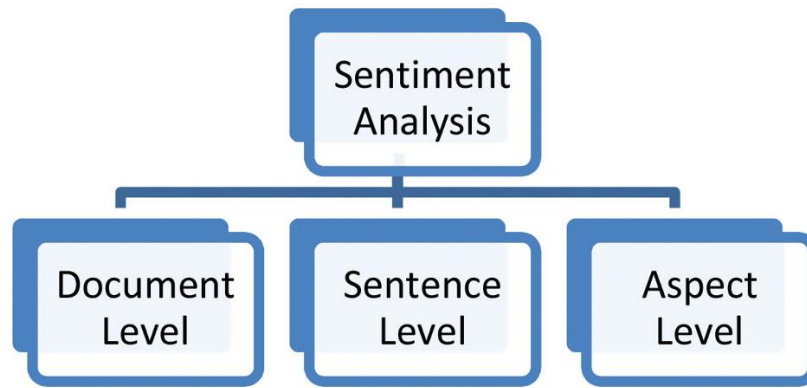
Sentiment analysis is a NLP problem. It touches every aspect of NLP, e.g. reference resolution, negation handling, and word sense disambiguation, which add more difficulties to solved problems in NLP. Sentiment analysis offers a great platform for NLP researchers to make tangible progresses on all fronts of NLP with the potential of making a huge practical impact

There are three levels classification of sentiment analysis

Document level: The task at this level is to classify whether a whole opinion document expresses a positive or negative sentiment.

Sentence level: The task at this level goes to the sentences and determines whether each sentence expressed a positive, negative, or neutral opinion.

Entity and Aspect level: Both the document-level and sentence-level analyses do not discover what exactly people liked and did not like. Aspect level performs finer-grained analysis. Aspect level was earlier called *feature level* (*feature-based opinion mining and summarization*). It is based on the idea that an opinion consists of a *sentiment* (positive or negative) and a *target* (of opinion). [1]



There are three approaches for analysing the Sentiments: lexicon-based, machine-learning-based, hybrid approaches.

Machine Learning Approach

In artificial intelligence, machine learning is one of its subsections which are proceeding with algorithm that let systems to understand. In machine learning technique it uses supervised learning and unsupervised learning.

Lexicon Based Approach

In lexicon based method it supports a lexicon to achieve sentiment classification through weighting and counting sentiment associated words has to be calculated and labeled. To assemble the viewpoint list there are three major methods are considered: dictionary-based method, corpus-based method and the manual opinion approach.

Dictionary-based classification

This type of classifications the data are collected from manually and the information is searching for synonyms and antonyms of sentiment dictionary. These dictionaries are WordNet dictionary and sentiwordNet dictionary.

Corpus-based classification

This approaches the objectives of dictionaries related to the specific domain. The words are related to statistical and semantic methods that are Latent Semantic Analysis (LSA) and method based on semantics.[2]

II. LITERATURE REVIEW

There has been done lot of work in the last few years, many articles, books and research papers have been written on sentimental analysis

Chuanming Yu et.al, [3], presented in the paper, during experiment four data sets were used to test the SVM model. Authors have compared Maximum Entropy classifier method for feature extraction with SVM method and they have concluded that SVM Method superior in terms of recall and precision rates.

Raisa Varghese et.al, [4] authors proposed in this paper different approach which bunch up the benefits of Senti-WordNet, dependency parsing, and co reference resolutions are well organized for the purpose of sentimental analysis. This was done by using Support Vector Machine classifier.

AmitGupte et.al, [5] presented in this paper the comparison between most likely used approaches for sentiments like Naive Bayes, Max Entropy, Boosted trees and Random Forest algorithms.

GautamiTripathi et.al, [6] Inthis paperauthors applied SVM and Naïve Bayes classifier in analyzing the movie sentiments. By this categorization they conclude that linear Support Vector Machine outperforms the Naïve Bayesian in case of accuracy.

Deepu S. Nair et.al, [7] demonstrated in the paper how machine learning technique was used to understand the Malayalam movie comment. For classifying the sentiments two machine learning approaches are used; they are SupportVector Machine and CRF along with rule based approach.

Suchita V Wawre1 et.al, [8] compared two most frequently used supervised machine learning approaches SVM and Naive Bayes for sentiment classification of reviews. The result shows that SVM has misclassified more number of data points as compared to Naive Bayes and Naive Bayes approach outperformed the SVM when there are less number of reviews.

Vishal A. Kharde et.al, [9] used lexicon-based methods for classification but it requires small effort in individual labeled text document.

Neha S. Joshi et.al, [10] In the papershown the outline of recommended methods along with its most recent advancements in the same field. As a result, authors concluded that unsupervised machine learning techniques fails to provide better achievement in sentiment classification than that of supervised learning.

AlessiaD'Andrea et.al, [11] described in this paper various tools used in sentimental analysis and some approaches for text classification. In this method they use hybrid approach which uses the aggregation of both lexicon based and machine learning techniques

Shun Yoshida et.al. [12] inthe paperproposed Naïve Bayesian classifier to analyze the sentences. Their experimental result shows that Naive Bayesian classifier model which has acceptable achievement for distinct Social Network Site and for large data set in which it consists of long comments.

Li Yang, et. Al. [13] proposed a new sentiment analysis model-SLCABG, which is based on the sentiment lexicon and combines Convolutional Neural Network (CNN) and attention-based Bidirectional Gated Recurrent Unit (BiGRU).

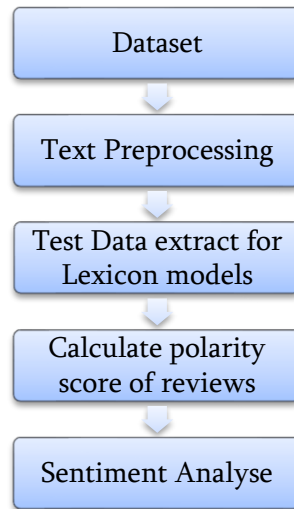
Mahesh B. Shelke et.al, [14] presented in this paper gives a comparative analysis of sentiment analysis performed in various Indian languages, which includes classification techniques which are based on Lexicon, Dictionary, and Machine Learning.

Pei Ke et.al, [15] proposed a context aware sentiment attention mechanism to acquire the sentiment polarity of each word with its part-of-speech tag by querying SentiWord-Net.

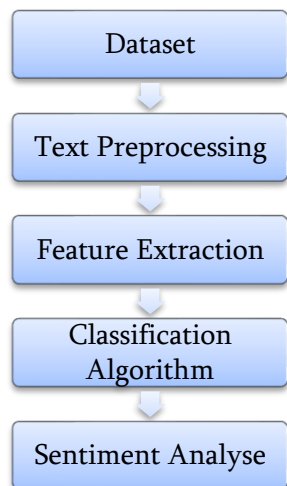
KomangWahyuTrisna et.al, [16] described in this paper, aspect-based sentiment analysis (ABSA). First, task of ABSA, there are three subtasks that we describe namely, aspect term extraction, aspect term categorization, and aspect term sentiment analysis and provided several models for each task from ABSA. Second, describe the deep learning methods that are used to solve the ABSA tasks and then described two popular datasets that used in the ABSA task.

Yuxing Qi et.al, [17] in this paper presented, extracts data regarding Covid-19 from people in the main cities of England on Twitter and separates it into three different stages. First, perform data cleaning and use unsupervised lexicon-based approaches to classify the sentiment orientations of the tweets at each stage. Then, apply the supervised machine learning approaches using a sample of annotated data to train the Random Forest classifier, Multinomial Naïve Bayes classifier, and SVC, respectively.

III. METHODOLOGY



Lexicon Based Approach



Machine Learning Based Approach

IV. PRE-PROCESSING TECHNIQUES

Tokenization: This step breaks the large paragraphs called chunks of text is broken into tokens which are actually sentences.

Normalization: It includes the conversion of all text to either upper or lower case, eliminating punctuations and conversion of numbers to their equivalent words.

Stemming: The stemming process is used to change different tenses of words to its base form this process is thus helpful to remove unwanted computation of words.

Lemmatization: Lemmatization is the process of merging two or more words into single word

Removing Stop Words: Stop words refer to most common words in the English language which doesn't have any contribution towards sentiment analysis.

Noise removal: The datasets taken comes in raw form. [2]

V. FEATURE EXTRACTION

TF-IDF:

The term frequency-inverse document frequency (also called TF-IDF), is a well-recognized method to evaluate the importance of a word in a document. Term Frequency of a particular term (t) is calculated as number of times a term occurs in a document to the total number of words in the document. IDF (Inverse Document Frequency) is used to calculate the importance of a term.

N-Gram:

N-Gram will form the features of text for supervised machine learning algorithms. These are sequence of n tokens from the given text. Value of n can be 1, 2, 3, and so on. If we consider the value of n to be 1 it is called unigram, for n=2, bigram and for n=3 trigram and so on.

Classification Algorithms

Logistic Regression: This is a popular classification algorithm which belongs to class of Generalized Linear Models. The probabilities describing outcome of a trial is modeled using logistic regression [18]. This algorithm is also called Maximum Entropy.

Naive Bayes: This is powerful algorithm for classification used for classifying data on basis of probabilities. It simply works on Bayes theorem and uses various probabilities to classify data. In Naive Bayes class with maximum probability is considered to be as the predicted class. It is a fast and highly scalable algorithm. It can also be used on small datasets and thus also gives good results [19].

Support Vector Machine

This is an efficient algorithm for regression as well classification purpose. It draws a hyperplane to separate classes. This algorithm works extremely well with regression, the effect of SVM increases as we increase dimensional space. SVM also perform well when the dimension number is larger than the sample number. [20]

Decision Tree

This algorithm can be used for both regression and classification. The core idea is to divide the dataset into smaller subsets and at the same time tree associated is incrementally created. [21]

K-Nearest Neighbour (KNN)

This algorithm is simple and has applications mainly in pattern recognition; intrusion detection and many more are also there.

Random forest: Random forest is a commonly-used machine learning algorithm trademarked by Leo Breiman and Adele Cutler, which combines the output of multiple decision trees to reach a single result. Its ease of use and flexibility have fueled its adoption, as it handles both classification and regression problems. [22]

Machine Learning Algorithm	Advantages	Drawbacks
KNN	It is simple and also used for multiclass	It requires more time to categorize when

	categorization of document.	huge number data are inclined. Takes lot of memory for running a process
Decision Tree	This is very fast in learning data set. Easy for understanding purpose	It has problem that it is difficult handle data with noisy data Over fitting of data
Naïve Bayesian	Simple and work well with textual as well as numerical data. Easy to implement Computationally cheap	Performs very poorly when feature set is highly correlated. It gives relatively low classification performance for large data set. Independent assumption of attribute may lead to inaccurate result.
Support Vector Machine	High accuracy even with large data set Works well with many number of dimensions No over fitting	Problems in representing document into numerical vector
Naive Bayes	It is simple and easy to implement. It doesn't require as much training data. It handles both continuous and discrete data. It is highly scalable with the number of predictors and data points.	Naive Bayes assumes that all predictors (or features) are independent, rarely happening. This algorithm faces the 'zero-frequency problem
Logistic Regression	Logistic regression is easier to implement, interpret, and very efficient to train. It is very fast at classifying unknown records.	If the number of observations is lesser than the number of features, Logistic Regression should not be used, otherwise, it may lead to overfitting.

VI. CONCLUSION

In this paper studied different approaches as well as different techniques for classification have been studies to find out sentiment analysis. Comparatively each approach is suitable according to what type of data that analyse both lexicon based and machine learning based work well but as far this study concern hybrid approach will more comprehensively work.

Future work should be to overcome the challenges of sentiment analysis are work ambiguity, sarcasm, use of Emoji, multimodal data classification, multilingual feedbacks.

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Industry 4.0 and Application of Artificial Intelligence - A Study

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ABSTRACT

Changes in the field of Information Technology have forced the economies to change of every continent. Artificial intelligence has gone from behind a buzzword to being implemented in many sectors of economy. In today's tech environment, corporate houses have a lot of scope to improve team's productivity and have a smooth flow of customers or leads for their business. With the help of AI, more value can be added to the business.

The economies across the globe are witnessing a wide range of opportunities for optimizing the manufacturing processes. Technology has drastically changed how organizations go about their operations in manufacturing or services. Thus, Artificial Intelligence in business management helps in every aspect of a business,

Keywords: Industry 4.0, Artificial Intelligence

I. INTRODUCTION

Periodical industrial development i. e., industrial revolution viz., Industry 1.0, Industry 2.0, Industry 3.0 and Industry 4.0. has been witnessed in the world of business.

Industry 1.0: -Power Generation: This was occurred after the introduction of power loom in 1784 in which mechanization of production facilities with water and steam.

Industry 2.0: - Industrialization: This witnessed introduction of Assembly Line in 1820. Electrification drives mass production in a variety of industries.

Industry 3.0:- Electronic Automation: Development of programmable logic controller (PLC) in 1969 and application of electronics and IT to automate production processes

Industry 4.0: - Smart Automation: Increasing use of Cyber Physical System (CPS). Industry 4.0 was initiated in January 2011 by German Federal Government as a future project. With the introduction of IPv6 in 2012 virtually unlimited addressing space becomes available. Governments, private companies and Industry associations have been focusing on Industry 4.0 and making investments since 2010.

II. OBJECTIVES OF THE STUDY

The objectives of this paper is to discuss the Impact of the Artificial Intelligence

- 1) To study Impact of the Artificial Intelligence on the economy.
- 2) To know utility of the Artificial Intelligence in the economy

III. RESEARCH METHODOLOGY

Research Methodology is a scientific procedure for acquiring knowledge based on empirical observation and logical reasoning and it is analytical, descriptive and quantitative research. Widespread secondary data sources had been used for this research. The Secondary sources, explain the theoretical and conceptual concepts related to Artificial Intelligence.

Technologies In industry 4.0 :

In industry 4.0, manufacturing, units have machines that are augmented with wireless connectivity and sensors. The types of sensors include cc camera, pressure sensors, temperature sensors, motion sensors etc..Machines augmented with sensors are connected with a system that can visualize the entire production line and takes decision on its own.

Some more development issues are mentioned below :

- **Evolution of business models** Mass production will become more individualized, leading to customer-specific products integrated into new service offerings.
- **End-to-end digital engineering** Preplanning will give way to a more active, autonomous, and self-organizing production.
- **Top floor–shop floor integration** Factories will adapt automatically to changes thanks to more transparency and autonomous decision making.
- **Real-time, value-added networks** Supply chains will evolve into highly adaptive networks managed through real-time monitoring and feedback.
- **Enhanced work environments** Work will be less centralized, more fluid, more project oriented, and more virtual and international.

Beside this, some benefits are listed as follows -

- Continuous Process Improvement through Variability Control
- Process operates at its full potential to produce conforming product.
- Process behaves predictably to produce as much conforming product as possible with the least possible waste.
- Focus on early detection and prevention of problems
- Helps identify bottlenecks, wait times, and other sources of delays within the process.

As such, Industry 4.0 includes Smart manufacturing in a Smart factory and it is the trend towards Automation of Processes with the help of data storage, data exchange, data access, data analytics which includes Cyber Physical Systems (CPS), Internet of Things, Cloud computing, Cognitive computing and Artificial Intelligence.

Current Status of NextGen Technologies in India :

As per the joint study conducted by Microsoft and the Internet and Mobile Association of India (IAMAI) – India is among the top three talent markets, producing 16% of the world's AI talent pool. Additionally, As per the report titled 'From Buzz to Reality: The Accelerating Pace of AI in India'- Artificial intelligence is no longer a fringe technology for Indian companies. The (AI) market is expected to grow at the second-fastest rate of 20% among major economies over the next five years, behind only China. This study was conducted on 343

enterprises and organisations that implemented AI, and 148 providers and tech players that provide AI solutions. It found “the thrust in adoption for enterprises is maximum in sectors viz., communication, over-the-top (OTT), gaming, technology and financial services”. The study stated that nearly 64% of the providers have AI or machine learning (ML) as a core element in their products and services making them “either ahead of or on par with their global counterparts”. The study further found extensive penetrations of AI or ML across enterprises, with nearly 80% of them having at least one AI model in their production. Large enterprises have adopted AI at a much higher rate as it helps them solve problems at scale, and provides vast amount of data. Nearly half of the large enterprises are planning to build their own AI models in the next three years, and 45% of small enterprises prefer to buy pre-built models due to their high cost of in-house building. Large enterprises have recently increased their demands as a result of the Covid-19 pandemic to transform operations with AI. In a step forward The Government of India’s NITIAayog came out with an AI strategy in 2018 and India became one of the first countries to talk about the use of artificial intelligence to address inclusion and social challenges. The adoption of AI has to be accelerated across all relevant sectors and value chains. The future of AI will be decided by a diverse group of stakeholders like researchers, private organisations and citizens.

Artificial Intelligence in Business Management – Global Scenario :

“Hyperautomation” - (i. e., Artificial Intelligence technology associated with Robotic Process Automation technology) is becoming a buzzword in the world of business. This can automate a wide variety of job that occupies lot of employees’ work hours. This technology can perform tasks fast and with accuracy as compared to humans and which is expected to save time & reap huge profits. Additionally, MIT Sloan Management Review’s 2017 Artificial Intelligence Global Executive Study and Research Project, 85% of executives believe that AI will help their businesses gain or sustain competitive advantage.

Artificial Intelligence for Business Managers :

A Manager needs to know how Artificial Intelligence AI can impact business and how to take advantage of it. Statistics indicate that organizations that leverage Artificial Intelligence in business management can benefit from the enhanced operational efficiency offered by the technology and outrun competition. With the increased interest in technologies like Metaverse, Blockchain, Web3, etc., business owners and managers need to understand where they stand in 2023 with their AI strategies to stay up to date in the market for future. AI technology enables machines to exhibit intelligent behavior to do complex tasks such as observing, learning, planning, and making decisions for problem-solving. By training a machine using a lot of data and AI algorithms machines can understand the data it processes and take actions accordingly.

Major use cases of Artificial Intelligence in managing business :

This include predictive analytics, process automation, customer analytics, security surveillance, and job optimization. Predictive analytics can help businesses to predict future trends based on their current business data.

Data-Driven Economy :

Big ICT giants like Google, Meta, etc., use billions and billions of data to analyze the needs of their customers and provide services accordingly. So business managers with the help of Artificial Intelligence can predict future trends, forecast profits, and make better decisions. As far as the financial sector is concerned about 40% of job cuts in the financial sector are expected to occur in money management due to the rise of robo-advisors replacing human fund managers.

Barriers for Adoption :

Here it is worth to note that data quality, infrastructure , scale and sensitivity or risks have been found to be the major barriers for enterprises for large-scale AI adoption. Providers also fail to develop minimum viable products (MVP), a product with enough features developed for early users and receiving feedback, due to a lack of infrastructure, tools and skills in data science.

As per the report titled 'From Buzz to Reality: The Accelerating Pace of AI in India' , India produces more talents than it consumes. Enterprises lack domain-specific expertise, data visualisation or analysis talents and data engineers and much of the talent is available specific to AI application development.

IV. CONCLUSION

Applications of AI in the manufacturing sector opens up a wide range of opportunities for optimizing the manufacturing processes. Technology has drastically changed how organizations go about their manufacturing operations. Thus, Artificial Intelligence in business management helps in every aspect of a business, it may be for simple tasks such as suggesting products or providing customers with basic customer service or in complicated measures such as conducting software tests and completing extensive problem-solving procedures. So, Artificial Intelligence had become an unavoidable factor in economies across the globe.

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Green Electronic Products and Consumer Buying Behaviour : An Empirical Study

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ABSTRACT

Right now, "green" is in. Most governments, companies, and consumers are aware of how important the environment is and how everyone contributes to its deterioration. It is now crucial that we alter our way of life in order to preserve ourselves. And marketing can significantly contribute to that transition. All you have to do is determine the needs, desires, and factors most likely to influence your customers. This study defines these factors and examines how they affect consumers' green shopping decisions. These eight factors include demographics, eco-labels, eco-brands, eco-awareness, green products, green prices, and green promotions. Each element has equal weight in the eyes of green marketers. Depending on the market segment he is concentrating on, he ought to be aware of which elements should be given greater weight.

Keywords: green marketing, consumer behaviour, eco-labels, ecobrand, green advertising, green product, green price and demographics.

I. INTRODUCTION

Environmental issues are the most often discussed topics all around the world. Environmental challenges are becoming increasingly important in business and society at large (Gupta et al., 2013). Every second person on the street is aware of the usual dangers, such as global warming, pollution, the thinning of the ozone layer, a lack of natural resources, etc. All of these dangers are somehow connected to manufacturing, and everyone is aware of this. Effective marketing involves seeing these trends and positioning the goods and services to appeal to customers (Maheshwari, 2014) both locally and globally.

Prior to recently, businesses were founded with the intention of maximising profits, but the current perception is to create businesses that are also attentive to society (Boztepe, 2012). And this is where green marketing enters the picture. This goal of the businesses is fulfilled with the aid of green marketing. This is not just another marketing tactic; in order for it to be effective, a thorough and meticulous examination of consumer purchasing patterns is required.

To avoid overemphasising any one marketing component, the marketing mix for green marketing needs to be balanced. Each of the four Ps has an unequal impact on consumers' thoughts. For some products, features are vital, the price should be reasonable, promotions have the biggest an impact on sales, and distribution and

availability have a big impact on sales. Consumer purchase behaviour is directly impacted by the product, price, promotion, and location. On the other side, demographic factors including age, gender, income, and education cause consumers' mindsets to differ from one another. Demographic factors mentioned above have a direct bearing on how green marketing alters consumer attitudes about the environment and influences them to buy green products. Many investigations and research projects have revealed that the impact of green marketing initiatives varies greatly according to changes in demographic factors.

II. LITREATURE REVIEW

The impact of eco-labels on customer purchasing behaviour, with particular reference to the bakery business, is explored in a thesis by Daria and Sara (2011). They argued that eco-labels do have an impact on consumer purchasing behaviour, but it is highly challenging to establish this claim for the bread business due to little advertising and the inability of consumers to learn about such items.

According to Kuthiala and Mahajan (2012), there is much room to explore the possibilities of green marketing, and consumer understanding is not reflected in their purchasing habits. They shed some light on how demographic factors like age, gender, education, and profession affect consumers' awareness of and willingness to pay for products made of fiber-reinforced plastic. It is a brand-new, environmentally beneficial material used in building. It is highly advanced technologically and doesn't even include CFCs. Markets are embracing the Green Building trends, which has resulted in the creation of LEED (Leadership in Energy and Environmental Design). Although LEED is making an admirable attempt, there is still a disconnect between what is being done and what is possible.

In a 2012 paper, Boztepe demonstrated how green product, green promotions, green pricing, environmental awareness, and green purchasing behaviour are related. He carried out research that found that environmental knowledge, green product features, green price, and green promotions all have an impact on male consumers, whereas only green promotion had an impact on female consumers' purchasing decisions. No longer are businesses created solely for financial gain. There are so many goals besides getting money. All of the study's variables showed a statistically significant positive link, he discovered.

Delafrooz et al(2014) .'s study of contemporary green marketing tactics used by businesses that prioritised packaging and labelling. They contend that socio-cultural factors, heterogeneous environments, and psychological-individual marketing all have an impact on customers' purchasing decisions. The main focus of marketers right now is how environmental advertising, eco-labels, and brands effect consumers' purchasing decisions. They both agree that "green marketing is currently not fulfilling its potential to improve customers' quality of life while enhancing the natural ecology."

According to Agyeman (2014), there is a correlation between the parameters and customer purchasing habits for green products. When it comes to the actual purchasing of green items, he claimed that factors such as product quality, affordability, and environmental considerations are crucial. He counselled green marketers to build their marketing mix strategies after having a thorough understanding of the segment market.

III. GREEN MARKETING AND CONSUMER BEHAVIOUR DEFINED

Green marketing refers to the promotion of goods that are safe for both the environment and society at large. It covers a wide range of actions, including adjustments to the manufacturing process, product alterations, packaging and labelling adjustments, and marketing adjustments. Green marketing is the process through which goods and services are evaluated based on the environmental advantages they provide and then sold. Any good or service that is ecologically beneficial in and of itself, or that is produced or packaged in such a way, is referred to as green. The logical presumption behind green marketing is that prospective customers will consider a product or service's "greenness" to be a perk and make selections based on that (Saini, 2013). Today's marketers participate in "green washing" practises where they portray their items as environmentally friendly when they are not. When customers grow dubious of the corporations' green marketing promises, this practise needs to be curbed. Also, consumers should be made aware of the fact that adopting energy-efficient equipment, decreasing pollution, and using less water during production are all examples of green marketing. The actions of marketers have an impact on consumer behaviour. Because of the way they act, marketers are forced to develop regulations that mostly effect them. Consumer behaviour refers to the mental, emotional, and physical processes people use to choose, buy, consume, and discard goods and services that meet their needs and preferences (kotler,1999). Consumer behaviour includes a variety of activities and serves as incentive as well. It is a procedure that involves various complexity levels at various phases. Consumer behaviour is influenced by a variety of outside factors, including culture, society, geography, family, and many more. There is a process and stages in consumers buying decision. The stages are-

- 1) Identification of problem or needs,
- 2) Searching the alternatives,
- 3) Evaluation of alternatives,
- 4) Making the purchase decision, and
- 5) Post purchase behavior.

And there are different variables which affect the buying behaviour of consumers. In this paper the green marketing variables are discussed.

IV. MOTIVES OF THE STUDY

The following are the objectives to conduct this study:

- 1) To identify various variables of green marketing.
- 2) To study the effect of each variable on consumers buying behaviour for green products.

V. RESEARCH METHODOLOGY

In this paper, the study is based on secondary data which is collected from various websites, online journals and research papers from various authors.

VI. GREEN MARKETING VARIABLES

The following are the green marketing variables and their effect on consumer buying behaviour is reviewed.

1) **Eco-labelling-** Eco-labeling didn't really take off until the early 1920s. Around the world, numerous nations are pursuing green procurement. Leading nations in the fight for eco labelling awareness and adoption include China, Japan, Australia, European Union nations, and Nordic nations. The green labelling programme (Eco-mark) was started in India in 1991. It failed to make an impact because the green marketing ideas weren't adopted. According to research done to determine the causes of the scheme's failure, one of the major factors was Indian consumers' lack of understanding.

One of the key components of green marketing is eco-labels. They are a component of packaging and can take the form of a diagram or a piece of paper. Labels offer knowledge about the brand of the goods as well as many other details. Labels serve two crucial purposes: an informational and a value-based one (Delafrooz N et al, 2014). Consumers can decide whether or not to purchase a product based on information provided by eco-labels regarding the product's manufacturing process. It makes it easier for customers to find environmentally friendly products.

There are research that demonstrate connections between eco-labeling and consumers' decisions to purchase environmentally friendly goods. According to Nik Abdul Rashid's research, there is a correlation between eco-labels and consumers' intentions to buy environmentally friendly products. One factor contributing to customers' mistrust of eco-labels is their inability to recognise them. Different eco-labels have varying effects on customers, according to the Natural Marketing Institute's 2007 LOHAS research on Consumer Trends Database. Consumers are more likely to make a purchasing decision if the labels are well-known and broadly acknowledged.

2) **Eco-brands-** By definition, a brand is "a name, word, sign, symbol, or design, or the combination of them, designed to identify the goods and services of one seller or group of sellers and to differentiate them from those of a competitor," according to the American Marketing Association. Eco-branding does the same thing by differentiating a brand based on its advantages for the environment. With an eco-brand, a product stands out from the dozens of other product options available and is easier to recognise. An eco-brand can be used to distinguish between green and non-green products. positively by consumers According to a study conducted in western nations like the USA and Germany, consumers are more favourable to eco-branded products. Several products, including glass, plastics, household cleaning products, insecticides, and aerosols, are regarded by Malaysian consumers in Wahid and Rahbar's study as being unsustainable, and customers respond positively to eco-branded product.

3) **Environmental Advertising-** To inform consumers about their green products or services, marketers are turning to media or newspaper advertisements. Environmental awareness among customers and expanding global green movements have prompted marketers to use environmental advertising. Its goal is to persuade customers to purchase products that are environmentally friendly.

According to a study by Dania and Erika, women are more receptive and have a more favourable attitude towards green advertising and green products. Green marketing tactics are growing as a result of eco-advertising (Haytko and Matulich, 2010). Green marketing tactics are now more widely adopted by customers thanks to eco-advertising (Neft and Thompson, 2007). According to Haytko and Matulich's

study, people who practise environmental behaviour are more likely to respond favourably to green advertising.

Another MAH Rahim study on Malaysian youth found that those who are familiar with "green life" have a higher favourable view towards eco-advertising (Rahim and Zukni, 2012). Their research identified television, social networking sites, and websites as the top three media platforms suitable for green advertising. They advise using the media outlets listed above for successful persuasion when the government and non-profit organisations are implementing green advertising. In his research (conducted in Shanghai), Bing Zhu discovered that a well-organized and planned design is necessary to implement a green campaign. Also, he discovered that trustworthiness is crucial when creating a green advertisement to persuade consumers to purchase green items (Zhu, 2013).

- 4) **Environmental awareness-** Environmentally conscious consumers can assess the costs of consumption and how they affect society and the environment (Babaogul and Ozgun, 2008). Students are aware of the negative consequences that products have on the environment and are aware of green items, according to a study done by Aslan at Kafkas University on 400 students. Students should pay attention to the features, packaging, and use after the product is finished (Aslan, 2007).

Aracioglu's poll indicates that a rise in environmental awareness has an impact on consumer purchasing habits. The results of another study by Bostepe are consistent with this conclusion. His research indicates a considerable positive relationship between environmental knowledge and green customer purchasing behaviour. As consumer awareness of the environment grows, so does their propensity to make green purchases.

However there is an opposing viewpoint to this assertion as well. According to one of Suki's findings, consumer choice for green products is unaffected by public awareness of green products (Suki, 2013). The results of his paper do not support those of D'Souza et al (2006). Although the respondents are aware of green issues and products, this awareness has no influence on their purchasing decisions. Ishaswini and Dutta assert that the contracts are breached. They found that customer awareness of green products and pro-environmental issues are indicators of consumer purchasing behaviour among Indian consumers. They found that 98% of respondents knew about eco-friendly items. The results also pointed out that consumers buy the products that are eco-friendly but are unsure about the quality and so why don't trust the green products (Ishaswini & Dutta, 2011).

The level of consumer awareness needs to be increased in India. India's manufacturers must exert additional effort to increase customer knowledge of green products, which is currently low (Maheshwari, 2014). The majority of respondents claimed that they had trouble identifying green products when they saw them on the shelves, which highlights the disparity between efforts made to raise environmental awareness.

- 5) **Green Products-** When the damaging impacts of products on the environment began to influence customer purchasing decisions, businesses realised the need to make green products (Uydaci, 2012). According to Grail Research's June 2009 survey of 520 eco-conscious customers, consumers believe that eco-friendly items have a positive environmental impact. According to Maheshwari's research, customer green buying habits and green product attributes are positively correlated (Maheshwari, 2014). This implies that as a product's green attributes rise, so does consumer inclination to purchase green goods.

Consumers' purchasing decisions are influenced by the quality of green products, so businesses must pay attention to quality as well (D'Souza et al., 2006).

The packaging of green products can easily persuade consumers to purchase them. In support of this are Dantas et al (2004). They claim that labels and packages just need a few seconds to attract consumers' attention. Consumers find it extremely challenging to identify green items. According to a report from the Massachusetts Department of Environmental Protection from 2002, one obstacle to consumers buying green items is their inability to recognise them.

According to a study by Promotosh and Sajdul on young customers, the health benefits of green products are typically the area of greatest concern (Promotosh and Sajdul, 2011). According to the same poll, 81.56% of young customers have positive purchasing intentions for eco-friendly goods. Nonetheless, the scarcity of green items remains the primary obstacle to converting buy intents into real purchases (Vermeir & Verbeke, 2004). When green products are more widely available, they have the potential to significantly influence customers' purchasing decisions.

- 6) **Green Price-** Customers will be encouraged to purchase green products if the price of the green product is kept low (Boztepe, 2012). Green product makers will benefit from maintaining low pricing if the product's price elasticity is reasonably high.

According to a 2009 Grail Research poll of American customers, those who have never purchased green products believed them to be too expensive and chose not to do so. According to a survey conducted a year later, cost is both the most significant issue and the biggest deterrent to purchasing green items. The pricing and customers' green purchasing behaviour are proven to have a favourable significant relationship (Boztepe, 2012).

According to Belz and Peattie (2008), green marketing placed a strong emphasis on green consumers. Some customers are willing to pay more for products that protect the environment. Many consumers would be willing to pay a higher price and choose to buy environmentally friendly products. Yet according to Rohit Nema's research, people are not prepared to pay more for environmentally friendly products. The low degree of consumer willingness in India means that marketers there should develop cost-cutting tactics (Nema, 2011).

One of the elements influencing consumers' purchasing decisions is perceived product pricing (D'Souza et al., 2007). He continued by saying that staunch environmentalists do not consider pricing while making green goods purchases and do not let prices influence their purchasing decisions. Being in favour of recycling and green products is not the same as being willing to pay extra for them. Customers may favour recycling and green products, but they may not be willing to pay a higher price (Hansla et al., 2008). There are research that support this point of view and studies that indicate how prices affect consumers' decisions to buy green items. Prices will remain a problem unless discounts are offered and promotions are emphasised (Gatersleben et al., 2002).

- 7) **Green Promotions-** It attempts to promote green products and foster in customers an image of a firm that cares about the environment. To accomplish the purpose, promotional tactics like public relations, advertising, and promotions are used. In a study including 3690 individuals, Shrum et al. (1993) concluded that men are unaffected by advertising and do not change their purchasing habits, whereas women are more likely to be cautious about advertisements for green products (Shrum et al., 1995).

After carefully considering them, businesses should advertise their goods. To avoid spreading any false information, they should highlight the product's functionality, design, and utility (D. Yazdanifard, 2014). Promotions and consumer green buying behaviour are positively correlated (Morel and Kwakye, 2012). According to a different article by Yazdanifard and Mercy from 2011, advertisements that highlight a company's environmental commitment have an impact on consumers. According to a study by J.S. Bagheri, customers have a favourable view towards green advertising, and it has an impact on their thinking (Bagheri, 2014). This study's findings support those of Hajeqrari (2014) and Boztepe (2012). H.C. Purohit (2011) found that the majority of respondents to his poll of 238 students agreed that they would be more likely to choose those green promotions (96% of respondents). Environmental protection-focused advertising initiatives are preferable (Purohit, 2011). According to a study by Ashoorvan, 63.2% of respondents said that green marketing had a high impact on the purchasing process, compared to 36.8% who thought it had a medium impact (Ashoorvan, 2014). From the earlier studies, it can be inferred that green promotions have a favourable impact on customer purchasing decisions.

- 8) **Demographics-** Many studies have previously found a connection between customer demographics and their green purchasing habits. It aids green marketers in market segmentation and tracking customer green behaviour. The 2003 study by Dimantopoulos and colleagues found that demographic factors alone were insufficient to identify the profile of green consumers. Yet, it was discovered in the same study that women have a stronger propensity for protecting the environment and are more likely to behave in this way. While there is a negative correlation between pro-environmental behaviour and age, married people exhibit higher pro-environmental behaviour (Dimantopoulos et al., 2003). One of the key variables influencing consumers' green shopping behaviour is demographics (Kollnuss & Agyeman, 2002). According to Hustad and Pessemier (1973), women need to have high levels of education in order to be more ecologically concerned. Consumers who care about the environment are younger and better educated (Berkowitz & Lutterman, 1968) and (Bourgeois & Barnes, 1979). Younger people are more receptive to fresh and creative ideas than older ones, according to Ottman et al. (2006). Many studies have shown that men and women behave differently, with women being more supportive of green ideas than males (Tikka et al., 2000; Stern et al., 1993; Zelezny et al., 2000). In contrast to the findings mentioned above, Chen and Chai (2010) claimed that psychographic factors are more effective than demographic factors in predicting consumers' propensity to make green purchases. There are differing opinions on the extent to which demographic factors influence consumers' decisions to buy green products, but there is no doubting that they do.

VII. CONCLUSION

Given India's GDP growth rate, the introduction of globalisation, liberalisation, and privatisation, the rapid advancement of technology, and changes in human desires, the country's GDP has expanded significantly (Maheshwari, 2014). (Boztepe, 2012). Humanity's growing wants have led to higher pollution levels and the loss of our natural resources. Yet, the harm can be minimised if the green marketing elements are employed effectively to sway consumers' opinions. Given the overwhelming evidence that all green marketing factors encourage customers to buy green products, marketers should pay close attention to these factors in order to develop the most effective marketing plan.

It can be advised that green product prices be kept at reasonable levels so that even those with average incomes can afford them. High prices are the main obstacle to purchasing green goods. Also, there is a need to raise consumer knowledge of the labels and names of eco-friendly product brands. They need to be made aware of eco-labels and eco-brands since they find it challenging to distinguish between them and other non-green products. Advertising that promotes environmental awareness should avoid misleading consumers about what being green entails. To send a message to consumers that they can rely on, "green washing" corporations should be penalised.

To send a message to consumers that they can trust the promises of green companies as the "false green companies" are treated seriously, "green washing" companies should be penalised. The demographic makeup of their target audience must also be a priority for the marketers. Most marketers don't think it's important while developing green marketing strategy. Yet, the differences in age, income, gender, and literacy have a significant impact on how successfully the green marketing approach is implemented. Hence, before moving further with the planning of the marketing strategy, it is crucial to do a thorough analysis of the impact each aspect has on consumers' minds.

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A Study of Digital Marketing and its Importance in Business

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ABSTRACT

Digital marketing refers to advertising delivered through digital channels such as search engines, websites, social media, email, and mobile apps. The concept of digital marketing started from the Internet, web search tools, and ranking the Websites. As per the marketing definition, brand is an identifying symbol, mark, logo, name, word, and/or sentence that companies use to distinguish their product from others. There is always a confusion between inbound marketing and digital marketing. The most important thing to remember about digital marketing and inbound marketing is that as a marketing professional, you don't have to choose between these two. From social media to text messages, there are many ways to use digital marketing tactics in order to communicate with your target audience. Digital marketing has become increasingly important because of many accessible digital channels. Additionally, digital marketing has minimal upfront costs, making it a cost-effective marketing technique for small businesses.

Key Words: Brand, Digital marketing, Businesses, Online, Inbound Marketing, Social Media,

I. INTRODUCTION

Digital marketing refers to advertising delivered through digital channels such as search engines, websites, social media, email, and mobile apps. Using these online media channels, digital marketing is the method by which companies endorse goods, services, and brands. Consumers heavily rely on digital means to research products (Keller & Kotler 2006).

It indicates that Digital marketing, online marketing, internet advertising, marketing a company online is a big deal these days. This research paper examines the impact of digital marketing in broad sense in profitable business.

II. THE CONCEPT

The concept of digital marketing started from the Internet, web search tools, and ranking the Websites. The first search engine began in 1991 with a network protocol called Gopher for inquiry and search. Since the dispatch of Yahoo in 1994 companies began to increase their ranking on the site. At the point when the predictions turned out to be wrong, the market was ruled by Google and Yahoo for search development. While, the Internet search traffic developed in 2006 along with the development of major companies like Google. "In 2007, the use of cell phones expanded Internet utilization moving radically and individuals everywhere

throughout the world began interfacing with one another more conveniently through social media” (Smyth 2007). “Recently, companies have been understood the significance of digital marketing. Businesses should consolidate online with conventional techniques to be fruitful for addressing the requirements of clients” (Parsons, Zeisser, Waitman 1998).

III. BRAND

As per the marketing definition, brand is an identifying symbol, mark, logo, name, word, and/or sentence that companies use to distinguish their product from others. A combination of one or more of those elements can be utilized to create a brand identity. Brand Visibility can be defined as the frequency at which people see a brand in search results, on social media, email marketing and other online marketing channels. Brand visibility is about engaging in active online marketing to help draw attention of customers to a brand. While digital marketing refers to advertising delivered through digital channels such as search engines, websites, social media, email, and mobile apps. Using these online media channels, digital marketing is the method by which companies endorse goods, services, and brands (Michael R. Solomon, 1998). In this complex and dynamic business environment, organization’s survival is highly determined by its ability to attract and retain customers. Ramakrishnan (2006) defines digital advertisement and marketing as the marketing goal of preventing customers from going to the competitor.

A digital marketing strategy allows us to leverage different digital channels such as social media, pay-per-click, search engine optimization, and email marketing to connect with existing customers and individuals interested in your products or services. As a result, firm can build a brand, provide a great customer experience, bring in potential customers, and more.

IV. INBOUND MARKETING AND DIGITAL MARKETING

There is always a confusion between inbound marketing and digital marketing. Digital marketing uses many of the same tools as inbound marketing—email and online content, to name a few. Both exist to capture the attention of prospects through the buyer’s journey and turn them into customers. But the approaches take different views of the relationship between the tool and the goal.

Digital marketing considers how individual tools or digital channels can convert prospects. A brand's digital marketing strategy may use multiple platforms or focus all of its efforts on platform. For example, a company may primarily create content for social media platforms and email marketing campaigns while ignoring other digital marketing avenues.

On the other hand, inbound marketing is a holistic concept. It considers the goal first, then looks at the available tools to determine which will effectively reach target customers, and then at which stage of the sales funnel that should happen. As an example, say you want to boost website traffic to generate more prospects and leads. You can focus on search engine optimization when developing your content marketing strategy, resulting in more optimized content, including blogs, landing pages, and more.

The most important thing to remember about digital marketing and inbound marketing is that as a marketing professional, you don’t have to choose between these two. In fact, they work best together. Inbound marketing

provides structure and purpose for effective digital marketing to digital marketing efforts, making sure that each digital marketing channel works toward a goal.

Now, this paper focus on importance of Digital Marketing. Any type of marketing can help your business thrive. However, digital marketing has become increasingly important because of many accessible digital channels. In fact, there were five billion internet users globally in April 2022 alone and constantly the number is increasing day by day. From social media to text messages, there are many ways to use digital marketing tactics in order to communicate with your target audience. Additionally, digital marketing has minimal upfront costs, making it a cost-effective marketing technique for small businesses.

V. B2B AND B2C MARKETING

Other aspect of digital marketing is B2B and B2C marketing. Digital marketing strategies work for B2B (business to business) as well as B2C (business to consumer) companies, but best practices differ significantly between these two.

Here's a closer look at how digital marketing is used in B2B and B2C marketing strategies.

- B2B clients tend to have longer decision-making processes, and thus longer sales funnels. Relationship-building strategies work better for these clients, whereas B2C customers tend to respond better to short-term offers and messages.
- B2B transactions are usually based on logic and evidence, which is what skilled B2B digital marketers present. B2C content is more likely to be emotionally-based, focusing on making the customer feel good about a purchase.
- B2B decisions tend to need more than 1 person's input. The marketing materials that best drive these decisions tend to be shareable and downloadable. B2C customers, on the other hand, favour one-on-one connections with a brand.

Of course, there are exceptions to every rule. A B2C company with a high-ticket product, such as a car or computer, might offer more informative and serious content. As a result, your digital marketing strategy always needs to be geared toward your own customer base, whether you're B2B or B2C.

VI. SOURCES AND RECEIVERS

Advertisers are commonly referred to as sources, while members of the targeted ads are the receivers. Sources frequently target highly specific, well-defined receivers like McDonald's did with shift workers and travelers. The company used digital ads because it knew these people made up a large segment of its late-night business. McDonald's encouraged them to download the Restaurant Finder app, targeting them with ads placed at automated teller machines (ATMs), gas stations, and websites that its customers commonly frequented.

VII. KEY PERFORMANCE INDICATORS (KPIs) IN DIGITAL MARKETING

Another key point to remember is that digital marketers use key performance indicators (KPIs) just like traditional marketers. KPIs are quantifiable ways that companies can measure long-term performance by

comparing them to their competition. This includes corporate strategies, financial goals and achievements, operational activities, and even marketing campaigns.

The following are some of the most common KPIs that marketers can use to help companies achieve their goals:

- **Blog Articles:** Marketers can use this KPI to figure out how many times a company publishes blog posts each month.
- **Clickthrough Rates:** Companies can use this KPI to figure out how many clicks take place for email distributions. This includes the number of people that open an email and click on a link to complete a sale.
- **Conversion Rate:** This measure focuses on call-to-action promotional programs. These programs ask consumers to follow through with certain actions, such as buying a product or service before the end of a promotional period. Companies can determine the conversion rate by dividing successful engagements by the total number of requests made.
- **Traffic on social media:** These tracks how many people interact with corporate social media profiles. This includes likes, follows, views, shares, and/or other measurable actions.
- **Website Traffic:** Marketers can use this metric to track how many people visit a company's website. Corporate management can use
- **Implicit Bias in Digital Marketing:** Implicit bias has a way of creeping into digital marketing, even when marketers and companies do all they can to ensure it doesn't. The term implicit bias refers to attitudes and stereotypes people have against or toward other groups of people that occur automatically without any conscious knowledge

Algorithms are a major foundation of digital marketing, which makes them very important when companies craft their marketing strategies. These algorithms are often created with the intention of being unbiased.

VIII. CHALLENGES OF DIGITAL MARKETING

Digital marketing poses special challenges for its purveyors. Digital channels proliferate rapidly, and digital marketers have to keep up with how these channels work, how they're used by receivers, and how to use these channels to effectively market their products or services. It's becoming more difficult to capture receivers' attention because receivers are increasingly inundated with competing ads. Digital marketers also find it challenging to analyse the vast troves of data they capture and then exploit this information in new marketing efforts.

The challenge of capturing and using data effectively highlights that digital marketing requires an approach to marketing based on a deep understanding of consumer behaviour. For example, it may require a company to analyse new forms of consumer behaviour, such as using website heatmaps to learn

IX. CONCLUSION

In the competitive markets, each firm tries to make the possible process to distribute products and services, attracting consumers, to make the best benefits. According to this, the marketing process is considered one of

the most important operations for any firm. (Nair, 2011) said, each firm has to focus on four principal elements to make the marketing process more effective. These elements are product, price, promotion, and place.

“Marketing science” has been evaluated like any other sciences in the last few years. According to this evaluation that comes as a result of many changes in the markets in the whole world. The firms have started to convert from traditional to digital marketing. This is to deal with targeted consumers directly. Using digital mediums such as social media, websites, and e mails technically allow us to engage with new markets.

Digital marketing should be one of the primary focuses of almost any business’s overall marketing strategy. Never before has there been a way to stay in such consistent contact with your customers, and nothing else offers the level of personalization that digital data can provide. The more you embrace the possibilities of digital marketing, the more you'll be able to realize your company's growth potential.

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Review of Attacks on Physical Objects and Their Counter measures in WSN of IoT Framework

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ABSTRACT

As the number of IoT applications is increasing day by day, the Security of the physical objects at different layers of IoT framework is a crucial issue. Physical objects like Smart Wearable devices, Smart Home Applications, etc. are sharing information like personal data, across the network, attacks on security to the physical objects is a main aspect of this research paper.

This paper represents the different attacks on the physical objects throughout the framework that are being observed, and the countermeasures needed for them to have secure physical objects.

Keywords: IoT: Internet of Things, WSN: Wireless Sensor Network, Wi-Fi, RFID, NFC

I. INTRODUCTION

Internet of Things is a heterogeneous network of Physical objects which are connecting various devices via different media to internet and connected together for communication and sharing information across the network.

In Internet of Things, the physical objects are connected and embedded in systems to act smart and share data across a network. The embedded systems are connected through different techniques like Wi-Fi, Bluetooth, etc. with a limited number of resources like bandwidth, power source, and ability to process the gathered data and share across the network to achieve a particular goal.

The term Internet of Things (IoT) refers to be:

IoT= Sensors + Networks + Data + Services.

The IOT technology works apart in aspect of time and place. IoT is capable of being implemented across the world and embedded systems are designed such that they can work with limited amounts of resources like power, storage, etc. in real-time.

II. IOT FRAMEWORK

There is no uniform framework for IoT, it depends upon the requirement for the project how many layers to be in the framework, general IoT framework has three layers, as shown in fig.1 [1]:

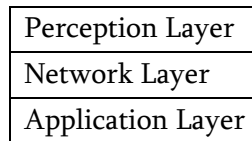


fig.1 three tier Architecture of IoT

Many researchers have analyzed these layers to have many layers in between them. The perception layer is the layer where sensor work which is most exposed to the physical world and is of importance and prone to attacks from intruders. The basic functionality of this layer is to collecting data from connected sensors and share it securely. From various studies done on this layer, the communication and sharing of data is done by using the technologies like Bluetooth, RFID, NFC, etc. [1-4]

The network layer is the layer at the core and is responsible for transmission of data, ensuring delivering the data to the right destination and flowing the data through various routers. Various technologies like IPV4/IPV6 are used for addressing devices with high effort.[1-4]

The application layer is the topmost layer in the framework, developed to provide service and present the data to the user according to the need. It provides the facility like a dashboard, representation of the data, and handling of the data.[1-4]

This framework is enhanced into five layers as in shown following diagram:

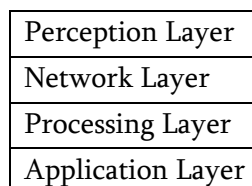


Fig.2 Enhanced IoT Architecture

By some researchers, the Processing layer is added in between the network layer and application layer to provide the functionality of computing and processing the received data. This layer is also responsible for the storage of data, varying to the devices being used.

III. ATTACKS ON PHYSICAL OBJECTS IN WSN OF IOT FRAMEWORK

The attacks are categorized into active attacks and passive attacks. [14]

Active attacks: These types of attacks are done to affect the performance of the system/network as well as to manipulate the data received/transported through the network.

Passive attacks: In these types of attacks the data is observed and monitored, and analysis of data traffic is done, here data is not damaged. [14]

Some of the Active attacks which are mainly seen are as follows:

- Distributed Denial of Service(DDoS): here the attacker introduces malicious nodes in the system to affect the services, either to change the data and then transmit the altered data on the network.[8][14]
- Jamming: in this type of attack the attacker gets control over the data transmission and prevents the data from transmission either from the system or to the system. Here the data packets are stopped from being transmitted.[14]
- Physical node attack: here the attacker physically damages the physical objects to stop the system from working. Here the physical objects can suffer permanent damage. [14]
- Node Tampering: here the attacker captures the physical object and gets control over it and modifies the services. [14]
- Spoofed Routing Information: the working of the network is affected here by spoofing.[14]

Some of the Passive attacks are as follows:

- Eavesdropping: here the attacker observes the data generated and transmitted over the network, where the data is not damaged physically but the protocols for privacy are violated. [12][14]
- Analyzing Data Traffic: here the attacker observes the data patterns that are being transmitted.[12][14]
- Homing Attack: here the attacker aims to find the resources of the network, and get access to the system for the active attacks.[12][14]
- Traffic Analysis: Monitoring the network this attack can be prevented from the pattern disclosure.[14]

IV. COUNTERMEASURES FOR ATTACKS IN WSN OF IOT

- DDoS: these types of attacks can have countermeasures by providing encryption algorithms, to stop the availability of resources to the attacker.[15]
- Jamming: these attacks can be overcome by splitting the network spectrum, to have a smooth data transmission.[15]
- Physical nodes attack: Tamper proofing is the solution to these attacks which prevents the system from having damaged physical objects.[15]
- Node Tampering: Having an efficient key distribution mechanism that keeps on changing the distributed key frequently, to prevent tampering with the node. [15]
- Homing Attack: Having a novel encryption technique, to prevent the network's resources. [15]
- Spoofed Routing Information: The MAC authentication can prevent the system from this type of attack.
- Authentication: A good authentication mechanism to strengthen the system from infringements.[16]

V. CONCLUSION

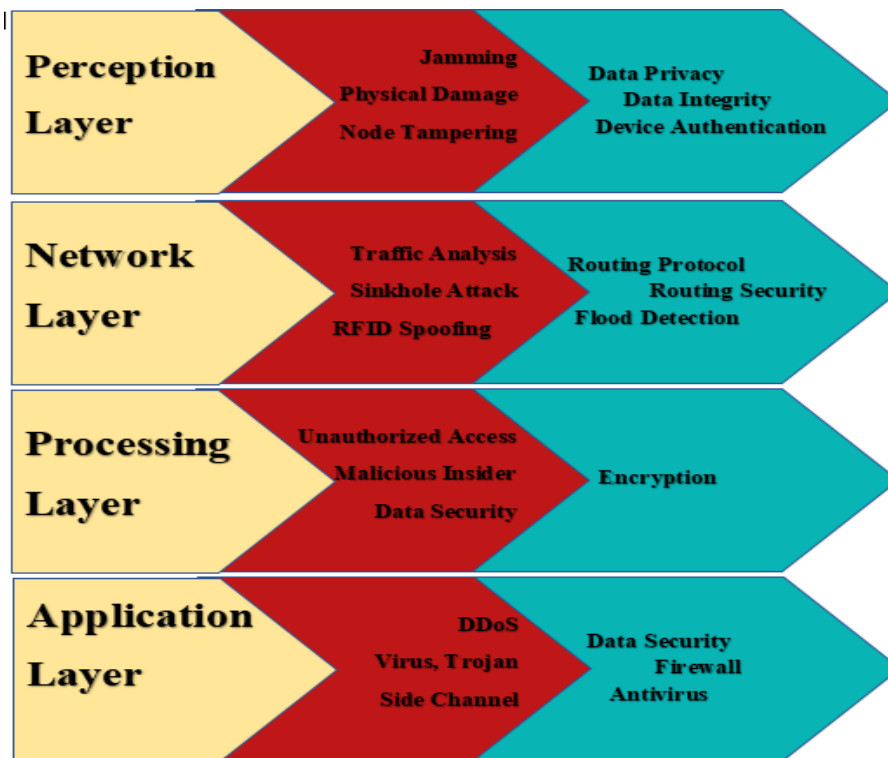


Fig. 3 Attacks in IOT and Countermeasures [2]

Paper discusses different attacks in IoT at various Layers, with effective Countermeasures to give clear view to the researchers to identify different attacks and provide countermeasures in their security mechanisms. The active attacks like DDOS, Jamming, Physical Nodes, Node Tampering, Spoofed routing and passive attacks like Eaves-Dropping, Analyzing Data Traffic can be effectively countered by given countermeasures. Using Encryption techniques at various layers of framework, can be an effective countermeasure for the attacks which affect Security, Privacy, and Integrity of the data.

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Identification of Emotion from Facial Expression Using Deep Learning

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ABSTRACT

Automatic emotion recognition and classification is an interesting research field which has many applications. Facial expression plays important role during communication which conveys emotional state of an individual. The present project focuses on identification and classification of facial emotion from facial expression using deep learning with convolutional neural network and vgg16 model. The aim of this project is to study the classification of emotion from facial expression with supervised learning by using deep learning. The VGG16 which was pre-trained on Image Net via transfer learning method. The emotion dataset in this study consists of 250 images which has three emotions such as Angry, Happy and Neutral and are used for training, testing and validation purpose. The accuracy achieved using this model is 94 %.

Keywords: Emotion recognition, Facial expression, deep learning, Convolutional neural network(CNN),VGG16.

I. INTRODUCTION

A Facial expression can be defined as "A Facial expression is a one or more motions or positions of muscles beneath the skin of the face". Facial expression is primary mean of conveying social information between the humans but they also occur in most of the mammals and some species of animals. Human can change and adopt facial expression voluntarily and involuntarily [1].

Facial expression is one of the most important areas having effective, natural and universal signals for human being to convey their emotional state and intentions. There are many researches been conducted in this area where recognition, identification and classification of facial emotion based on facial expression has been done using different Machine learning and deep learning techniques [2].

Emotion is very important aspect of human communication which plays a crucial role when it comes to describe emotion behind any speech system. Emotions are basically divided into seven categories such as Anger, Happiness, Neutral, Disgust, Surprise, Fear and Sadness [3].

Facial emotions can be positive and negative. Positive emotions represent healthy mental states such as Happy, Pleasure, etc. and negative emotions represent unhealthy mental state by carrying Angry or Sad facial expressions. Therefore both positive and negative emotions closely affects the emotional health of an individual in day-to-day life [4].

Human emotions are an inevitable part of interpersonal communication which can be expressed in many forms [5].

When it comes to forensic science, facial expression can be applied in the field of Biometrics, Human-Computer Interaction (HCI), Forensic Psychology, Pattern Recognition, Criminal Profiling, Tampered videos, Forgery detection in face forensics and related fields of forensics.

A. VGG16 Model :

VGG16 is Visual Geometry Group model and it was proposed by Karen Simonyan and Andrew Zisserman of the Visual Geometry Group Lab of Oxford University in 2014 in the paper "VERY DEEP CONVOLUTIONAL NETWORKS FOR LARGE-SCALE IMAGE RECOGNITION".

This model has been used on ImageNet dataset which consists of 14 million images belonging to 1000 classes. And the model achieved 92.7 % top-5 test accuracy on it. The ImageNet dataset which was used in this model contains fixed size of images 224*224 and has RGB channel. VGG16 is a convolutional neural network (CNN) architecture which was used to win ImageNet competition in 2014. It is considered as one of the excellent vision model architectures till the date.

B. Image Processing and pattern recognition:

An image may be defined as a two-dimensional function, $f(x, y)$, where x and y are spatial coordinates and the amplitude of f at any pair of coordinates (x, y) is called intensity or grey level of image at the point. When these values are finite, discrete quantities, then this image is called a digital image. The field of digital image processing refers to processing digital images by means of a digital computer.

Pattern recognition is a scientific discipline whose goal is the classification of objects into a number of categories or classes. Pattern recognition is an integral part of most machine intelligence systems built for decision making. Machine vision is an area in which pattern recognition is of importance. A machine vision system captures an image via a camera and analyses them to produce descriptions of what is imaged [7].

II. METHODS AND MATERIAL

The present research focuses on identification of emotion from facial expressions using deep learning algorithms with VGG16 model and CNN Classifier for testing/ identification purpose. In the current research project, a digital images dataset of three basic emotions (Angry, Happy and Neutral) has been created and used by using deep learning i.e. a simple CNN multi-image classifier.

The database of digital images with three basic facial expressions Angry, Happy and Neutral were collected from B.Sc. -III and M.Sc. II year students of GIFS, Aurangabad using Samsung Galaxy A31 Smartphone in a controlled environment with proper light and seating arrangement. Three folders named Angry, Happy and Neutral were made. Each emotion folder containing 54 images. All these folders were stored in a single folder named "Project Database" for easy execution of code. From a total of 18 subjects, images were collected, for each single emotion there are three images were captured from 18 subjects. And all these images were cropped manually to acquire the region of interest. Therefore a total of 162 images were collected, cropped and all the samples were used for further processing.

A. Plan of work



B. Pre-Processing Database :

Once the database was collected pre-processing was done. In pre-processing step, various emotions images were manually cropped by removing unnecessary area in an image. Unnecessary area contains uneven edges of an image and extra background contained in the image. After pre-processing, the images containing only the facial area has been selected and the images were prepared for further processing.

C. Loading Dataset Into CNN And VGG16 Model:

Once pre-processing is being done, according to different facial expression dataset was divided into three datasets such as training, validation and testing dataset. And then the dataset were loaded into CNN and VGG16 model.

D. Creating Weight/Features With VGG16 For Train, Validation And Test Data:

Once the dataset were loaded into CNN and VGG16 model feature extraction was done. In this step we defined dimensions of image depending upon image size. Then bottleneck file system was created, which will be used to convert all image pixels into their number (numpy array) correspondent and store it in our storage system. Finally, we defined the epoch and batch sizes for our machine. For neural networks, this is a key step.

E. Loading Extracted Features of Training, Validation & Testing Data:

Before doing this step we imported transfer learning model vgg16. In this step whatever bottleneck files have created and saved for training, validation and testing that has loaded and prepared for convolutional neural network.

F. Creation Of Our Model :

First step is to initialize the model with Sequential(). After that we flatten our data and add our additional 3 (or more) hidden layers. This step is fully customizable to what we want. This is a labeled categorical classification. Then after we have created and compiled our model, we fit our training and validation data to it. Finally, we create an evaluation step, to check for the accuracy of our model.

III. RESULTS AND DISCUSSION

The present research focused on identification of emotion from facial expression using deep learning. The dataset was created by capturing images of fellow students of cyber department as well as other departments. By applying CNN and VGG16 model extracted bottleneck features and stored bottleneck files for training, validation and testing data and loaded bottleneck files in model. CNN is used in this model. Then model was trained and accuracy is compared with different dataset division. We have used 250 image samples of Angry, Happy and Neutral of which and 60% were used for training purpose and 20% samples were used for validation purpose and 20 % for testing purpose.

TABLE I: RESULT ACHIEVED

Sr. No.	Model Dataset	Accuracy Rate in (%)
1	Training images : 60% Validation images : 20% Testing images :20 %	94.00 %

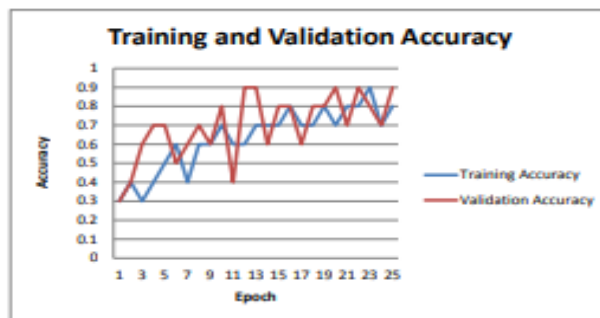


Fig. 1 Training and Validation Accuracy

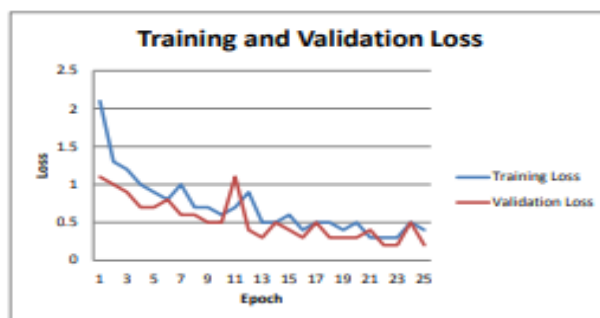


Fig. 2 Training and Validation Loss

IV. CONCLUSION

In order to apply deep leaning the CNN and VGG16 model is used for identification and classification of emotions such as Angry, Happy and Neutral. The CNN Classifier algorithm is used in this model. In which the training and validation accuracy has analysed and concluded that the model has good accuracy for emotion identification and classification from facial expression. And this model has achieved 94 % accuracy.

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The Study of Automation View on Laboratory Management in Medical Sector

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ABSTRACT

The management concerns in laboratories for diagnostic type of work are vital at medical sector. There are several ethics are important in the laboratory management such as consent, confidence, tallit, code of conduct, conflicts over diagnosis and patient care are often handled using the fundamental results and interpretations of laboratory test results. These activities already performed through manual and systematic process, the aim of this paper is to study the technologies used for automation of laboratory management and diagnosis system that generates more accurate result than manual ones in the modern era. This paper also brought light on growth of exactness and precision into clinical medical practise in the lab diagnostics using PT and CBC method analysis.

Keywords: Laboratory Management, Prothrombin Time Test, Complete Blood Count Test.

I. INTRODUCTION

In the healthcare sector several medical ethics that delivers advice as well as information to practitioner, scientists on health, safety particularly on how to conduct risk assessments and suitable control measures [9][10]. Modern laboratories like any other business or institution need a wide range of skills based on strict management principles for the ethical use of patient data and other materials, choices on the wellbeing of specific patients as well as general observation and interventions on patients' laboratory tests are also important. Generally, automation in laboratory management and diagnosis provide more correct result than manual equipment [11][12].

This study focused on manual procedure as well as automatic way concern to PT and CBC diagnosis using certain instruments. Let us see the detail working of both tests and analyse their result that specify essentiality of modes of diagnosis.

II. LABORATORY MANAGEMENT

The majority of lab administration tasks i.e., diagnosis tests such as maintaining equipment, refilling consumables, planning of tasks, providing technical guidance and preserving records of entire lab operations or incidents. To ensure most of these jobs fulfil in time it needs efficient way to do these jobs.

A. Manual Machine:

A handbook, document, or book known as a lab manual aid in understanding what must be done in a laboratory. The term "manual machine" refers to machinery or tools used in machine and fabrication shops that are controlled manually, for as by depressing buttons, turning knobs, or pulling triggers. Instead, then being controlled by a computer, these machines rely on the operator's intelligence and expertise.

B. Automated Machine:

An automated machine analyser is a type of medical lab that uses little to no human intervention to quickly measure various chemicals and other properties in a variety of biological samples. These measurable characteristics of blood and other fluids may aid in the rapid detection of disease. The best part of automatic machine tools is their overall better functionality and real-world performance, which improve the testing process's accuracy, consistency, and repeatability. Automatic machine tools operate automatically once they are set up, with the exception of applying power, lubricating supplies, and shutting off power.

III. LABORATORY DIAGNOSTIC TECHNIQUES

Lab tests and diagnostic procedures are used to determine whether a person's health is normal. A lab can examine a sample of your blood, urine, or body tissue to determine whether something is wrong.

A. PT (Prothrombin Time): Manual Method

Prothrombin Time (PT) is frequently used to monitor oral anticoagulant medication, screen for extrinsic factor shortage, and evaluate extrinsic coagulation factor levels. The basic figure of PT test is given below (3).

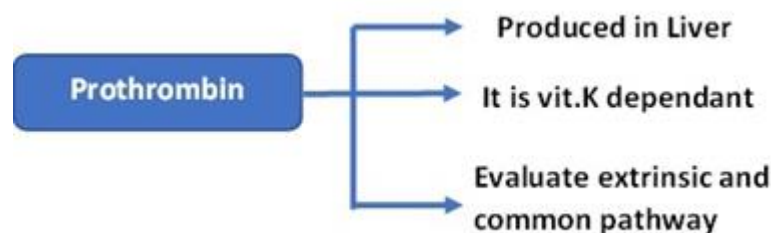


Fig.1 Prothrombin Time Test

The Fig.1 shows the PT test and its associated terms such as prothrombin produced in liver, its dependant on vit.k and used to evaluate extrinsic and common pathway.

The step-by-step procedure to perform PT test is given below:

1. Take 100 ul of plasma in a glass test tube.
2. Place in water bath or incubator for 5 min.
3. After 5 min Add 200ul of PT reagent (Tissue thromboplastin)
4. Start a stopwatch shake the tube gently to mix content.
5. By tilting tube note the clotting time.
6. In the manual method we cannot observe the micro sec as compare to automatic method.

$$\text{Prothrombin Time Ratio (PTR)} = \frac{\text{Clot time of the test plasma}}{\text{Clot time of the control}}$$

$$\text{INR} = \text{PTR}^{\text{ISI}}$$

Example: PTR of 2.0 and an ISI of 1.0

$$\text{INR} = 2.0^{1.0} = 2.0$$

B. Automatic PT-INR Method:

The manual method explains above and now see the automatic procedure of Prothrombin Time test i.e., PT-INR.

1. First, we have taken tube of sodium cr. In which sample were are collected.
2. Allow sample to settled in the centrifuge the sample 300 rpm for 5mins
3. Then take while in which manage tic rod where place then add 200 ul PT reagent the machine for 60 sec.
4. Then put the supernatant (plasma) for centre tube.
5. We can observe micro sec also and PT or INR also as compare to manual.



Fig.2 PT-INR Machine

C. Complete Blood Count (CBC): Manual Method

Automatic analysers replace manual processes and lower analytical mistakes as technology advances. The preanalytical stage of the entire continuum, however, becomes increasingly prone to problems as the No. of test orders in hospitals and, consequently, as the No. of sample accessioning in medical biochemistry laboratories, rise. Currently, the pre-analytical stage is when the vast majority of mistakes that affect test findings take place [1]. The total blood count is one of the studies' most assessed metric. CBC is thus one of the tests whose results are numerically impacted by preanalytical mistakes [2]. The management of the preanalytical process is challenging since divisions other than the laboratory must participate [6]. It is crucial to have knowledge of the factors that affect the CBC test in order to avoid preanalytical mistakes. The administration of the laboratory is responsible for creating and following the guidelines relating to this problem. This reference material was created as a helpful, appropriate, and practical guide for all medical laboratory personnel, nurses, phlebotomists, students, researchers and the explanation about RBC, WBC given below [4][5].

- **Red Blood Cells (RBC, erythrocytes):** The akaryocytes that make up red blood cells have a concave disc shape. Its average capacity is 90 fL, and its average diameter ranges from 6.2 to 8.2 m.



Fig.3 Red Blood Cells (erythrocyte)

- **White Blood Cells (WBC, leukocytes):**

Due to their superior achromatic eyesight over that of red blood cells under a light microscope, white blood cells are given the name "white blood cells." They can be further classified into five groups: neutrophils, eosinophils, basophils, lymphocytes, monocytes, and thrombocytes. It takes a very long time to view the results of the manual full blood count technique.

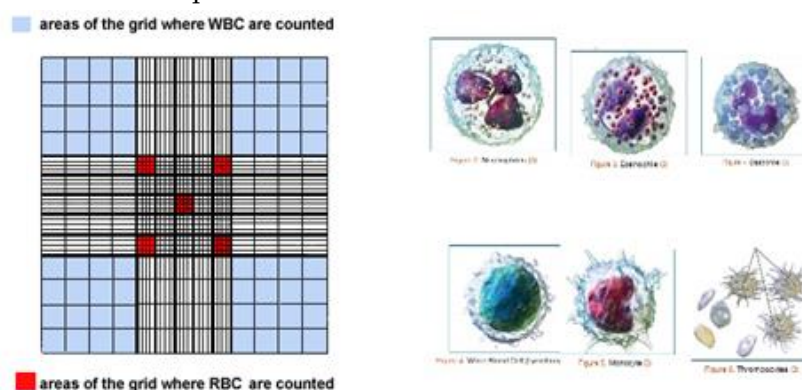


Fig.4 White Blood Cell (leukocytes)

D. Complete Blood Count (CBC): Automatic Method

Blood samples are subjected to testing using hematology analysers. White blood cell counts, complete blood counts, reticulocyte analyses, and coagulation tests are all performed using it in the medical profession [2]. Hematology analysers are available for both human and animal blood, which is helpful for research labs, zoos, and veterinarians. Hematology analysers have different features like "closed vial testing" and "open sampling testing" [6][7][8]. Some hematological analysers give the customer the option of selecting their preferred testing method. The sample size necessary, the kind and number of testing modes, the speed at which the results are provided, the automated flagging of findings that are outside of the normal range, and the number of test results it can store are further elements to take into account in a hematology analyser.



Fig.5 Hematology Analyser

In a matter of seconds, we can see that the automatic machine has displayed the entire CBC. like a manual machine. Because of this, I advise using an automatic machine, which is the best. Its laborious apparatus and data from multiple sources can be gathered simultaneously.

IV. CONCLUSION

The main purpose of the study is to identify impact on outcomes depends on manual and automatic method in diagnostic test carried out at laboratory. To know this PT and CBC tests considered and studied both the approaches i.e., Manual and Automatic Method. Although there is significant debate over the benefits and drawbacks of manual and automatic machines, the comparison and data presented above show that, in lab tests automatic machines outperform manual ones. According to the study, laboratories are much appreciated and accept automation equipment more than manual equipment.

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Evaluation and Survey of Security, Privacy Issues of Cryptocurrency Exchange Application

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ABSTRACT

Digital currencies only exist in digital form. They do not have a physical equivalent. Cryptocurrencies, Virtual currency, Central bank digital currency are the types of digital currencies. Cryptocurrency is decentralized digital money that is based on blockchain technology and secured by cryptography. Blockchain technology is a technology that uses distributed database that is shared among the nodes of a computer network. Blockchain stores information electronically in digital format. In recent years, many businesses around the world are integrating blockchain technology. In the present investigation, we have conducted the survey to examine users familiarity, reliance on cryptocurrency, users expectations about security and privacy of cryptocurrency, perception about use, view point of people on different aspect of cryptocurrency and cryptowallet. We have analysed and compared the users responses and expectations. It was observed that there are six commonly used applications for cryptocurrency exchange in India. Based on comparison and survey, It was found that the best cryptocurrency exchange application which satisfied the user expectations (Parameters selected for comparison) about user friendliness security and privacy of cryptocurrency exchange application.

Keywords: Block chain technology, crypto currency, digital money, security, vulnerabilities, Decentralization

I. INTRODUCTION

Cryptocurrency is a currency that exists digitally and uses cryptography technique to secure its transaction [1]. Cryptocurrency can be defined as any medium of exchange, apart from real world money, that can be used in many financial transactions whether they are virtual or real transactions. Cryptocurrencies represent valuable and intangible objects which can be used electronically or virtually in different applications and networks such as online social networks, online social games, virtual worlds and peer to peer networks [2].

Blockchain-based digital currencies are built upon the concept of blockchain. Cryptocurrencies use blockchain technology to record and secure every transaction [4]. Blockchain word is the combination of two words that is "Block" and "chain". "Blocks" that hold sets of information they have certain storage capacities and, when filled, linked to the previous block, forming a chain like structure known as Blockchain. Blockchain is the fundamental technology underlying the emerging cryptocurrencies including Bitcoin [5]. Blockchain technology has become one of the most popular techniques that will change the world, mostly due to its several

features such as decentralization, immutability, and Peer-to-Peer (P2P) transactions. It provides an effective and a coherent solution to some real-world problem [6].

In block chain Header and body are the 2 parts of blocks. The block header with metadata such as merkle tree root, nonce, timestamp, and many more. Whereas, the block body consists of a set of transaction. A block header is a hash of many things determined by the BC, but most often consists of the previous block header hash, the merkle root of the current block, and the timestamp. by including previous block hash blocks are linked together [7].

A Crypto currency is a peer-to-peer digital exchange system. This process involves distributed verification of transactions without a central authority. In this process bit coin transactions are validated digitally on the bit coin network and added to the blockchin ledger. This verification process is called mining. Crypto currencies such as Bit coin, Ethereum, Litecoin, Ripple, Blackcoin , Dash, Decred, Dogecoin, Ark steem and Permacoin are the widely used, and with the greatest capital as well as transaction rates.

Frauds of crypto currencies:

- 1) **Ponzi Schemes:** Ponzi schemes only pay users with the funds invested by new users, and therefore implode as soon as new investors stop joining. As a result, most investors in Ponzi schemes just lose their money.
- 2) **Malware:** The alleged untraceability of crypto currencies has been extensively exploited by malware developers. There are two types of malware 2.1) **Ransomware:** After infecting the victim's device, this kind of malware encrypts the data on the device, and locks it until the user 2.2) **Crypto loggers:** This kind of malware tries to steal information about the victim's accounts on crypto servicespays a ransom.
- 3) **Fake Cryptoservices:** Fake exchange Fake exchange frauds deceive users by offering incredibly competitive market prices for purchasing crypto currencies.

II. METHODS AND MATERIAL

For this research study survey based methodology is used.

In May 2022, a pilot study was conducted. Research gives clear picture of active scenario of crypto currency about how many people are aware about crypto currency, how often they invest, legal perspective about crypto currency, also examined how many participants feel secure while investing in crypto currency, participants' opinion about security parameters related to crypto currency and crypto currency exchange applications.

Step 1: For the pilot study on cryptocurrencies, various questions were created in various aspect of crypto currencies. For that purpose many research paper are helped for forming question on various aspect of Crypto currency like legal, security concern, privacy concern, technical view, future expectations.

Step 2: I distribute survey online using social media. For that I created Google form of 30 questions in three different parts first part 10 questions related to basic awareness about crypto currency was included in second part 10 questions related to technical and legal aspect of crypto currency was included and in third part 10 questions related to security and privacy of crypto currency was provided and various options are provided for record responses of from the people.

Step 3: Google form was circulated in the peoples from various background such as banking sector, teachers, who have interested in treading, Finance, commerce background, information technology sector. To examine the participant's opinion about security parameters related to crypto currency and crypto currency.

Step 4: data of 400 plus people was collected in particular time duration that is 8 days.

Step 5: after that sorting of collected responses was done. In 412 participants 25% people are not having the prior knowledge about crypto currency and 75% people have the knowledge about crypto currency.

Step 6: after that sorting participants who have prior knowledge about crypto currency was considered. And only their opinion is considered for further study.

Step 7: analysis of sorted data is performed, following findings are noted from sorted data.

Step 8: I analysed that many of the participants are in the age group of 21-24 years old and around 67% participants are male. Following are the finding from analysis of survey 1) many participants around 75% participants are aware about crypto currency but only 33% people are invested in crypto currency according to survey. 2) Most of the participants expect central authority, legal legislation to deals with crypto currency offences. 3) Most of the people wants multifactor authentication, multisignature security KYC verification, content backup of personal information, biometric security from particular application are found in survey. 4) According to their opinion bit coin are securecrypto currency than others and coin switch, coin dcx are secure application comparative to zebpay, Cryptoxpress.

Step 9: from that survey got clear idea about people expectation on crypto currency and cryptocurrency exchange application.

Step 10: On the basis of survey analysis some parameters are selected to find out which application is best for exchanging cryptocurrency in digital world.

Step 11: on the basis of selected parameters 6 cryptocurrency exchange application which was mostly downloaded in India are selected. And three different categories are made according to number of downloaders and which application satisfy maximum number of parameters was find out of three different category of number of downloaders are compared and find application which satisfy maximum number of parameters.

Data collection and data analysis:

In 412 participant's 25% people are not having the prior knowledge about cryptocurrency and 75% people have the knowledge about cryptocurrency.

Many of the participants are in the age group of 21-24 years oldand around 67% participants are male.

III. RESULTS AND DISCUSSION

The research objective was evaluating the most secure cryptocurrency application according to user expectations. For that survey is conducted on different aspect of cryptocurrency, according to that various parameters are formed. Selected 6 cryptocurrency applications are downloaded compared according to selected parameters.

Comparison of application was analysed and observed that coinDCX satisfy more parameters compare to other 5, after that wazirX satisfy less parameters than coinDCX but satisfy more parameters than other 4 application.

Zebpay satisfy less parameter than wazirX and coinDCX and satisfy more parameters than other three applications. Bitpay satisfy more parameters than Safepay and CryptoXpress and satisfy less parameters than coinDCX, WazirX, ZebPay, CryptoXpress satisfy less parameters compare to selected all other 4 applications. According to the survey response Coinswitch is more secure and user friendly after coinswitch, CoinDCX is more user friendly and more secure after coinDCX wazirX is more secure and user friendly after wazirX zebpay is more secure and user friendly

IV. CONCLUSION

Cryptocurrency offer a new, easy, less time consuming method for buying selling exchanging money. A clear picture about cryptocurrency and their application use has been drawn from my conducted study. Pilot study has been conducted with sample of 412 people, but the result showed me an awareness about cryptocurrency, perception about use, viewpoint of people on different aspect of cryptocurrency and cryptowallet, trust of using, expectation regarding security and privacy issues.

According to comparative study of 6 selected application coin DCX satisfy more parameters, wazirX satisfy less parameters than coinDCX, Zebpay satisfy less parameter than wazirX and coinDCX, Bitpay satisfy less parameters than coinDCX, Zebpay, wazirX, safepay satisfy less parameters than 4 selected application, CryptoXpress satisfy less parameters than all the 5 selected applications. According to both survey and comparison of application coinDCX is more secure and user friendly cryptocurrency application.

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Cost-Effective Carbon Cathode for Dye-Sensitized Solar Cell Using Eco-Friendly Eosin Y Dye

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ABSTRACT

Due to high catalytic properties and stability against deterioration, Platinum coated films on fluorine-doped tin oxide (FTO) glass surfaces have been preferred commonly as the cathodes in the research of dye-sensitized solar cells (DSSCs). The platinum cathode films have been synthesized by drop casting the alcoholic solution of hexachloroplatinic acid (H_2PtCl_6) on the cleaned TiO_2 -coated glass plates. Still, the cost of platinum is too high, being a heavy and rare element. Consequently, the intention of producing a low-cost and eco-friendly DSSC suffers. In the current study, efforts have been done to replace the heavy and expensive platinum cathode with a light and cost-effective carbon cathode. An attempt has been done to prepare the DSSC using Platinum and Carbon cathode under similar circumstances i.e. using Al-doped TiO_2 nanoparticles photoanode, eco-friendly Eosin Y dye has been used for sensitization of anode and iodine triiodide has been employed as the electrolyte. Study reveals carbon cathode can successfully replace the platinum cathode as the efficiency of DSSC using carbon cathode has been found to be greater as compared to the DSSC using the platinum cathode.

Keywords: Dye-sensitized solar cell, Al-doped TiO_2 photo anode, carbon cathode, eosin Y dye,

I. INTRODUCTION

Dye-sensitized solar cells (DSSC), another class of third-generation hybrid solar cells, have been extensively studied since O'Regan and Gratzel reported 7.1% solar energy conversion efficiency in 1991 [1]. Actually, DSSC being an electrochemical sensing solar cell and does not rely on expensive or energy-intensive processing methods, offers a particular promise as an efficient, low-cost alternative to silicon semiconductor solar cells. Since the working principle of DSSC is the mimicry of the natural photosynthesis process, DSSCs are the most promisingly environmentally benign solar cells. Unlike silicon solar cells, DSSC uses sensing dye for light harvesting and electron transport which allows researchers to fine-tune each component separately and optimize the device's performance. Along with environmental friendliness, DSSCs pose attractive properties like flexibility, multicolored, and hence aesthetics [2].

In a typical DSSC, light photons are absorbed by a sensitizer, which is adsorbed to the surface of wide band gap semiconductor oxide. The sensitized nanoparticles of semiconductors in combination with the electrolyte and

counter electrode produce the regenerative cycle of the photoelectrochemical cell [3]. In the literature, typical components of Dye-Sensitized Solar Cells (DSSCs),

Most often, doped or undoped titanium oxide (TiO_2) has been used as the wide band gap semiconductor oxide working as an anode, ruthenium complex dye employed as the most common and successful dye, and iodine tri-iodide is observed to be the traditionally used electrolyte whereas, Platinum coated FTO has been found to be frequently used as the cathode [3].

In our previous studies, Al-doped TiO_2 photo anode had been proven to be fruitful to increment the photovoltaic parameters i.e., photocurrent and efficiency of the DSSC [4-6].

Counter electrodes (Cathodes) have usually been prepared by depositing a thin layer of platinum (Pt) onto the FTO substrates. The FTO substrate without platinum coating can also work as the counter electrode however, its charge transfer resistance is very high of the order of mega ohm per square centimeter in iodine-triiodide electrolyte and hence, the platinum layer is deposited on the FTO to work as the catalyst. It reduces the oxidized form of the redox couple in the electrolyte so that the cathode material must be adapted to the redox system in the electrolyte. Although platinum is the most efficient catalyst for the counter electrode to date, the rarity and high cost of platinum make it unsuitable for low-cost DSSC. Hence, several other materials have also been adopted for the preparation of counter electrodes in DSSCs, such as conducting polymers such as poly (3,4-ethylene dioxythiophene) doped with toluene sulfonate anions, carbon materials, and cobalt sulfide, carbon black [7]. Moreover, platinum being heavy metal costs too high and elevates the overall cost of DSSC [8-9]. Whereas, DSSC comprised of carbon cathode has also been found to exhibit comparable results to that of the platinum cathode [10-15].

Considering the support of these studies, the current study of DSSC comprised of Al-doped TiO_2 nanoparticles photo anode sensitized by eosin Y dye has been further explored towards the cost-effective and environmentally benign DSSC by employing the carbon cathode.

In all summaries, the DSSC comprising of Al-doped TiO_2 nanoparticles photo anode sensitized by Eosin Y dye was found to be leading towards attractive results to acquire the environmentally benign DSSC. Hence, the combination deserves further studies towards minimizing the cost by replacing rare and hence costly Platinum counter electrodes with abundantly available, low-cost carbon cathode. Hence, the present investigation deals with the comparative study of DSSCs comprised of Eosin Y dye-sensitized Al-doped TiO_2 nanoparticles photo anodes along with carbon cathode and platinum cathode for the development of the cost-effective and environment-friendly device.

II. METHODS AND MATERIAL

A. Materials

Titanium Tetra iso-propoxide (TTIP) (Otto Chemicals, Germany), Eosin Y dye and Chloroplatinic acid (H_2PtCl_6) (Ward Hill, U.S.A.), Aluminium Nitrate ($\text{Al}(\text{NO}_3)_3$) and Poly-ethylene Glycol (Otto Chemicals, India), Lithium iodide and iodine all reagents were used without further purification.

B. Experimental

1) Synthesis and characterization of doped TiO_2 nanoparticles

Al-doped TiO_2 nanoparticles have been synthesized as described in previous studies [6-8] and characterized using Raman spectra and FTIR spectra.

2) DSSC Fabrication and Testing

The DSSCs were assembled as follows: cleaned fluorine-doped tin oxide (FTO, Sigma- Aldrich) conductive glasses of size 2*2 cm² have been used as the substrate. The semiconductor paste has been prepared using mortar and pestle as explained in previous studies (4-6).

The semiconductor layer of the Al-doped TiO₂ nanoparticles paste prepared has been coated on an area of 1 × 1 cm² by the doctor blade method and maintained at 10-12 μm by using a double layer of scotch tape. Thereafter, the TiO₂ layer coated on the FTO substrate has been sintered at 450°C for 1 h to enhance the bonding between the semiconductor and the FTO glass. After cooling to 80°C, the prepared photoanodes have been immersed into 0.3mM Eosin Y dye solution in ethanol for 24 hours at room temperature (30°C). The Carbon counter electrode has been produced just by spattering the HB pencil on a 1cm area of FTO glass whereas, the Platinum counter electrode was deposited on cleaned FTO glass by drop-casting the Chloroplutanic solution. The dye-adsorbed photo anodes and counter electrodes have been assembled using a Surlyn polymer spacer, crocodile clips, and alligator pins. An electrolyte prepared using 0.05mM Iodine and 0.5mM lithium tri-iodide in Acetonitrile has been inserted in the space between two electrodes just before connecting for the photovoltaic characterization. The performance of DSSCs was determined by an indigenous solar simulator under irradiation of 100mW/cm² (I_{in}). The current density-voltage (J-V) curves have been obtained on a source measurement unit (Keithley 4200) to obtain J_{sc}, V_{oc}, and FF of DSSCs. The efficiency of DSSCs has been calculated using the formula,

$$\% \eta = \frac{J_{sc} * V_{oc} * ff}{I_{in}} * 100\%$$

Where V_{oc} open circuit voltage and I_{sc} represent the short circuit current density and FF is the fill factor of DSSC and I_{in} is the intensity of incident light.

III. RESULTS AND DISCUSSION

In the previous research [4-6], the synthesis, characterization, and optimization of Al-doped TiO₂ nanoparticles have been illustrated in detail. The summary of the experimental results can be shortly explained as; the cost-effective, easy, and robust sol-gel technique has been used for the synthesis of TiO₂ nanoparticles, which reduces the carbon footprint of the final device.

A. FTIR Study of Aluminium doped TiO₂ nanoparticles

FTIR study confirms the Al-doped TiO₂ nanoparticles bond formation. Ti-O stretching vibrations are observed at 552 for Al-doped TiO₂ nanoparticles whereas bending vibrations of Ti-O-Ti have been observed at 611.86 per cm for Al-doped TiO₂ nanoparticles, indicating the formation of TiO₂ nanoparticles (figure 1).

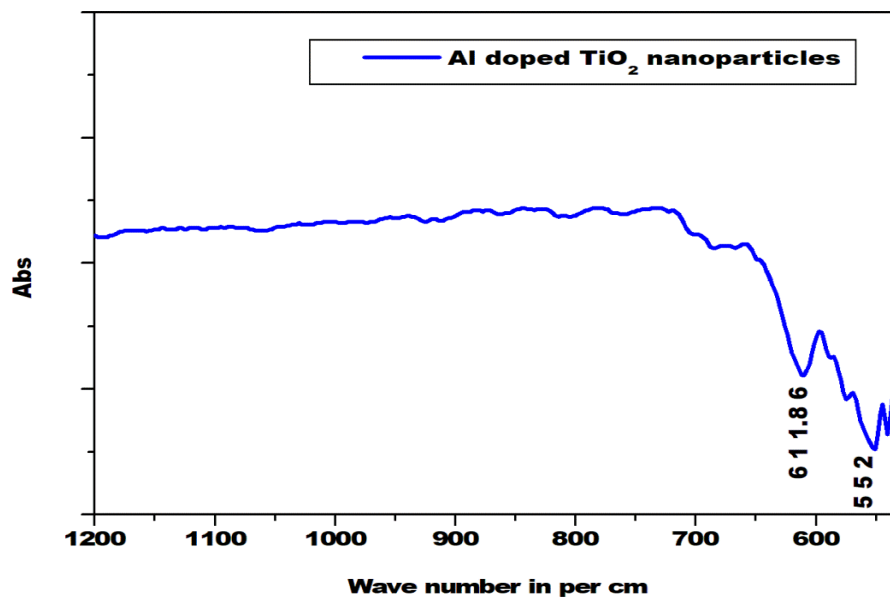


Figure 1: FTIR spectra of undoped TiO₂ nanoparticles,

B. Raman characteristics of Aluminium doped and undoped TiO₂ nanoparticles

Raman spectroscopy has been found a very sensitive tool to confirm the phase of TiO₂ nanoparticles. Figure 2 shows the Raman spectra of undoped and Al-doped TiO₂ nanoparticles.

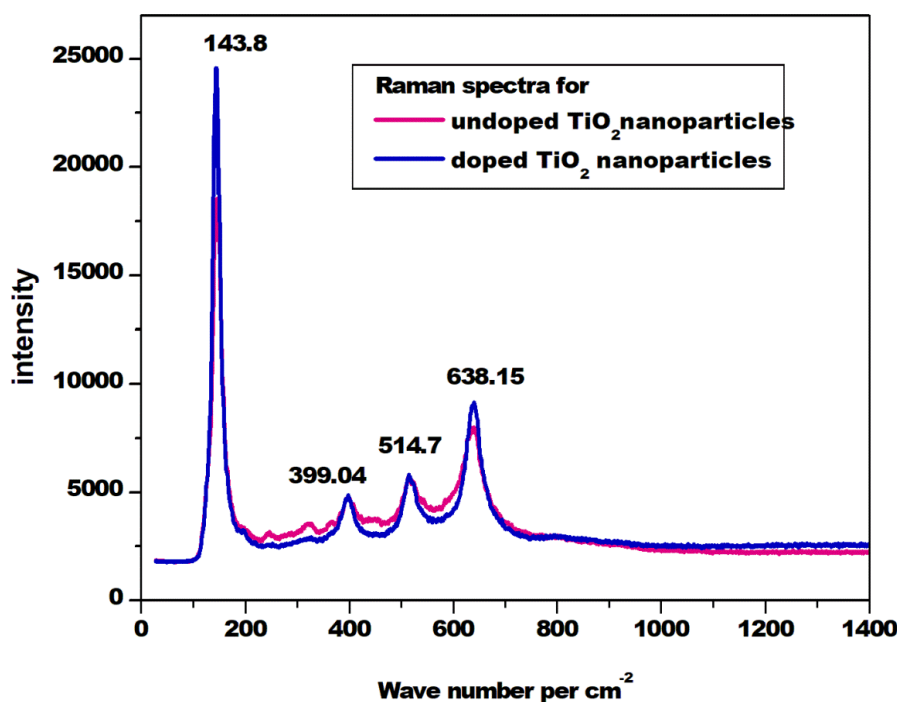


Figure 2: Raman spectra of TiO₂ nanoparticles

Strong bands near 143.8, 399.4, 514.7, and 638.15 per cm have been observed for both undoped and Al-doped TiO₂ nanoparticles. According to factor group analysis, all of these have been assigned to the anatase phase and could be attributed to E_g, B_{1g}, A_{1g}, and E_g respectively [16]. SEM studies supported the spherical shape of nanoparticles (figure 3) and doping of Al in TiO₂ nanoparticles has been confirmed using EDX investigation

[5].Further, AFM investigation of the TiO₂ photo anode, focused on the surface roughness factor causing anchoring of more and more dye on the TiO₂ nanoparticles photo anode [6].

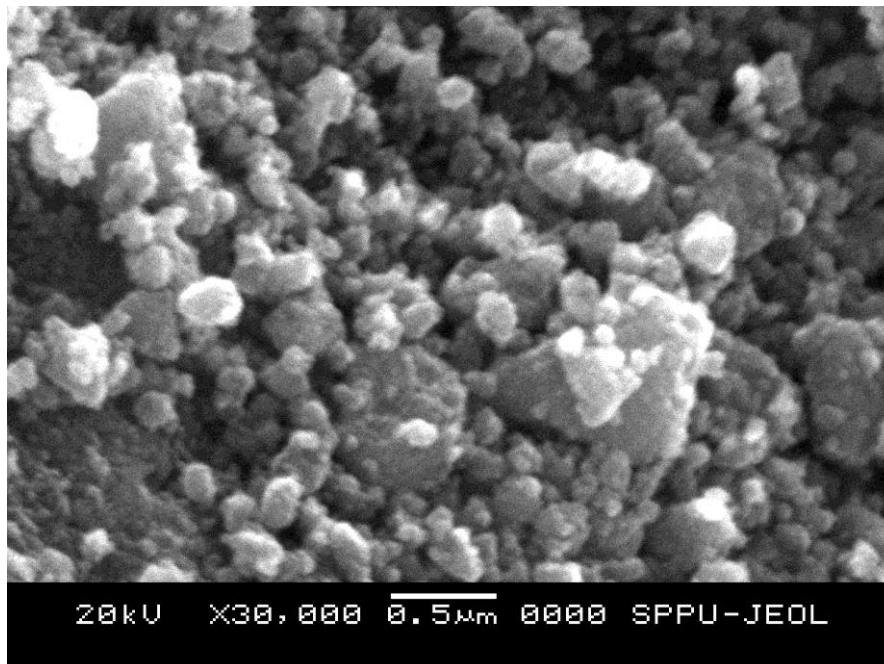


Figure3: SEM image of Al-doped TiO₂ nanoparticles

C. Photovoltaic study of DSSCs

Figure 4 exhibits the comparative study of photovoltaic characteristics of the DSSCs using TiO₂ nanoparticles photo anode and Platinum and Carbon cathode. The study reveals that in the case of the Al-doped TiO₂ photo anode DSSC also, the short circuit current has been found to be decreased when the platinum cathode of the DSSC was replaced by the carbon cathode. However, open circuit voltage has been increased by more than fivefold, and the efficiency by 30 fold.

In Al-doped TiO₂ photo anode DSSC, the fill factor has been found to be increased comparatively when the platinum cathode has been replaced by a carbon cathode. Figure 4 exhibits the photovoltaic characteristics of the DSSCs using Al-doped TiO₂ nanoparticles photo anode and Platinum and Carbon cathode.

In all the devices the photo anode has been sensitized by eco-friendly Eosin Y dye. Table 1 shows the photovoltaic parameters of the DSSC comprised of Al-doped TiO₂ nanoparticles photo anode sensitized by Eosin Y dye and Platinum and Carbon coated photocathodes

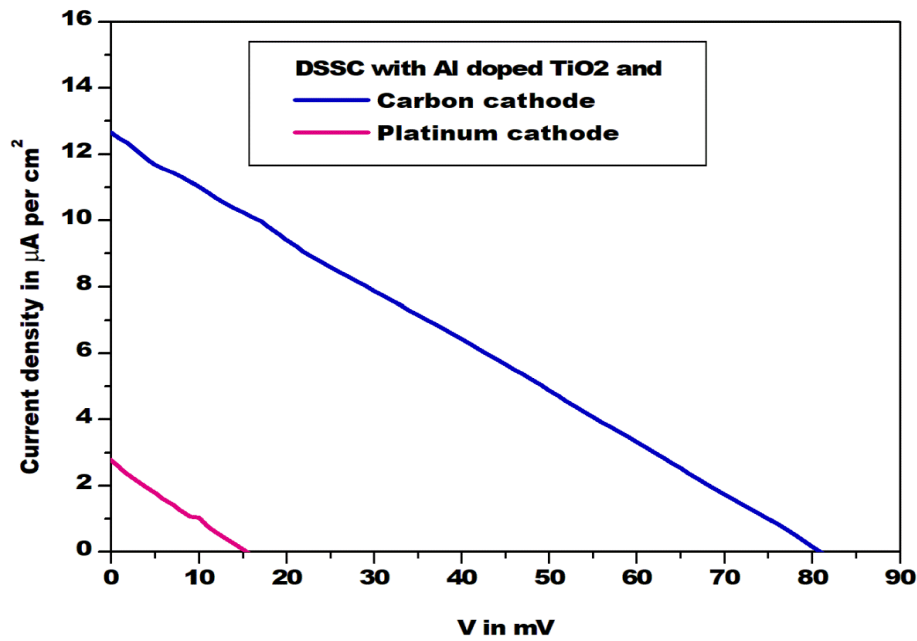


Figure 4: Comparative study of Photovoltaic characteristics of DSSCs using Al-doped TiO₂ photo anode with platinum and carbon cathode

IV. CONCLUSION

It has been observed that the DSSCs using carbon cathode exhibits excellent result like an increase in open circuit voltage and efficiency, as compared to the DSSCs using Platinum cathode and the DSSCs using Al-doped TiO₂ nanoparticles photo anodes sensitized by Eosin Y dye. Thus, the investigation leads to the conclusion that the carbon counter electrode could replace the platinum counter electrode to construct an eco-friendly DSSC using Al-doped TiO₂ nanoparticles photo anode sensitized by Eosin Y dye which will be a step towards eco-friendly DSSC.

Table 1: Photovoltaic parameters - maximum current density (I_m), maximum voltage (V_m), Short circuit current density (J_{sc}), open circuit voltage (V_{oc}), fill factor (FF), efficiency (η) using Eosin Y and Hibiscus dye

DSSC Fabricated using	J_{sc} ($\mu A cm^{-2}$)	V_{oc} (mV)	I_m ($\mu A cm^{-2}$)	V_m (mV)	FF	(%) η
0.05M Al-doped TiO ₂ nps& Pt cathode	12.6	15	1.4	10	0.07	0.00014
0.05M Al-doped TiO ₂ nps& C cathode	2.9	80	6.28	41	1.11	0.00300

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Electrochemical Synthesis of Polyaniline Conducting Composite Films Using Various Dopants

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ABSTRACT

The synthesis of conducting composite films is novel concept as well as challenging technology in thin film. In proposed work conducting composite films were electrochemically synthesized by using various dopants such as zinc sulphate, silver nitrate, potassium chromate and potassium dichromate, ferrous sulphate etc. These composite films were characterized and analysed by various characterization techniques such as X-ray, FTIR, SEM and UV-Vis. Spectroscopy. Conductivity of the films were measured by four probe methods and compared.

Keywords: Electrochemical, Composite films, conductivity, dopants

I. INTRODUCTION

The study of conducting polymer film is innovative concepts as well as the challenges for new technologies [1]. The composite films has unexpected properties like electrical conductivity, simple processibility, a variety of conducting polymer Polyaniline (PANI), polypyrrole (PPY), poly(phenylene)s (PP), Poly(p-phenylene) (PPP), polyacetylene (PA), poly(p-phenylenevinylene) (PPV), poly(3,4-ethylene dioxythiophene) (PEDOT), polyfuran (PF) and other polythiophene (PTh) derivatives, etc, have a special interest in the field of nano science and nanotechnology [2-5] The Polyaniline is a conducting polymer of the semi flexible class polymer family. Among all the over classes polyaniline is of much significance worldwide because of its unique properties. The synthesis of polyaniline was firstly shown in the mid 19th century by Henry Lethe by the working on the electrochemical and chemical oxidation products of aniline in acidic media [6]. The electrochemical study of Polyaniline composite films synthesized with various dopants like potassium chromate, potassium dichromate, silver nitrate, zinc oxide and ferrous sulphate has been carried out. The electrochemically synthesized PANI/ZnO film and films with other dopants were characterized by electrochemical technique, the ultraviolet (UV), Fourier transform infrared spectroscopy (FTIR), scanning electron microscope (SEM) and four probe technique for conductivity measurement. This comparative study observed that as compared to PANI/K₂CrO₄, PANI/K₂Cr₂O₇, PANI/AgNO₃ and PANI/FeCl₃ films.

II. METHODS AND MATERIAL

In experimental procedure the freshly prepared 0.1 N aqueous solution of aniline and pyrrole in double distilled water and proper concentration of dopants and electrolyte. The pH of aqueous medium was maintained by using phosphate buffer solution. The electrochemical polymerization of aniline and pyrrole was characterized by galvanostatic method in one compartment there is a three electrode system electrochemical cell. In electrochemical cell, the three electrode system was used among that platinum foil was used as a counter electrode (cathode), the indium tin oxide coated glass plate was used as a working electrode (anode) whose resistance is 50Ω and silver-silver chloride (Ag/AgCl) as a reference electrode. All these electrodes were immersed in an electrochemical cell having 50 ml proper concentration reaction medium was used for each reaction [7-9]. The pH of electrolyte is measured by calibrated ELICO LI120 pH meter. The electrochemical characterization was carried out by galvanostatic method, by maintaining a current constant overall reaction. Experimental process, various composite polymer films has prepared by electrochemical synthesis for taking proper concentration of monomer, electrolyte and dopants and maintain the various process parameters.

TABLE 1. Monomer ,electrolyte, dopant concentrations

Sr. No.	Monomer/ concentration	Dopant/ concentration	pH	Current density mA/cm ²	Polymerization Potential (mV)
1	Aniline (0.1M)	K ₂ CrO ₄ (0.05 M)	2.5	0.5	670
		K ₂ Cr ₂ O ₇ (0.0025M)	1.5	0.5	676
		FeCl ₃ (0.05 M)	2.5	0.5	700
		AgNO ₃ (0.004 M)	2	0.5	672
		ZnO (0.2M)	3.5	0.5	650

III. RESULTS AND DISCUSSION

The electrochemically synthesized composite films of PANI with different dopants and electrolyte are prepared with proper concentrations, which affecting its morphology and some of its properties. The previous investigated work electrochemical polymerization of aniline was carried out in micellar solutions of camphor sulphonic acid and cetyltrimethyl ammonium bromide [10]. It was observed that the effects of various synthesis parameters on electrochemical polymerization of aniline and measured potentials at constant current density 0.5mA/cm².

1. The influence of pH in electrochemical synthesis of various composite films

The PANI composite polymer films were synthesized by various pH and measured the polymerization potentials. The figure 1.shows influence of pH (1, 1.5, 2.5,3). We have recorded low polymerization potential of PANI/K₂CrO₄ at pH 2.5and high polymerization potential of PANI/FeCl₃at pH 2.5 and current density was 0.5mA/cm².

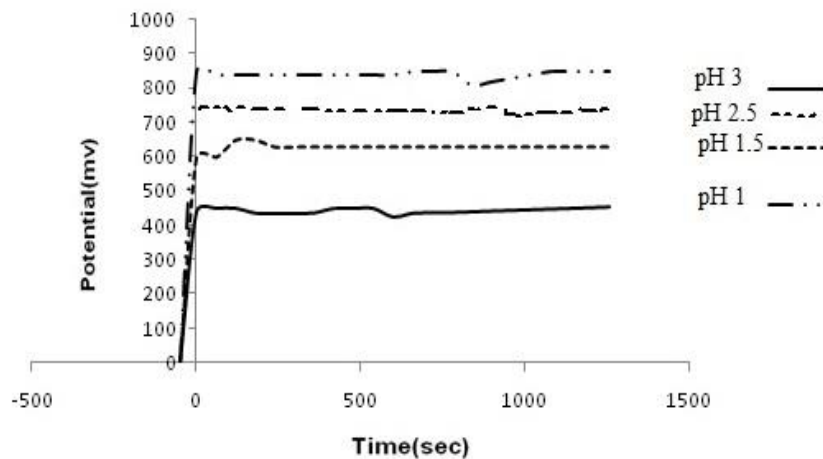


Figure 1. Influence of pH in PANI with different dopants.

2. The Ultra-violet spectroscopy of composite films

Figure 2 (a-e) shows UV spectroscopy of electrochemically synthesized composite polymer films. The measurement of the band gap of nanomaterials and thin films by using UV spectroscopy, the band gap is the energy difference between valence band and conduction band. It gives the conductivity of materials. The peak shows absorption of sample, following graphs shows UV spectrum of PANI composite films with different dopants.

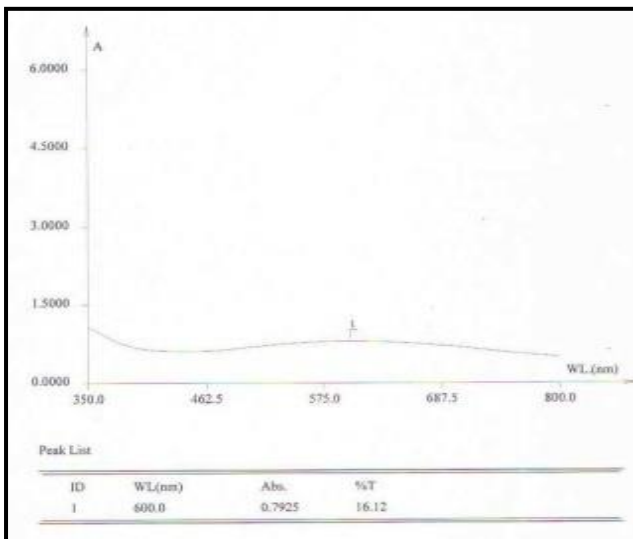
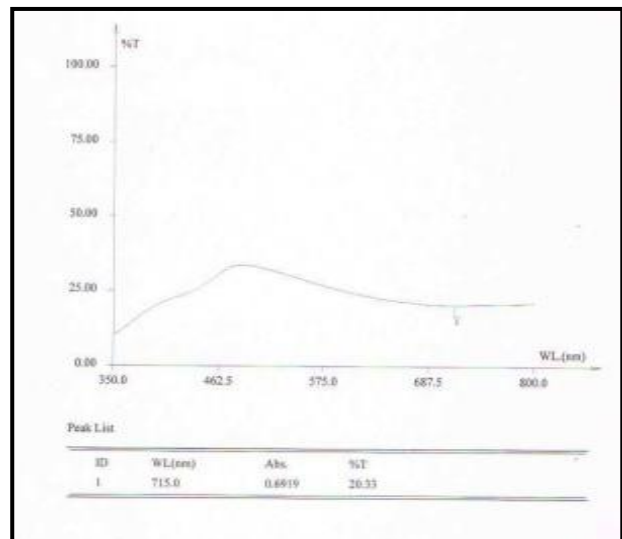
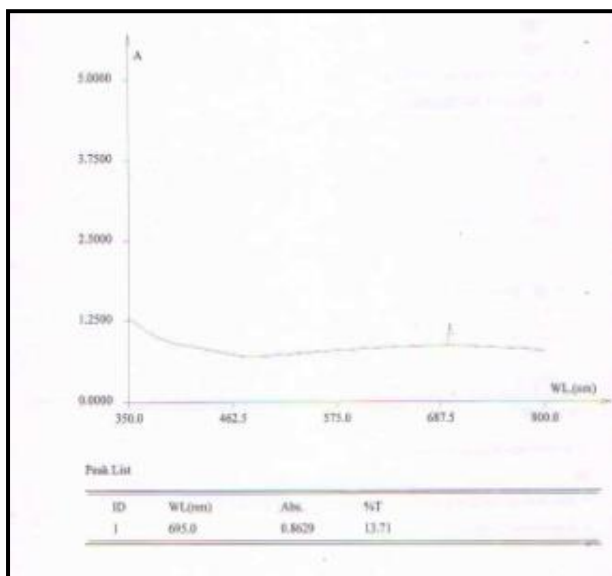
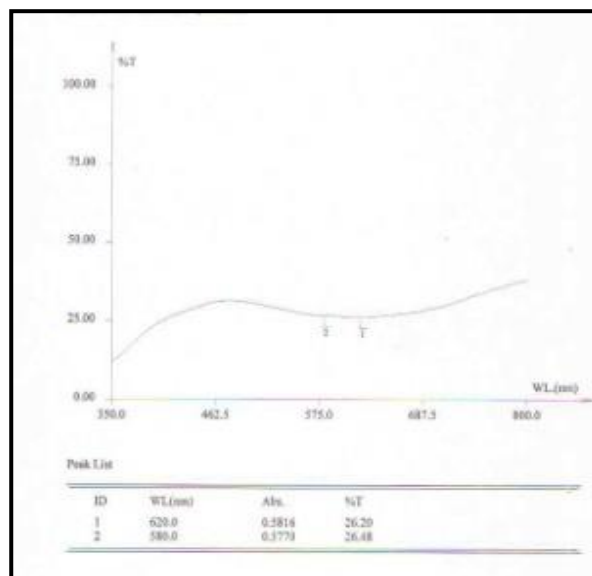
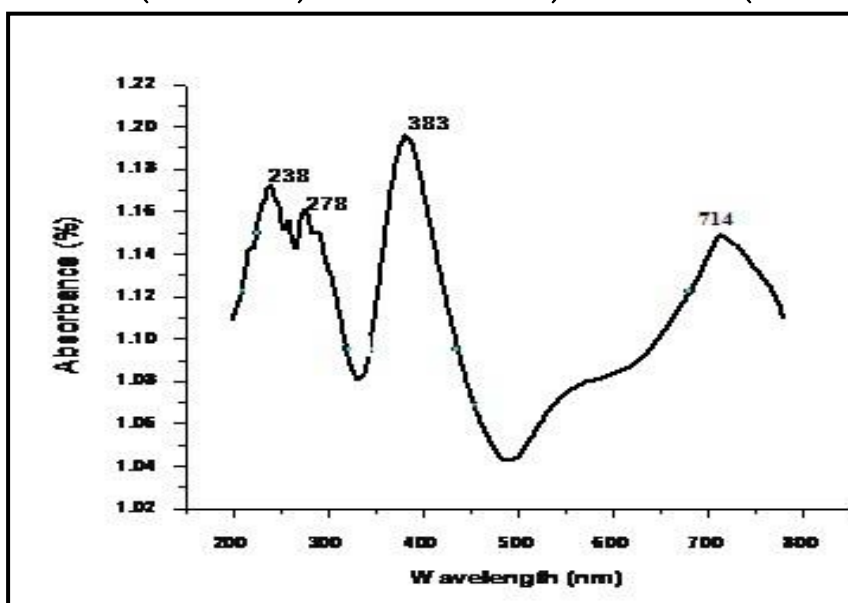


Figure 2. a) PANI/K₂Cr₂O₇ (WL-600 nm)



b) PANI/AgNO₃ (WL-715 nm)

c) PANI/FeCl₃ (WL-695 nm)d) PANI/K₂CrO₄ (WL-580 nm)

e) PANI/ZnO (WL-383 nm)

3. The conductivity measurement of composite films

The four probe technique (S.E.S. Instrument Pvt. Ltd. Rookie) was used for the measurement of electrical conductivity of PANI/K₂Cr₂O₇, PANI/K₂CrO₄, PANI/FeCl₃, PANI/AgNO₃ and PANI/ZnO composite polymer films prepared on ITO coated glass plate by electrochemical synthesis. The four probe method is one of the standard and most widely used methods for the measurement of resistivity of semiconductors.

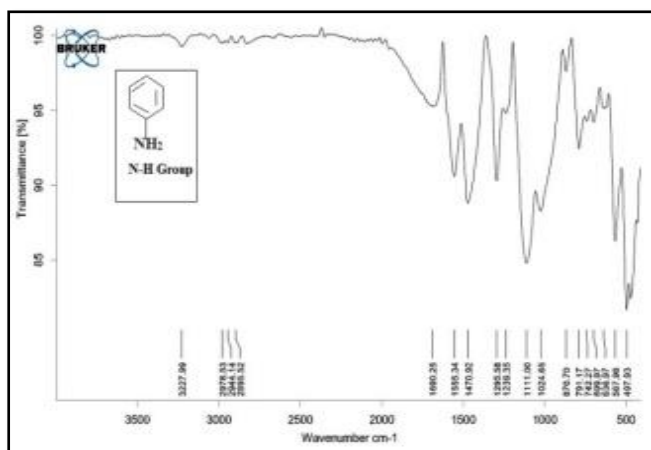
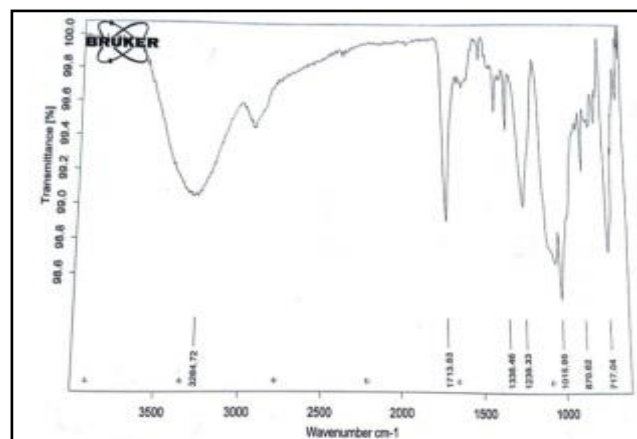
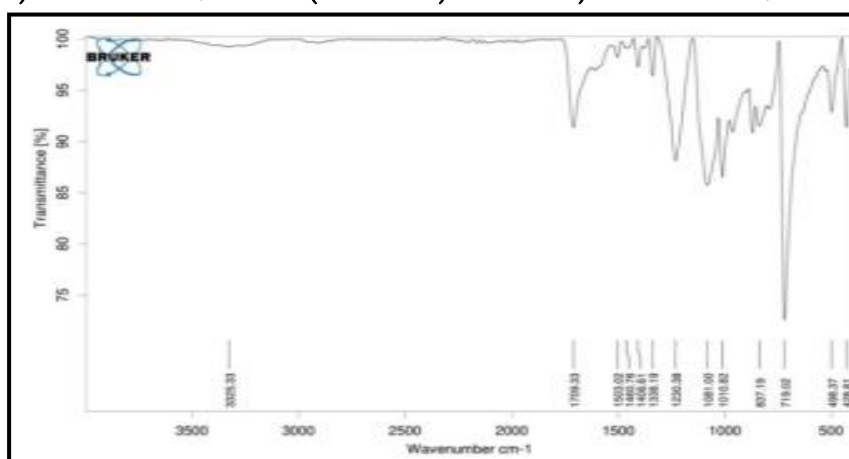
Table 2 shows conductivity of various composite polymer films, along which PANI/FeCl₃ and PANI/AgNO₃ polymer film shows high conductivity at polymerization potential 700 mV and 672 mV respectively for current density 0.5 mA/cm² at pH 2 and 2.5

TABLE 2: Band gap energy and conductivity of composite films

Sr.No.	Composite polymer films	Band gap Energy (eV)	Conductivity (S/cm)
1	PANI/K ₂ CrO ₄ /ITO	2	0.0154
2	PANI/K ₂ Cr ₂ O ₇ /ITO	2.07	0.0162
3	PANI/FeCl ₃ /ITO	1.78	0.0172
4	PANI/AgNO ₃ /ITO	1.73	0.0180
5	PANI/ZnO/ITO	2.52	0.0175

4. Fourier Transforms Infrared Spectroscopy of Composite Films

Figure 3 (a-c) shows the FTIR spectra of PANI with K₂Cr₂O₇, FeCl₃ and K₂CrO₄ composite polymer films. The peaks at 870.7cm⁻¹ and 1024cm⁻¹ are attributed to C-H wagging, the characterization peaks at 1555.34cm⁻¹ and 1470.92cm⁻¹ corresponds to the C=C stretching, whereas peaks at 1709.33cm⁻¹ and 1338cm⁻¹ represent the C=N and C-N bonds respectively. The occurrence of small peaks at 3227cm⁻¹, 3254cm⁻¹ and 3325cm⁻¹ of figure (a-c) is assigned to presence of N-H stretching vibrations respectively [11].

Figure 3. a) FTIR of PANI/K₂Cr₂O₇ (N-H 3227)b) FTIR of PANI/FeCl₃ (N-H 3264)c) FTIR of PANI/K₂CrO₄ (N-H 3325)

5. Study of x-ray spectroscopy of PANI composite films

The X-Ray diffraction of PANI shows amorphous in nature. In figure 4 broad peak was observed at about 2θ

$=21.8^\circ$. The broad peak is characteristic of amorphous PANI and are due to the scattering from PANI chains at the inter planer spacing.

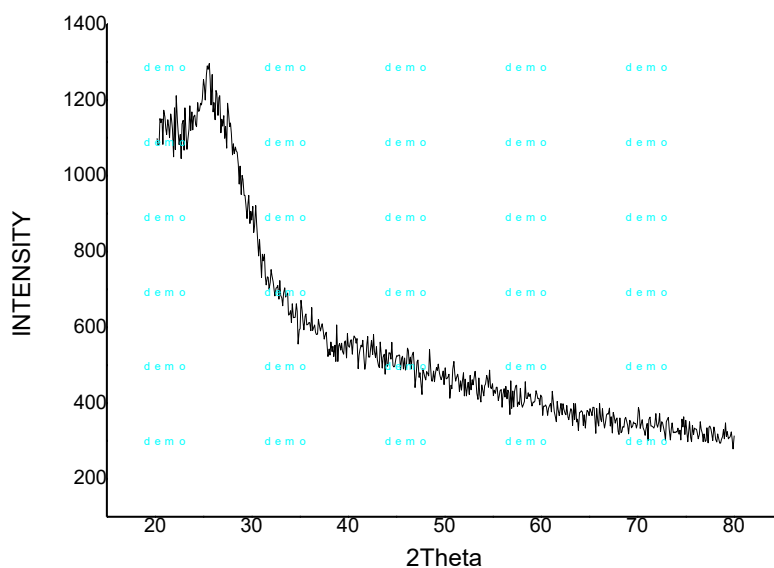


Figure 4. X-ray spectroscopy of PANI composite films

The X-ray spectroscopy analysis of PANI composite films used for measurement of polymer chain separation S and average crystallite size D . For PANI composite film, ($\theta = 25.31$) chain separation was given as $S = 43.52$ nm, and average crystalline size is calculated it is given as $D = 63.15$ nm.

6. Scanning electron microscopy of composite Films

The figure 4. (a-e) shows scanning electron microscopy image of PANI composite composite films using various dopants such as potassium dichromate, potassium chromate, silver nitrate, ferrous sulphate and zinc oxide. The images show porous and globular in structure.

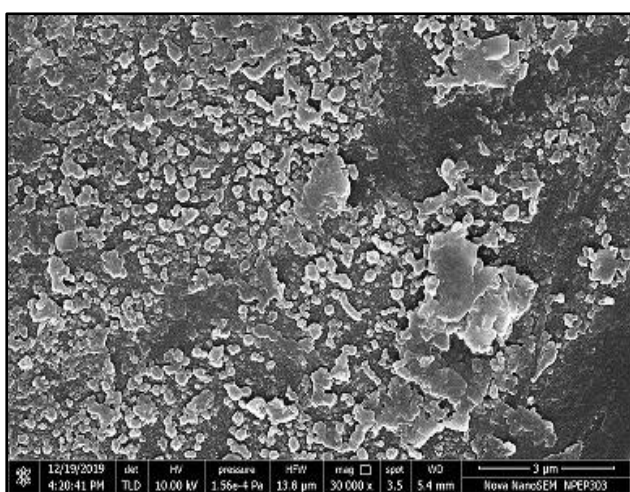
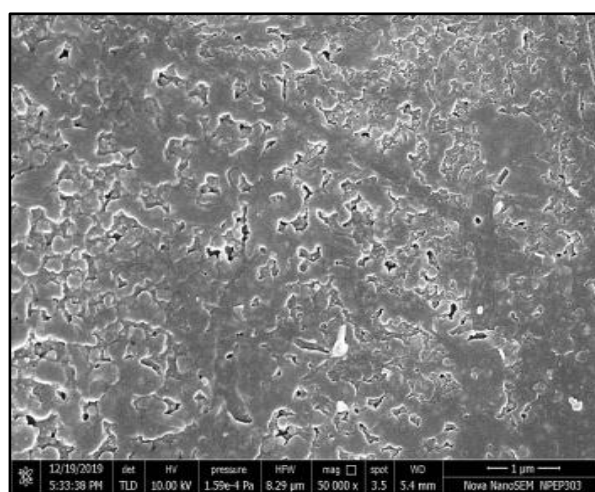
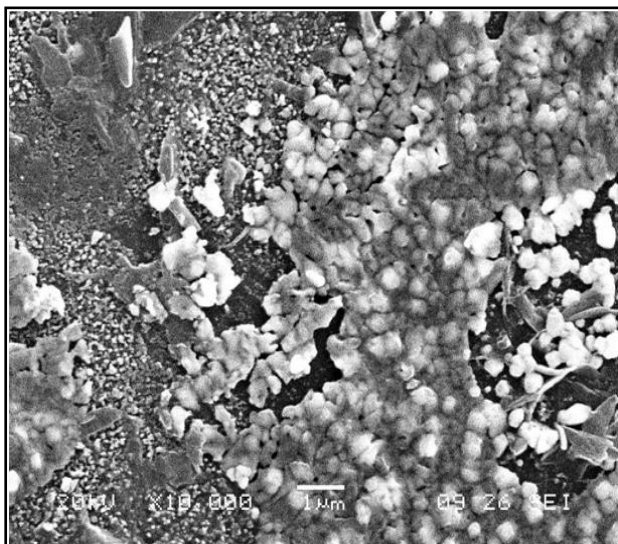
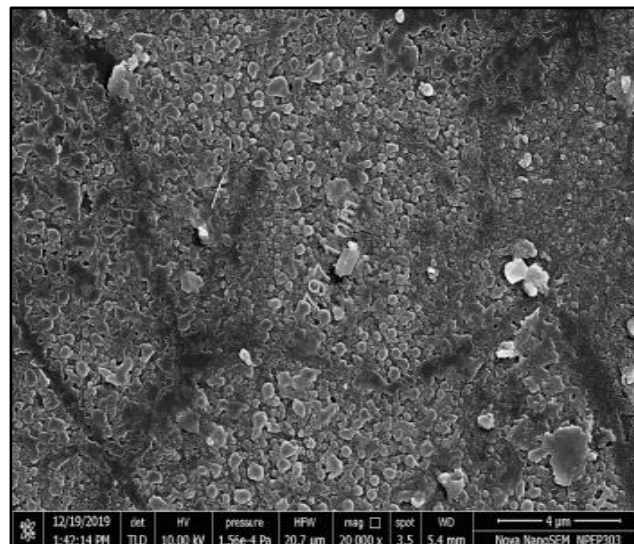
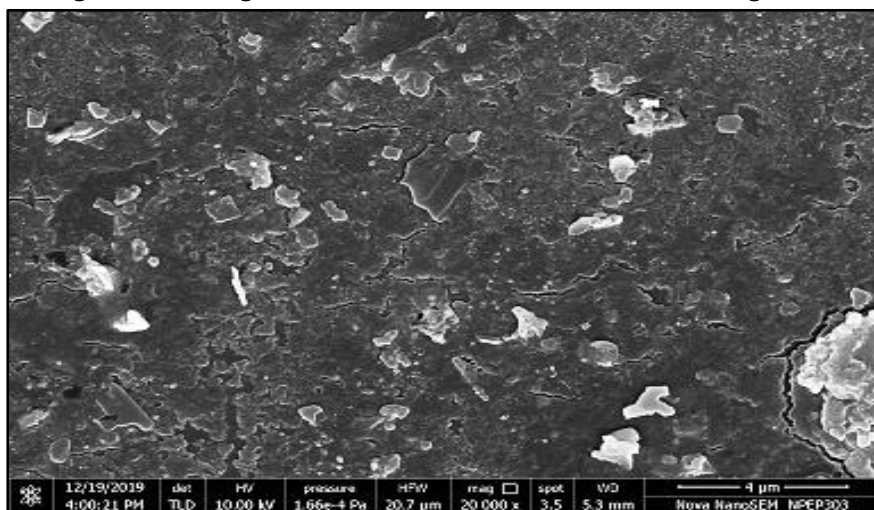


Figure 4. a) SEM image of PANI/K₂Cr₂O₇



b) SEM image of PANI/K₂CrO₄

c) SEM image of PANI/AgNO₃d) SEM image of PANI/FeCl₃

d) SEM image of PANI/ZnO

IV. CONCLUSION

The electrochemically synthesized composite films with various dopants were compared by its conductivity. The conductivity of PANI/FeCl₃ and PANI/AgNO₃ composite films were higher than other dopants but all composite films shows conductive. Here PANI/FeCl₃ better composite film for fabrication of sensor because it is simple, low cost and highly stable. These composite film also provide a polymer matrix having a good porosity, high conductivity, uniform surface morphology and good mechanical and environmental stability.

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Carbon Nanotubes in Biomedical Applications

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ABSTRACT

Nanotechnology involves minimization of the size of molecules that are designed in such a way that it acts at bimolecular level. Nanotechnology-based delivery systems are benefiting the consumers by improving the therapeutic index and reducing the side effects. Surface modification methods are very useful to make biocompatibilities of CNT in biological systems and improve propensity to cross cell membranes. Functionalized CNT can be developed as biomedical application.

Keywords: CNT, Nanotechnology, Surface modifications, biomedical application.

I. INTRODUCTION

Nanotechnology: Nanotechnology brings evolutionary changes in everyday's life. It has become a well-known field in the last three decades [1, 2]. Nanotechnology explores many facts about the structures and properties of materials. CNTs (Carbon Nano tubes) are the members of the fullerene family by Kroto et al. [3] in 1985. Buckyballs are spherical fullerenes, whereas CNTs are cylindrical, with at least one end typically capped with a hemisphere with the buckyball structure. CNTs, also known as sp^2 -bonded carbon atoms [4, 5].

Types of CNTs: CNTs can be divided into three categories on the basis of number of tubes present in the CNTs.

Single-walled CNTs: Single-walled CNTs (SWCNTs) are made of a single graphene sheet rolled upon itself with a diameter of 1–2 nm (Figure 1. A). The length can vary depending on the preparation methods.

Double-walled CNTs: These nanotubes are made of two concentric carbon nanotubes in which the outer tube encloses the inner tube, as shown in (Figure 1. B)

Multi-walled CNTs: These tubes have an approximate inter-layer distance of 0.34 nm (Figure 1.C) [7].

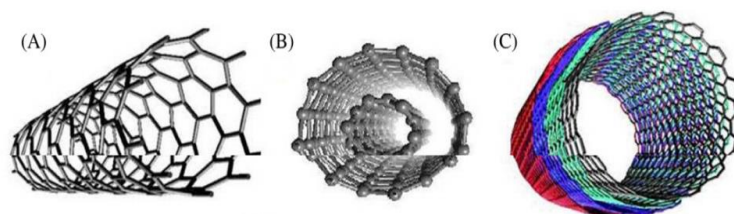


Figure 1. (a) Single-walled CNTs (b) Double walledl- CNTs (c) Multi-walled CNTs

[Source: Beg, S.,.... 2010. J. Pharm. Pharmacol. 63, 141-163]

Functionalization of Carbon Nanotubes

The process of functionalization imparts high solubility with enhanced biocompatibility to the CNTs. Accordingly, functionalized and accumulated in organs. Functionalized CNTs are highly suitable for encapsulation of therapeutic molecules for multimodal-targeted delivery [6]. Functionalization is broadly classified into two major categories: noncovalent functionalization and covalent functionalization. Various approaches for functionalization of CNTs are elaborated below:

Covalent Functionalization: Covalent functionalization creates a more secure conjunction of functional groups, surfactants, polymers, drugs, or other biomacromolecules [7]. In order to achieve such types of functionalization, CNTs are subjected to treatment with chemical and high temperature reflux conditions. Complete control over such chemo- or region-selective additions, however, is somewhat tricky to achieve, as it involves particular groups,. Moreover, such reactions often require extreme conditions for covalent bonding. Furthermore, characterization of such functionalized nanotubes to determine the precise functionalization location and mode of addition are also very difficult. In drug delivery perspectives, Drug molecules to CNTs surface have been for therapeutic biomacromolecules,

End-defect functionalization

This is a special type of covalent functionalization, where oxidation of native pristine CNTs is carried out using strong acids, such as H_2SO_4 or HNO_3 . This causes reduction in the length of CNTs, followed by ring opening at both the ends. Furthermore, it generates carboxylic groups at the “end,” on the surface of tips, after the ring opening due to 1,3-dipolar cycloaddition reaction. Consequently, the process is also called carboxyl functionalization, which is used for increasing the dispersibility of CNTs in aqueous solutions [8]

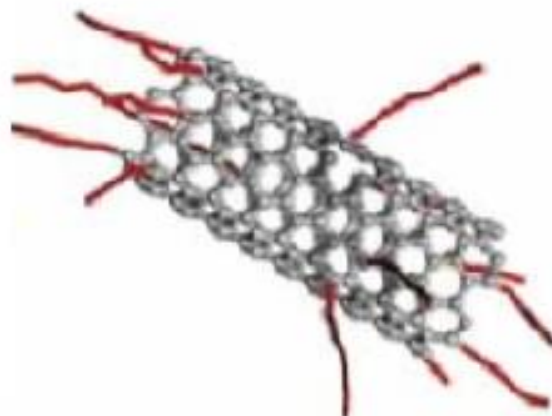


Figure 2.(a) End Defect functionalization

Side-wall functionalization

Such functionalization is primarily used for the dispersion of CNTs in aqueous solutions, which can be assisted by covalent binding of surfactants, proteins, and peptides on the surface of CNTs. Furthermore, sidewall functionalization can also be achieved by directly reacting CNTs with organic species such as nitrenes, carbenes, and other radicals to generate respective functional moieties. In this regard, SWCNTs are more susceptible toward sidewall functionalization than MWCNTs. CNTs reportedly have extremely high surface areas, large aspect ratios, and remarkably high mechanical strength.

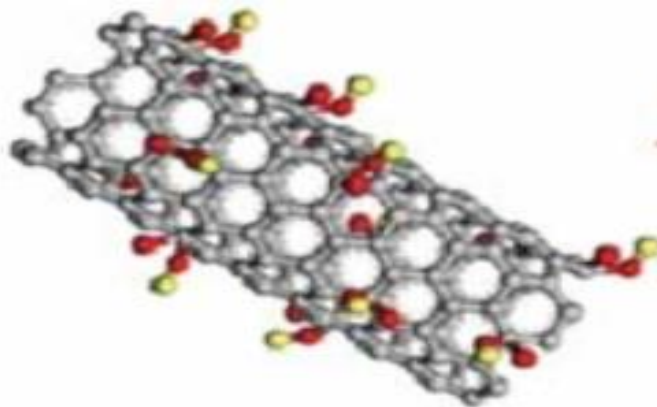


Figure 2(b) side-wall Functionalization

Multifunctional applications of Carbon Nanotubes

Carbon nanotube-nanoreservoirs CNTs have been recently used as nanocarriers for controlled drug delivery of therapeutic molecules, due to their electric property and hollow tubular structure. Likewise, selective functionalization of CNTs with polymers having electrical conductivity provides controlled drug delivery upon electrical stimulation. Functionalized CNTs have been used for the delivery of biomolecules and drugs to the desired sites.



Figure 3. CNT as nanoreservoirs

II. METHOD

Non-covalent method (Physical modification), interaction is achieved without disturbing the system of graphene sheets.[9,10] This could be done by exposing the CNTs to a severe environment like concentrated sulfuric acid which causes high instability and breaking of hexagonal structure within the surface architecture which is responsible for the generation of reactive regions on the surface.

III. RESULTS AND DISCUSSION

Noncovalent SWCNT reactive surface surfactants, polymers and biopolymers can be bonded involving π - π stacking. This extension of pi electrons helps in improving the conductance of material and thereby increases its application in several fields. Use as delivery agents, chemical functionalization is a preferred approach for sensing in nanosensors.

IV. CONCLUSION

With the remarkable development of nanotechnology-based approaches in healthcare sector, CNTs always regarded as a new and interesting type of materials, have a unique set of electrical, mechanical and thermal properties. It is clear that novel technologies Nanotube functionalization methods lead to less toxic CNTs especially for wide-ranging applications to biomedical and engineering.

V. ACKNOWLEDGEMENT

The Authors are thankful to Sarwar Beg and Jurgen Abraham for understanding functionalization of Carbon Nanotubes as a smart and nanocarriers.

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Study of POA-PVS-DBS Composite Films for the Development of Gas Sensor

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ABSTRACT

In the present investigation, the composite films of poly(o-anisidine)-polyvinylsulphonic acid-dodecylbenzenesulphonic acid (POA-PVS-DBS) were synthesized on silver electrode, using electrochemical polymerization technique. These synthesized composite films were characterized by electrochemical technique, conductivity measurement, UV-visible spectroscopy, Fourier transform infrared (FTIR) spectroscopy and Scanning electron microscopy (SEM). The optimal film growth was achieved for synthesis of the poly(o-anisidine) composite films in the presence of polyvinylsulphonic acid-dodecylbenzenesulphonic acid (PVS-DBS). The synthesized POA-PVS-DBS composite films exhibit good electrochemical properties, conductivity with a uniform porous surface morphology which could be used for development of gas sensor.

Keywords: o-anisidine, galvanostatic method, composite film, gas sensor

I. INTRODUCTION

Among the polyaniline derivatives, o-anisidine has been extensively used because of their easy polymerization, high electrical conductivity, chemical stability and ability to form freestanding films. However, the role of structural & mechanical behavior of poly (o-anisidine) for its application to gas sensor is yet to be explored. The stability of polymer film depends on anion size. The anions play an important role during the electrosynthesis. The anions are small sized (inorganic) anions e.g., (Cl^- , NO_3^- , HSO_4^-), medium sized (mainly organic) anions e.g., p-toluenesulphonate (pTS) and large sized polymeric anions e.g., dodecyl benzene sulphonic acid (DBS), polyvinyl sulphonate (PVS) [1]. The POA film can be doped with small sized anion which can be incorporated into the film on oxidation. But, the polymer film formed with small anion has poor stability. To overcome this problem, the POA films needs to be synthesized with the large sized anion like polyvinyl sulphonate (PVS), p-toluene sulphonate (pTS), dodecyl benzene sulphonic acid (DBS) and their various combinations.

The conducting properties and surface morphology of the polymer film depends on the method of synthesis and various electrochemical process parameters such as, monomer, dopant and co-dopant concentration, type of co-dopant, synthesis temperature, pH of the reaction medium and applied current density during the

electrochemical polymerization [2-11]. Electrochemically synthesized conducting polymer films offers lot of advantages because it is very simple, low cost, carried out in a single compartment glass cell, reproducible and the synthesized films has desired thickness and uniformity [12-19]. By using electrochemical polymerization technique, thin films of conducting polymers of desired physical and chemical properties can be synthesized. Conducting polymers have extensively used in biosensors [20], electronic devices [21], electrochromic display devices [22], EMI shielding [23], light weight batteries [24], and electrochromic materials [25]. The basic issues related to electrochemical polymerization and characterization of substituted polyaniline to explore the possibility to utilizing these as alternatives of polyaniline in the technological oriented applications has been the focal point of research activity [26, 27].

It is reported that the large sized anions are not able to leave the polymer; it can result in a stable polymer film. The polymer synthesized with large sized anions causes the ions inserted into the films to maintain the charge neutrality during reduction, which is very useful for the gas sensing. The presence of polyelectrolyte in the polymerization solution results in increased growth rate, higher compactness and improved environmental stability of the synthesized film [28-30]. Few researchers had been studied the influence of large sized ions like PVS, pTS, DBS on the physical, chemical and electrical properties of various conducting polymers during their electrochemical synthesis [31-35]. The aim of the present research work is to study the influence of PVS-DBS combinations of co-dopants on the physical, chemical and electrical properties of electrochemically synthesized POA films so that it can be used for the gas sensing applications.

II. EXPERIMENTAL

The dopants polyvinyl sulfonic acid (PVS) (Aldrich), and dodecyl benzene sulfonic acid (DBS) (Loba Chemie) were used. All above dopants were obtained from Rankhem Ranbaxy New Delhi (INDIA). An aqueous solution of o-anisidine, dopant and co-dopants were prepared in distilled water. The o-anisidine monomer was distilled twice before use. The reference electrode was kept in close proximity to the working electrode to minimize the electrolytic ohmic drop. The pH was adjusted by adding nitric acid (HNO_3) or sodium hydroxide (NaOH). The electropolymerization of o-anisidine was carried out by galvanostatic technique, in one compartment electrochemical cell on Silver electrode. The reference electrode was Ag/AgCl. All three electrodes were placed vertically in cell. An 80 ml solution was used for each reaction. The pH of the electrolyte was measured by a calibrated ELICO LI120 pH meter.

We have taken 0.2:0.4:0.1M (o-anisidine: PVS: DBS), 1.0 pH and $1\text{mA}/\text{cm}^2$ applied current density at room temperatures during synthesis of POA films respectively. The deposited POA films were tested for conductivity, uniform and porous surface morphology. The electrochemical characterization was carried out by galvanostatic technique, which maintains a constant current throughout reaction. The conductivity was measured by using four-probe technique. The optical absorption studies of these films were carried out in the wavelength range 300-900 nm using UV-visible spectrophotometer Shimadzu 1601. The FTIR spectrums were recorded using Shimadzu FTIR-8400 series, in the region $400\text{-}4000\text{ cm}^{-1}$. The scanning electron micrographs were recorded using JEOL JSM-6360A Analytical system.

III. RESULTS AND DISCUSSION

Galvanostatic study of POA-PVS-DBS composite film

The potential-time curve recorded during the synthesis of POA-PVS-DBS film is shown in the Fig. 1. In fact, the behaviour of the galvanostatic synthesis overshoot during the first few seconds probably indicates the formation of dimmers and oligomers. After this, the potential remains constant suggesting that building up of the film proceeds according to the full thickness of the polymer.

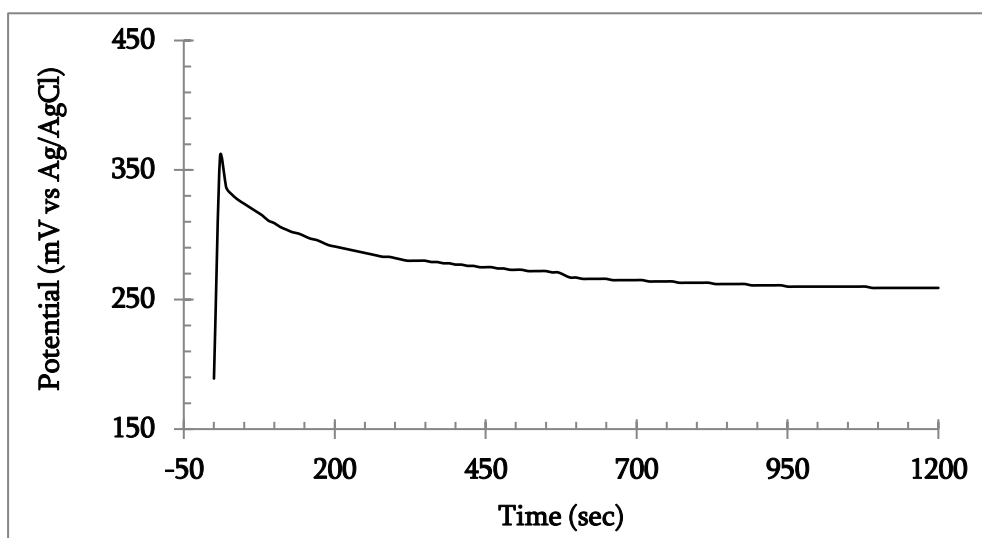


Figure. 1 Potential-time curve of POA-PVS-DBS film for 1.0 pH, 1mA/cm² current density a room temperature.

The POA films are galvanostatically synthesized with 0.2:0.4:0.1M (o-anisidine: PVS: DBS), 1.0 pH and 1mA/cm² applied current density at room temperature respectively. In order to have high conductivity, the polymerization potential should be minimum [03]. The polymerization potential 259 mV and conductivity 3.21×10^{-2} S/cm was recorded for PVS-DBS. It shows very good resemblance with polymerization potential recorded during the polymerization. This reveals that, the synthesized POA film with PVS-DBS co-dopants will have higher conductivity and provides more stable polymer matrix which is more advantageous for gas sensing.

UV-Visible study of POA-PVS-DBS composite film

The UV-visible spectra of synthesized POA film with PVS-DBS co-dopant is shown in the Fig.2. A green coloured film of PVS-DBS co-dopant shows a peak appearing at 300nm which is assigned to a $\Pi \rightarrow \Pi^*$ electronic transition between the valance and conduction bands of the polymer. It shows a strong peak appearing at 600nm, attributed to an intermolecular charge transfer excitation associated with quinide ring whereas a tail at 800nm indicates that the formation of emeraldine salt (ES) [27, 35].

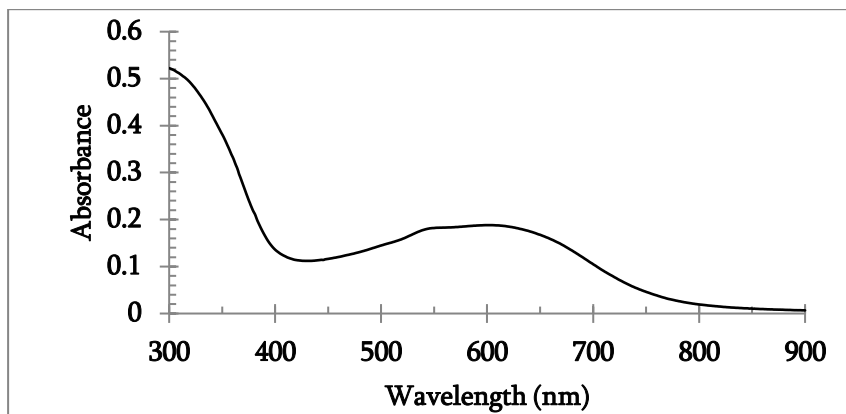


Figure 2. UV-visible spectra of POA film with PVS-DBS co-dopants.

FTIR study of POA-PVS-DBS composite film

The FTIR assignments of POA film with PVS-DBS co-dopant are given below.

The characteristic band at 3435.0 cm^{-1} arises mainly from N-H stretching and the bands at 1656.7 cm^{-1} arises from C=N group while the bands at 952.8 cm^{-1} arises from O-C=O. The characteristic band at 1423.4 cm^{-1} arises mainly from C-O group whereas the bands at 1315.4 cm^{-1} arises from C-H stretching. Thus, FTIR assignments results confirm the structure of POA film [35].

SEM study of POA-PVS-DBS composite film

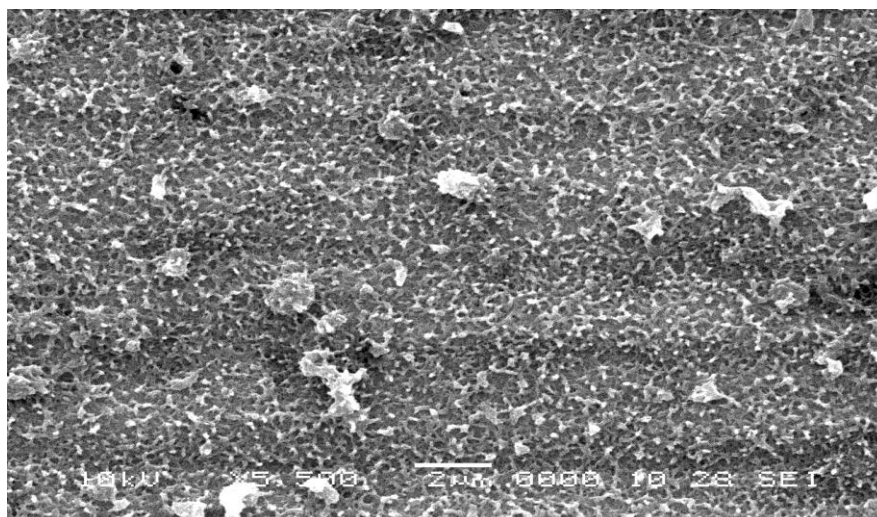


Figure 3. SEM picture of synthesized POA film with PVS-DBS co-dopant.

The surface morphology of the POA film using scanning electron microscope synthesized with PVS-DBS co-dopant is shown in the Fig.3. It shows the sponge like structure with whitish and blackish colours clearly indicate the presence and effect of PVS-DBS co-dopants. The POA film doped with PVS-DBS co-dopants shows a sponge like matrix with excellent porosity which is advantageous for gas sensing.

IV. CONCLUSION

The POA films with PVS-DBS co-dopant have been successfully synthesized. The conductivity of the POA film synthesized with PVS-DBS co-dopants was found to be 3.21×10^{-2} S/cm. The UV-visible spectra show the systematic changes with the conductivity. The FTIR spectra confirm the formation of POA in the presence of PVS-DBS co-dopants. The POA-PVS-DBS composite films show good electrochemical properties, conductivity as well as uniform and porous polymer surface morphology which is more advantageous for gas sensing.

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The Study of ICT Based Education with Relevance to English Literature

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ABSTRACT

The expertise and abilities of teachers to use Technology in the classroom are one of the key aspects. Nowadays ICT have an impact on how many disciplines are taught and learned at higher education institutions, especially courses in English literature. ICT may also be a potent and adaptable teaching tool for English literature. The ultimate work of this study is to investigate the challenges and solutions that available to students and teachers when learning the English language. Also, in order to determine the functions that would assist and support of remedial ICT tool in teaching learning process.

Keywords: ICT, English Literature, ICT Tools.

I. INTRODUCTION

Information and communication technology (ICT) is widely used in education today. ICT comprises computers, mobile phones, the internet, and electronic delivery devices including radios, televisions, and projectors, among others. ICT is successfully employed for instruction, learning, and evaluation, and it is viewed as a potential instrument for transforming and reforming education. Technology generally widens access to education. Learning can occur whenever, anywhere, and with the use of ICT. For instance, students can access web based (online) course materials whenever they choose seven days a week [1]. In tele-conferencing classes, professors and students can easily and concurrently converse. Thanks to ICT, learning and education are no longer solely dependent on printed materials. Most higher education institutions teach programs in English literature. The repetitive practice of teaching and studying English literature in the same manner every day wears both teachers and students out. So, ICT may be a very useful tool for adding diversity to the teaching of English literature by removing the element of monotony from it and injecting freshness into it every day and every minute [2]. By getting students interested in and involved in what is being taught, ICT may help make the classroom more interesting.

II. LITERATURE REVIEW

There are several researcher and academician focused on ICT enabled Teaching, learning methodology in general English as well as English literature classroom to improve performance of both teacher and students.

Siti Hawa Mohd. et. al. focused on a study that looked into how ICT was used in English literary classes at a university that was Islamic. The usage of ICT in English literature lessons was the subject of interviews with a few chosen English literature teachers. The study's outcomes will be discussed along with ideas for how to employ ICT applications to enhance English literature teaching and learning.

A. Zainal discussed on how Teacher educators from secondary schools used ICT to teach English literature to second-language (L2) students. The Interview method followed for collection of data with lesson video and analysing the interview data using TPCK model put forth by Mishra and Koehler. The TPCK model's advancement is another goal of this work and the results will also aid in understanding the function of literature in language instruction.

P. K. Sahni concentrates on incorporating these components into the flat and lifeless teaching of English literature, covering various genres, primarily poetry, prose, and drama, by judiciously utilising the experimental solution of ICT to make the teaching method of English literature more exciting, full of energy and alive, with less effort on the parts of teachers to teach the literature of a foreign language in India.

M. M. Davurovna given a comprehensive overview of the linguistic team of the corpus as well as an introduction to its linguistics. It concentrates on linguistic corpora's use in the IT industry. According to study, corpora will undoubtedly be employed as internet and primary data in the IT industry and Automatic corpus linguistic extraction from the text sources will take place.

Xiaobo Li discussed a crucial component of NLP i.e.; keyword extraction plays a significant role. To increase the accuracy of keyword extraction, the TFIDF algorithm is weighted and improved based on the location characteristics of terms in the title and complete text of the text. This technique increases the performance of the original algorithm and the precision of keyword extraction.

Teena Gomes et.al. studied the challenges that students confront when learning the English language. To find the functions and working that will aid in creating a supporting ICT tool for the primary as well as secondary level pupils, the requirements of pertinent learning activities are also studied. The findings emphasised the challenges and flaws in the educational system's elementary level teaching and learning. The criteria identified the necessity of updating the present system to meet the demands of the digital natives.

III. ICT-BASED ENGLISH LITERATURE TEACHING:

Like literature in many other languages, English literature contains a wide range of musical, emotional, action, and dialogue aspects. Regrettably, these components are frequently overlooked by teachers while instructing students in English literature because they are not properly presented in the way they should be, either due to a lack of resources or teacher ability [3]. ICT can be effectively included into the instruction of English literature to address and fix this issue. Its attempt to comprehend how these aspects may be included into the dull and lifeless instruction of English literature in the classroom, encompassing a variety of genres, namely poetry, prose, and theatre through ICT approach it improves at several aspects.

A. ICT Teaching/ Learning Tools:

The ICT enabled teaching accomplished through two common ways i.e., Offline and Online (web based). The blended mode teaching is more popular in educational institutions, the ICT tools given below [4].

1. Offline Tools:

These are the instruments used at classroom for teaching learning process that directly effect on overall performance of students.

- **Television:**

The current affairs broadcasts make sure that language exposure for learners is current and integrated with the lives of native speakers. It is significant technical tool that language instructors utilise since it appeals to both the eyes and the ears. TV offers a complete auditory visual simulation that is lively and more realistic. In addition to facial emotion, television also conveys language. CD/DVD player as well as USB drives are available with TV for viewing educational contents.

- **Over Head Projectors (OHP):**

An effective substitute for chalk and discussion is the projector, a common teaching strategy. By creating the materials in advance, the OHP takes time, but this type of multimedia provides high-quality education. The enormous class needs a visual assistance to help them understand the context. OHPs let teachers use pictures and diagrams related to important scene from the novel which reducing their workload by drawing it on the board. The more complex sources from OHP can be used in any classroom because they are simple to use, adaptable, and simple for students to take notes from.

- **Computer/ Laptop:**

The computer system or laptop is working with TV or OHP projector and there are several applications are available. Learning literary texts, questionnaires, report writing, letters to the editor, emailing, SMSing, and stock market reporting help pupils become more proficient using computer system. For editing, use Microsoft Office Word for drafting SMS and emails, use the thesaurus and e-dictionary from Encarta, send an SMS and email to the editors of newspapers and magazines. The Power Point helps instructors to teach plays and novels through movies. Not all teachers enjoy teaching poetry, students can listen to audio poetry that have been downloaded from a website portal, recorded in application and then shared in mp3 format for use on mobile devices.

2. Online Tools (Web Based):

One of the fastest growing fields is Online (web-based) learning, often known as technology-based learning, online education, or e-learning. It offers chances to develop e-learning environments that are well-designed, learner centred, affordable, interactive, official, and flexible. There are countless English online courses available that provide training in a range of fundamental language abilities, including learning, speaking, reading, and writing, and are interactive in different ways. The following are some of the popular technologies used for education purpose [6][7].

- **YouTube:**

It always seems like watching movies makes things easier to recall that are otherwise difficult to picture. Finding an English-language film was difficult in the little town. The YouTube portal delivered content online that result into that most students performed well on the textual exam questions.

- **E-mail, E-groups and Chat applets:**

Yahoo Messenger, Skype, and Google Talk etc. are some of the application works with help of internet online mode. questionnaire and report writing activity among students makes easy through e-group concept for sharing report and discussed about topic, query asking if any via chat applets.

- **Web Blogs and Websites:**

A reader could communicate with the majority of contemporary writers through their websites or other online spaces. Students read the novels and the blog posts on which readers had left various opinions about the content before being asked to leave their own thoughts. The authors' perspectives were one of the many that the students learned to comprehend in the text. On the text, they also used a number of critical theories. It is also one of the ways to teach Critical Theories and Criticism through self-learning activity with the help of web blogs. The group reading of websites, online resources, electronic encyclopaedias aided in the understanding of English literature such as plays and poems, literary theories, modernisms etc.

B. Significance of ICT:

Human being capacity for remembering and storing has a limit, nobody is able to retain all of the knowledge in existence. These online materials are incredibly helpful in the classroom, as well as for self-learning with the help of internet. Technology has helped most of teacher to become more skilled at deciphering literary nuances. As a result, students are better equipped than they were using the traditional lecture method to appreciate language and literature. The sense of combine several tools to promote student proficiency is main aspect of teaching. Hence it is very helpful for teachers to use ICT tools in the classroom.

IV. CONCLUSION

The use of ICT tools in the teaching and learning of English subject was examined in this study. It would appear to be impracticable to separate the traditional procedures and approaches from the modern technologies used to teach English as a second language and English literature at higher educational institutions. A teacher cannot ever be replaced by ICT, human teacher is superior to a machine in the classroom. If interest and readiness of students to participate in this ICT based system then definitely the students' competence levels will raised with the use of ICT in the classroom and they will have a deeper comprehension of language and literature.

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Antimicrobial Investigation of Nanoparticle of Some Glucosyl Thiocarbamides, Thiocarbamates

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ABSTRACT

Recent years have seen an increase in the branch of current study known as nanotechnology. This discipline focuses on the design, characterization, manufacture, and use of structures, devices, and systems by manipulating form and size at the nanoscale scale. Here we screened for their antibacterial and antifungal activities against common pathogens like *Escherichia coli*, *Proteus vulgaris*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Aspergillus niger* and *Penicillium*. Some compounds exhibit less to good activity while some are resistant to the said micro-organisms.

Keywords: TAG Isothiocyanate , Thiocarbamides , Thiocarbamates Nanoparticles and Antimicrobial Activities.

I. INTRODUCTION

Because of all the ways they may be used, carbohydrates and their derivatives have become extremely important to human life. In particular, these substances have been effectively tested against a number of illnesses and have therefore earned medical significance. Chemical substances are used for treatment of diseases and has been known since the 1500's. The chemical substances used for the treatment of infectious diseases and diseases caused by the proliferation of malignant cell are called as chemotherapeutic agents. Antibacterial agents are any chemicals that prevent microorganisms from growing or that kill them. Despite the fact that many different compounds possess these qualities. The phrase is often limited to chemicals that are active at concentrations adequate for practical purposes when it is employed at sufficiently high concentrations. Antimicrobial agents can be divided into many categories based on how they work and the objectives they serve. Depending on the category of microorganisms impacted, division may be made. Hence, substances that affect bacteria are known as bacteriostatic or bacteriocidal, whereas substances that affect fungus are known as fungistatic or fungicidal¹. The cup plate agar diffusion method²⁻³ provides a simple, convenient reliable test specially applicable in routine clinical bacteriology laboratory.

Carbohydrate represents an important chemical class as many drugs and drug intermediates⁴ are based on carbohydrates chemistry and many drugs such as amino glycoside antibiotics containing carbohydrate structure. Carbohydrates are vastly diverse group of organic compounds occurring in all known plants, animal and microbial life. The function of carbohydrate is to provide energy and strength in plants and mammalian tissues

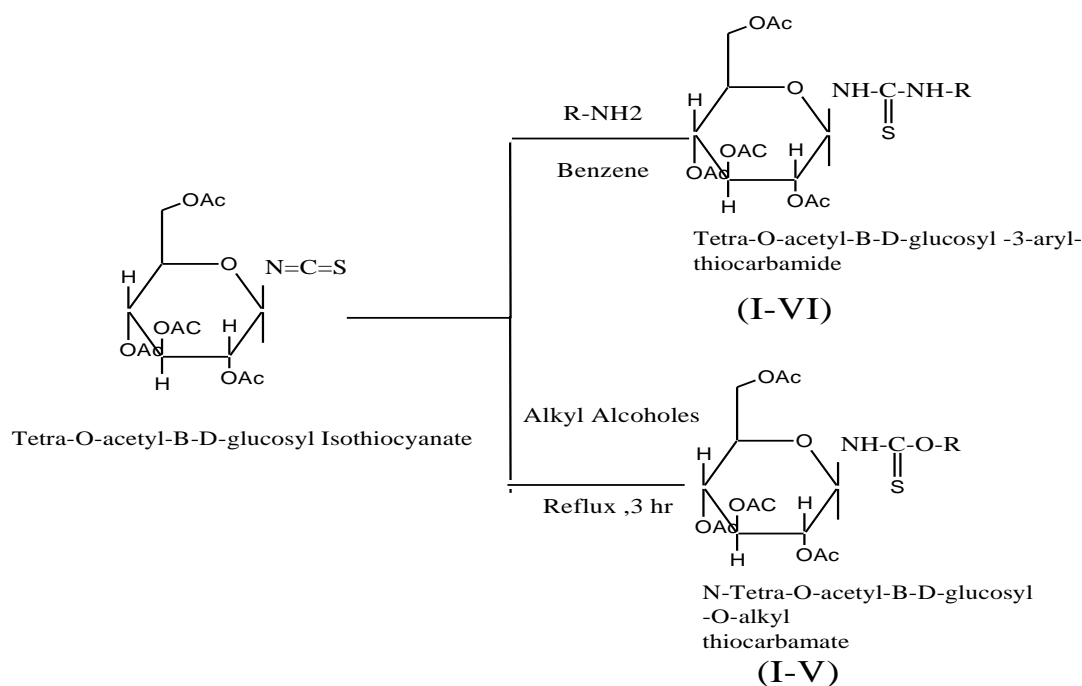
they provide a whole variety of specialized functions ranging from cell and organ differentiation to immune protection for new born babies.

Among all carbohydrates our interest is to synthesized nitrogen linked glucosyl compounds due to its applications in medicinal chemistry and in many other ways⁵⁻⁶. Sugar isocyanate are versatile synthetic intermediate in carbohydrate chemistry. They have attracted considerable interest in synthetic and medicinal chemistry⁷⁻⁸. The glycosides have found use as divertic agent, analgesics, antidiabetic compounds and in many other ways⁹. Methyl β -lactosyl can significantly reduce the formation of tumor colonies in mice¹⁰. To increase its efficiency multivalent β -lactosyl have been synthesized in Roy's group. Heterocyclic derivative of sugars were found to possess anti-tumor and anti-bacterial activity. Besides these and other pharmaceutical applications of glycosyl urecides, they also found to possess applications in paper, textile and food industries

II. EXPERIMENTAL

The research work presented deals with the study of antimicrobial activities of newly synthesized N-glucosides against pathogenic organisms. Screening of following compounds were carried out against the microbes like *E. coli*, *P. vulgaris*, *S. aureus*, *P. aeruginosa*, *A. niger* and *Penicillium*.

Reaction Scheme :-



Experiment No. 1:- synthesis of 1- tetra-*O*-acetyl- β -D-glucopyranosyl-3-*p*-amino phenyl thiocarbamides

Benzene solution of 1-tetra-*O*-acetyl- β -D-glucopyranosyl isothiocyanate (0.005 M, 1.0 g in 20 ml) was added to benzene solution of 1,4 phenyl diamine (0.005 M, 0.35 g in 10 ml) and reaction mixture was kept under microwave irradiation . Afterwards, solvent benzene was removed by distillation and resultant syrupy mass was triturated several times with petroleum ether, a granular solid was obtained, crystallized from ethanol-water, m.p. 162-167°C.

The product was found soluble in ethanol, acetone, chloroform and benzene while insoluble in water and petroleum ether. It charred on heating with conc. sulphuric acid. It was found non-desulphurisable when boiled with alkaline plumbite solution. The product was optically active and its specific rotation was found to

be $[\alpha]_{D}^{28} = 125.20^{\circ}$ (c, 0.96 in chloroform). The purity of the product was checked by TLC, Rf value 0.93 (CCl₄ : EtOAc, 3:2).

Experiment No. 2 : Synthesis of N-tetra-O-acetyl- β -D-glucosyl-O-ethyl thiocarbamate

Tetra-O-acetyl- β -D-glucosyl isothiocyanate (0.005 M, 1.9 g) was added to ethyl alcohol (20 ml) and the reaction mixture was refluxed over boiling water bath for 3 hr. It was then allowed to cool and pour it in water with vigorous stirring; a white granular solid was separated out, crystallized from aqueous ethnaol, m.p. 146°C. [Found C, 50.56; H, 6.09; N, 3.39; C₁₇H₂₅O₁₁N; requires; C, 50.62; H, 6.20; N, 3.47%]

It was found soluble in alcohols acetone, chloroform and benzene while insoluble in water and petroleum ether. It charred when warmed with conc. sulphuric acid. The specific rotation was found to be $[\alpha]_{D}^{35} = -136^{\circ}$ (c, 0.74 in chloroform). The purity was checked by TLC, and recorded Rf value 0.62 (CCl₄: EtOAc 3:2.1)

III. RESULTS AND DISCUSSION

The synthesis of N-glycosyl thiocarbamides is a simple and reliable route. This strategy can be successfully applied to prepare a wide range of glycosyl thiocarbamides and their derivatives which can be widely used for the preparation of biologically active molecules and good active lead in Medicinal Chemistry. Thus the synthesized novel N-glycosyl thiocarbamides exhibits antibacterial and antifungal activities against the organisms tested. The method adopted in the synthesis and investigation is simple, efficient and inexpensive in synthesizing pharmacologically important molecule.

Antimicrobial Activity:- These newly synthesized thiocarbamides were screened for their microbial activity against different pathogenic microbes for their antibacterial and antifungal activities using well method¹⁶. The compounds were screened for antibacterial activity against *E. coli*, *P. vulgaris*, *S. aureus*, *P. aeruginosa*, *A. niger* and *Penicillium*. in potato dextrose agar medium. Procedure for antimicrobial screening Media used (Nutrient broth): Peptone – 10 g, NaCl – 10 g and yeast extract 5 g, Agar 20 g in 1000 ml of distilled water. Initially, the stock culture of bacteria were revived by inoculating in broth media and grown at 37 OC for 18 h. The agar plates of the above media were prepared and wells were made in the plate. Each plate was inoculated with 18 h old culture (100 μ L, 10⁴ cfu) and spread evenly on the plate. After 20 min. the wells were filled with different concentrations of samples. The control wells were filled with Gentamycin. All the plates were incubated at 37 OC for 24 h and the diameter of inhibition zones were noted in mm. The activity was quantitatively assessed on the basis of inhibition zone

Table 1 : Antimicrobial activities of 1-Tetra-O-acetyl- β -D-glucosyl-3-aryl thiocarbamides (I a-g)

Compounds	<i>E.coli</i>	<i>P.vulgaris</i>	<i>S.aureus</i>	<i>P.aeruginosa</i>	<i>A.niger</i>	<i>Penicillium</i>
I-a	++	++++	++++	+++	+++	++
I-b	++	++++	++++	++	--	--
I-c	+++	++++	++++	+++	+++	+++
I-d	++	+++	+++	+++	+++	++
I-e	++	+++	++	--	+++	++
I-f	--	+++	+++	++	++	++
I-g	+++	+++	+++	--	+++	++

N.B. : ++++ Strongly active (above 20 mm)

+++ Moderately active (15 mm to 20 mm)

++ Weakly active (8 mm – 14 mm)

-- Inactive (below 8 mm)

Bore size = 7 mm

Table 2 : Antimicrobial activities of N-Tetra-O-acetyl- β -D-glucosyl-O-Alkylthiocarbamates (III a-e)

Compounds	<i>E.coli</i>	<i>P.vulgaris</i>	<i>S.aureus</i>	<i>P.aeruginosa</i>	<i>A.niger</i>	<i>Penicillium</i>
II-a	++++	+++	+++	+++	++	+++
II-b	++	+++	+++	+++	+++	++
II-c	+++	+++	+++	--	+++	++
II-d	++++	+++	+++	+++	+++	+++
II-e	+++	+++	+++	+++	+++	+++

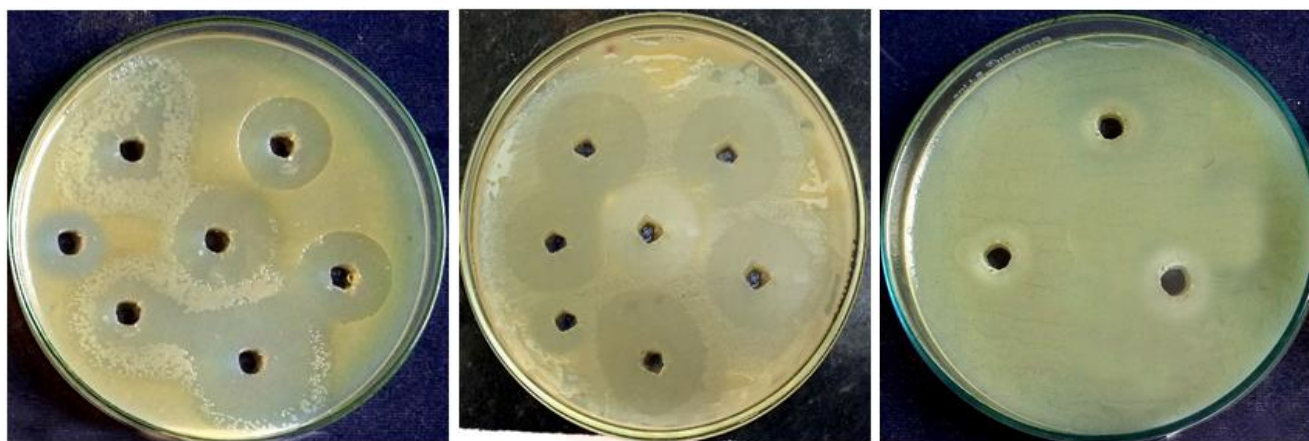
N.B. : ++++ Strongly active (above 20 mm)

+++ Moderately active (15 mm to 20 mm)

++ Weakly active (8 mm – 14 mm)

-- Inactive (below 8 mm)

Bore size = 7 mm



E.Coli

P.vulgaris

P.aeruginosa

The compounds 1-tetra-O-acetyl- β -D-glucosyl-3-aryl thiocarbamide (I-7) showed comparable activity. Compounds 1,2,3 showed strong activity against *P.vulgaris* and *S.aureus*. Compounds 1-7 showed moderate activity against used microorganisms.

The compounds N-tetra-O-acetyl- β -D-glucosyl-O-alkyl thiocarbamate (8-12) show resistance to good inhibition. Compounds 10, 12 showed strong inhibition against *E. coli* other are showed weak and moderate activity against used micro-organisms.

IV. CONCLUSION

Derivatives were synthesized and characterized for their structure elucidation. Various chemical and spectral data supported the structures. Some of the compounds synthesized showed promising antimicrobial activities. The newly synthesized thiocarbamides and thiocarbamates exhibits comparable antibacterial and antifungal activities against the organisms tested. The method adopted in this investigation is simple, efficient and

inexpensive and is useful in synthesizing pharmacologically important molecules. The method adopted in the synthesis and investigation is simple, efficient and inexpensive in synthesizing pharmacologically important molecules.

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Nano Structured Li_2MnO_3 Based Thin Film as a Green Power Source: Review

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ABSTRACT

Lithium ion batteries and solar cells are promising energy conversion and storage Technologies that could address some environmental problems, as well as prevent the potential depletion of resources and create jobs. LIB is currently generating a tonne of interest due to its extensive portable and transportation applications as well as the rising demand for sustainable energy sources. Electrochemical energy technologies are appealing because they produce clean energy with great efficiency, which has a significant impact on the global economy and ecology. The mainstay of future power source expansion will be energy sources with high energy density, long life cycles, and great efficiency. The current modification methods for thin films are outlined in this overview. The paper also examines the necessity for and future directions of research in thin-film cathode designs for energy storage in cutting-edge portable and personal devices.

Key words: Li_2MnO_3 , cathode material, thin film, green energy

I. INTRODUCTION

The issue of substituting a conventional automobile battery with a renewable energy source is both the most crucial and challenging for electric vehicles. Many different technical systems and functions have made use of thin solid films. The rapid progress of electrical device miniaturization is made possible by advances in thin film technology. Thin film technologies have advanced significantly and developed quickly due to the necessity to make thin materials that are of a high standard of quality, dependability, and reproducibility. In semiconductor devices, transistors, integrated circuits, wireless communications, telecommunications, rectifiers, solar cells, light-emitting diodes, photoconductors, light-crystal displays, lithography, micro electromechanical systems (MEMS), and batteries, thin film materials are employed. An essential component of thin film materials

II. REVIEW OF LITERATURE

According to M. C. Rao, increased electronic conductivities and ion diffusivities in anode and cathode materials are what further permit the improvement in capacity of current lithium batteries. Thin, lightweight, and flexible portable electronic gadgets as well as, more recently, batteries for transportation systems, such as hybrid and electric vehicles, have all benefited from the use of lithium-ion batteries. Over the past 50 years, global energy use and CO₂ emissions have risen dramatically. The development of clean and renewable energy systems, such as solar cells, fuel cells, batteries, and wind turbines, is more crucial than ever as we become more aware of greenhouse gas (GHG) emissions and their detrimental consequences on the environment. Due to their extremely high energy density, lithium-ion batteries have a large amount of energy storage capacity. LiCoO₂ has a large capacity and excellent cycling stability, making it a popular cathode material for lithium-ion batteries. Because of their large theoretical capacity and low price, layered LiNiO₂, LiMnO₂, and their derivatives are potential cathode materials for lithium-ion batteries. [1].

Rechargeable batteries are essential today and are required for the majority of large electronic gadgets that the majority of people use for communication, transportation, and surveillance, according to Bensalah N et al. The characteristics of LIBs need to be improved for future applications that call for high energy and power density with long-term stability. High capacity, low cost, environmental friendliness, and long-term charge/discharge cycling for large and practical applications are the ideal cathode materials for LIBs. Future commercial production of LIBs is anticipated to increase as their energy density and capacity are enhanced. [2].

Tong bo Song et al. discovered that the study and use of solar cells have drawn interest from all over the world due to the rising use of conventional energy and the deteriorating environmental problem. The second generation of solar cell technology, based on semiconductor thin-film materials, has flourished during the past ten years thanks to advancements in thin-film technology. Thin-film solar cell technology can significantly lower material prices because less material is needed. Additionally, the thin film materials may be easily applied to substrates including glass, stainless steel, and plastic, making them especially well suited for incorporation into solar buildings. [3].

Peng Zhang studied. A consistent and dependable energy source is necessary for modern life. Energy prices are anticipated to increase, nevertheless, as a result of pollution and the diminishing availability of fossil fuels. On the other hand, the more sustainable energy sources such as wind and solar power have attracted more and more attention in the last decade.

Batteries offer a way to store energy from a variety of sources. In particular, the lithium-ion battery is currently the most advanced energy storage device for modern electronics due to its high energy density, relatively high power and long life. [4].

TshidiMogashoa et al. studied high energy density Li-ion batteries are in high demand for the realisation of electric and hybrid vehicles in the automotive industry. Due to its high capacity of 459 mA-g-1, Li₂MnO₃ is considered a promising cathode material for next- generation lithium-ion batteries [5].

SongyootKaewmala et al study Lithium-ion batteries are used as energy storage devices for large energy storage systems, electronic devices, and electric vehicles. This is because they have higher energy density than other commercially available battery technologies such as Pd-acid, Ni-Cd and Ni- MH batteries. The performance of lithium-ion batteries is highly dependent on the electrochemical properties of their electrode materials, especially the cathode materials. The cathode materials contain Li-ions in their structure. So the

electrochemical properties of the cathode materials greatly affect the performance of lithium-ion batteries, including power and energy density.^[6]

Lian-Bang Wang, et al investigated that rechargeable lithium-ion batteries have been continuously developed since their first use in electronic products in the 1990s. Lithium-rich manganese oxide is a promising candidate for the cathode material of next generation lithium-ion batteries due to its low cost and high specific capacity. Currently, the most widely used cathode materials are ternary NMC and LiFePO₄, while Li-rich manganese-based materials have attracted much attention due to their low cost and high specific capacity. However, the sharp price fluctuations of cobalt and nickel in recent years and their negative impact on the environment have led researchers to develop a Li-rich manganese oxide without Ni and Co, using $x\text{Li}_2\text{MnO}_3-(1-x)\text{LiMnO}_2$ as a substitute^[7].

Ho Soonmin et al. it has been studied that the deposition of binary, ternary and quaternary metal sulphide thin films has been successfully carried out using the chemical bath deposition method. This deposition technique is simple, inexpensive and suitable for large area deposition at low temperature. The deposition time is one of the factors affecting the structural, optical, morphological and compositional properties of the films. The films prepared with a longer deposition time are thicker and have a low absorption value in the higher wavelength range. The physical, optical and electrical properties of the films were characterized using different tools. The experimental results showed that the obtained materials could be used in solar cells and optoelectronic devices.^[8]

SanathAlahakoon et al. as a result of the major challenges facing the world today due to global warming and diminishing conventional energy sources such as fossil fuels, the development of methods to harness all possible forms of renewable energy has become a heavily researched area within the energy and research community major energy consuming sectors such as transportation, manufacturing, electricity consumers, etc., could also benefit from the introduction of energy storage. In transportation, for example, the increasing use of hybrid and plug-in electric vehicles, as well as new transportation concepts such as electric highways, have elevated the importance of energy storage solutions for transportation to the highest level. Energy storage will be an essential and important feature of future power grids.^[9]

Yong-Ning Zhou et al found that it is important to investigate the underlying relationships between the chemical composition and electrochemical properties of the active material used in lithium batteries. Due to the many advantages of thin film electrodes over powder-based electrodes, including their high purity, perfect stoichiometry, and freedom from the additives and binders used in the latter, the fabrication of thin film electrodes using versatile deposition technologies has undoubtedly proven to be the simplest and most effective way to gain insight into the required intrinsic properties of lithium storage materials.^[10]

Rakesh Saroha, et al. investigated electrochemical performances of Li-rich layered-layered Li_2MnO_3 - LiMnO_2 solid solutions as cathode material for lithium-ion batteries explained the importance of Li Ion Batteries.^[11]

Jae-Kyo Noh et al. in Mechano-chemical Synthesis of Li_2MnO_3 Shell/ LiMO_2 (M = Ni, Co, Mn) Core-Structured Nano-composites for Lithium-Ion Batteries reports that as the application of lithium-ion batteries expands to higher energy consumption devices, such as electric vehicles (EVs) and electrical energy storage (EES) systems, the development of electrode materials with higher energy density becomes increasingly important. For cathodes, materials with higher operating voltage windows and larger specific capacities are under intense investigation. As part of these developments in advanced cathode materials, most attention in recent years has

been paid to the layered transition metal oxide, which can accommodate more than one unit of Li per molecule. [12]

Zhimin Qi, et al studied, thin film batteries are promising for high-power lithium ion batteries as the reduced thickness allows faster lithium diffusion in the electrodes. Modification of thin film electrodes is necessary to meet industrial standards. Among all the techniques for fabricating nanostructured thin film cathodes, electrostatic spray deposition (ESD) is a very versatile and simple technique for fabricating a film with a high surface-to-volume ratio, which could be an easy choice in fabricating nanostructured thin film cathodes. Thin film electrodes have advantages in solid-state battery integration. Therefore, advanced thin film electrolytes and thin film anodes using either a nanostructure or a Nano composite approach also need further investigation. In addition, research should focus on the interfacial interactions between electrolyte, cathode and anode [13].

III. RESEARCH METHODOLOGY

A technique for depositing thin films is the chemical bath deposition method. The main benefit of CBD is that, in its most basic form, it only needs solution containers and substrate mounting tools. Chemical bath deposition is a reasonably easy procedure that produces stable, adherent, homogenous, and hard films with good reproducibility. The formation of thin films is greatly influenced by growth circumstances, including substrate topography and chemical composition, solution composition, temperature, and deposition time. By altering deposition parameters including temperature, precursor concentration, complexing agent, and solution pH, it is feasible to regulate thickness and chemical composition in this method.

Sol-gel technique: the sol-gel method is a technique for solidifying a substance containing a solvent under mild circumstances.

IV. EXPECTED OUTCOMES AND SCOPE

This work aims to prevent and reduce environmental contamination while also putting human and animal safety first. The majority of research scientists and students working in the subject of energy storage systems will benefit from this study's findings. Decrease in reliance on foreign fuels. Reduces dangerous emissions. Fostering economic growth, opening up jobs in manufacturing and installation, and more ultimately, the future increase of power sources will favour energy sources with high energy density, lengthy life cycles, and high efficiency.

Several deposition methods, such as chemical bath deposition, can be used to create metal oxide thin films. This method of deposition is affordable for low-temperature deposition over a vast region. Several instruments can be used to characterize the thin film's physical, optical, and electrical properties. It can be applied to electrical vehicle technologies, portable electronics, and energy storage devices. The substance utilized in wireless sensors and pacemakers, among other applications.

V. CONCLUSIONS

- The problems of today are to make AL batteries more permeable and stable by addressing the corrosion issue, according to the literature review.
- Cathode: Li-rich and Ni-rich oxides are drawing increasing attention because Co-free Li-rich materials have enhanced kinetics and cycling performance, but further study is still needed to increase rate capability and cycle performance.
- Anode: Graphite is a key component of Li-ion technology, but its energy and power are limited. Additionally, it is a crucial raw material among natural graphite's, necessitating research into new compositions with other metal sulphides that might be recyclable from other products and promote a circular economy.
- Salt, solvent, and additives are all components of electrolytes, which have a significant impact on the power, cost, and energy density of batteries.

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An Evaluation of The Problems Encountered by Users in Accessing Digital Information Resources in Non-Agricultural University Libraries

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ABSTRACT

The use of digital information resources has greatly increased in the past decade, and their use has become paramount for academic research. Non-agricultural university libraries are particularly reliant on digital information resources for the support of teaching, research and other activities. However, users of these digital information resources in non-agricultural university libraries often face various challenges in accessing them. This research paper aims to evaluate the problems encountered by users in accessing digital information resources in non-agricultural university libraries. It will explore the challenges faced by users in terms of availability, accessibility and usability of digital information resources. It will also examine the strategies employed by libraries to overcome these challenges. The research will be based on a qualitative approach, involving semi-structured interviews and document analysis. The findings of this study will provide a better understanding of the problems encountered by users in accessing digital information resources in non-agricultural university libraries and will inform strategies to improve the user experience.

KEY WORDS: - Problems, digital information resources, non-agricultural university libraries, challenges.

I. INTRODUCTION

In an increasingly digital world, university libraries are becoming increasingly reliant on digital information resources to support their research and teaching activities. This shift has been driven by the availability of more and better digital resources, as well as the need to meet the demands of an ever-changing student population. However, the use of digital information resources in university libraries is not without its challenges. This paper seeks to evaluate the problems encountered by users in accessing digital information resources in non-agricultural university libraries. To do this, the paper will examine the types of problems encountered by users, the causes of these problems, and the strategies that university libraries can use to address them. In addition, the paper will discuss the implications of these issues for university library staff and the wider library community. By evaluating the problems encountered by users in accessing digital information resources, this

paper seeks to provide insight into the challenges facing university libraries in the digital age, as well as providing recommendations for improving the user experience.

Electronics and digital information resources are rapidly emerging, especially in the last decade of the 20th century, thanks to the enormous advancement of information technology (IT). Due to many benefits, users and libraries are showing a positive and encouraging attitude towards the use of e-resources. Therefore, effective and efficient use of e-resources requires the knowledge, skills and problems involved in using e-resources to be diagnosed, identified and monitored.

Further, it is equally important to update the knowledge and skill levels of library users through continuous learning programs, special programs for advance search skills, and other skill programs. However, electronic and digital information resources cannot be used effectively without the necessary training from library and information science professionals. It is also necessary to make provisions for well-planned electronic resources and services for library users.

II. REVIEW OF LITERATURE

Adegbore (2014) has made a review of literatures on university faculty Use of Electronic Resources. This study examines use of electronic resources among academics and the satisfaction levels of user with these resources are the critical issues to this review. The work is based on theories to emphasize use of electronic resources. **Lbrahim (2004)** concluded with the result of a survey conducted at the United Arab Emirates University. It states that faculty members in the UAEU seem to be equipped with fairly good computer skills that enable them to search and utilizes e- resources. It seems the possession of computer skills alone are not adequate for efficient use of e-resources, hence more organized training programs are needed to familiarize some of the faculty members with the e-resources, even though the results didn't explicitly show there was a severe lack of training or that librarians offered insufficient bibliographic instruction. **Kumar and Sampat Kumar (2018)** have identified and also found out five problems in accessing the electronics sources by the academic community. They are- a) Problems with accessing suitable personal computers, b) Problems with accessing suitable software, c) Lack of information about how to use electronic information resources, d) Lack of time to acquire skills needed to use electronic information resources and finally, e) Lack of support from the library staff. The common problems of bandwidth is not identified them. **Hadagali, Kumbar, Nelogal and Bachalpur (2014)** have also made a study on use of e-resources by their search scholars in Karnatak University, Dharwad the problems face by the users are again same; slow access speed, download problems, too much information is retrieved and lack if training needed that include; filtering effectively for online information and locating high quality information resources. **Thirunavukkarsu and Murugan (2013)** have studied the skills to use the digital resources in university library by research scholars and faculty members. Their study reveals that 29% of the respondents have better skill to use the digital resources. It is also found that their colleagues, 75% use the sources will in their departments and 53% stated they use them once a week. **Laabsetwar (2014)** in a study of Engineering College Library use of Electronic Sources and Services has identified problems encountered by the student and faculty. It is found that among faculty highest number with 45.7% have expressed the problem of Internet Bandwidth, whereas among student respondents, 38.8% have expressed the lack of ICT infrastructure are lack of training and lack of infrastructure.

III. OBJECTIVES

1. To identify the problems encountered by users in accessing digital information resources in non-agricultural university libraries.
2. To examine the association between knowledge, skills and problems of users and actual use of Electronic and Digital Information Resources.

IV. HYPOTHESIS TESTING

H0: - There is no relationships exist between knowledge, skills and problems of users and actual use of Electronic and Digital Information Resources.

H1: - There is relationships exist between knowledge, skills and problems of users and actual use of Electronic and Digital Information Resources.

Knowledge, skills and problems of users and Actual use of Electronic and Digital Information Resources

			Knowledge, skills and problems of users	Actual use of Electronic and Digital Information Resources
Kendall's tau_b	Knowledge, skills and problems of users	Correlation Coefficient	1.000	.800**
		Sig. (2-tailed)	.	.000
		N	243	243
	Actual use of Electronic and Digital Information Resources	Correlation Coefficient	.800**	1.000
		Sig. (2-tailed)	.000	.
		N	150	150
**. Correlation is significant at the 0.01 level (2-tailed).				

[Sig (2-tailed) value $0.00 < 0.05$ thus reject null Hypothesis.]

Table 78 shows the correlation matrix of Knowledge, skills and problems of users and Actual use of Electronic and Digital InformationResources of total sample of 243 respondents. Here in this table the significance two tailed value is 0.00 which is less than our significance value (0.05) therefore, we reject null hypothesis. Thus, we can conclude that There is a significant relationship between the knowledge, skills and problems of users and Actual use of Electronic and Digital InformationResources.

The correlation (r) is 1.000 which depicts the very strong association among the two variables. This indicates a positive association among the Knowledge, skills and problems of users and Actual use of Electronic and Digital InformationResources. i.e., with an increase in Knowledge, skills and problems of users, Actual use of Electronic and Digital InformationResources of users also increases, and vice versa.

V. RESEARCH METHODOLOGY

Research Method: -

Descriptive method was used for research in this research paper. As the area of research is vast and wide spread it is hard to collect data so survey method is adopted for this study.

Sampling Method: -

The process of sampling is selecting units from a set of peoples who are interested in studying the sample we may fairly generalize the results back to the population from the area that they have chosen. Data was collected from the Students of Non-Agricultural University.

Data collection: -

To answer specified research questions, test hypotheses, and assess results, data collection is the act of acquiring and measuring information on variables of interest in a systematic and defined manner.

Primary data is that kind data which is freshly collected. In this study primary data has not collected. This study is total based on secondary data.

Secondary data means that kind of data which already is available on various platforms and it can be collected using the help of research papers, journals, newspaper articles, personal blogs, etc.

Sample Size: -

Respondents	Frequency
Students of Non-Agricultural University	150
Total	150

VI. PROBLEMS FACED BY USERS

1. **Difficulty in locating and accessing information:** Users may find it difficult to locate and access digital information resources in non-agricultural university libraries due to a lack of proper cataloguing and indexing of these resources. As a result, users may be unable to find these resources or may have difficulty in locating them.
2. **Difficulty in determining the validity and accuracy of information:** Users may have difficulty in determining the validity and accuracy of digital information resources in non-agricultural university libraries due to limited access to the source of the information and lack of proper peer review of the content.
3. **Difficulty in understanding and using digital resources:** Users may have difficulty in understanding and using digital information resources due to lack of user support and inadequate training in the use of digital tools and technologies.
4. **Cost of accessing digital resources:** Users may find the cost of accessing digital information resources prohibitive due to high subscription fees or other associated costs.
5. **Incompatibility of digital resources with existing systems:** Users may experience difficulty in making use of digital information resources due to incompatibility of the resources with existing systems or software.

6. **Privacy and security concerns:** Users may have concerns about their privacy and security when accessing digital information resources due to the lack of secure encryption technologies and lack of awareness about the terms and conditions of use.

VII. FINDINGS

- It is found that Many users are not familiar with the technical aspects of digital information resources and lack the necessary skills to effectively utilize them. This is particularly true for older users, who may be intimidated by the technology.
- The user interface of some digital information resources is not intuitive or user-friendly, making it difficult for users to find the information they need.
- Some digital information resources are only available to users with specific credentials, such as library cards, making it difficult for users to access them.
- While some digital information resources are free, others can be expensive, making them inaccessible to some users.

VIII. CONCLUSION

In conclusion, the problems encountered by users in accessing digital information resources in non-agricultural university libraries are varied and complex. The most commonly reported problems include a lack of access to resources, difficulty navigating and searching for resources, an inability to access and understand the content within digital resources, insufficient training on how to use digital resources, and the general complexity of technology. In order to improve user experience and access to digital information resources, library staff and administrators should focus on providing adequate training and support, improving the user interfaces of digital resources, and educating users on the best practices for using digital information resources. Additionally, libraries should strive to create a user-friendly environment that is accessible to all users and provides adequate support and assistance as needed. From the Testing of Hypothesis, it is concluded that There is no relationships exist between knowledge, skills and problems of users and actual use of Electronic and Digital Information Resources.

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Synthesis of CdO Thin Films for NO₂ Gas Sensor

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ABSTRACT

Cadmium oxide thin films were successfully deposited on glass substrates using the chemical bath deposition method and annealed at 500°C using Cadmium chloride and sodium hydroxide as starting precursors. These optimized films were tested for nitrogen dioxide (NO₂) as oxidizing gas using a static gas sensing unit at different operating temperatures at a constant gas concentration (NO₂) of 10ppm. The maximum response of the CdO thin film is at 100 °C as an operating temperature. The sensor's response and recovery time were calculated and reported. Our results show that the CdO thin film is suitable for NO₂ gas sensing applications at possible low operating temperature.

Keywords: chemical bath deposition, thin film, cadmium oxide, gas sensor

I. INTRODUCTION

With the growth of contemporary industry and technology in recent years, the emission of various toxic gases has become a major concern. Numerous studies have been done to develop novel solid-state gas sensors based on metal oxide semiconductors. As a result, low-cost detection and measurement of gaseous species in air are becoming more important for human health and safety, energy efficiency, and pollution control. [1,2].

Metal oxides, such as NiO, CdO, ZnO, SnO₂ and others, have long been used as an active layer in gas sensors to detect toxic and hazardous environmental gases, such as NO₂, CO₂, and CO, because they are less expensive than other sensing technologies that are reliable, small in size, and lightweight. The recent growth of industries and improvements in quality of life have increased the importance of the problem of air pollution. As a result, the quality of urban air has recently become a public health issue. Nitrogen dioxide NO₂ is one of the most dangerous air pollutants, causing toxic and harmful effects on the environment and human health. [3,4]. Car exhausts, as well as domestic and industrial combustion processes, are sources of nitrogen dioxide. NO₂ has a threshold limit value of up to 25 ppm [5], so detection at this low concentration is required. However, widely used commercial gas sensors have significant limitations. These concerns arise from their high-power consumption, low sensitivity, and high operating temperature [6,7]. As a result, there is an urgent need for new

gas sensors with improved performance. Several metallic oxides, such as ZnO [8], SnO₂ [9], CdO [10], NiO [11], and Fe₂O₃ [12], have attracted the attention of researchers and are being studied for this purpose. CdO is a well-known n-type semiconductor with a band gap energy of (2.2-2.7) eV. The electrical conductivity ranges between 10² and 10⁴ S/cm. Cd interstitials (Cdi) and oxygen vacancies (Vo) act as doubly ionised (+ 2) charge donors in CdO, resulting in such high electrical conduction [13,14]. Its high electrical conductivity and optical transmittance in the visible region of the solar spectrum, combined with a moderate reflective index, make it suitable for a variety of applications such as photodiodes, gas sensors, and so on. [15,16]

Spray pyrolysis [17], electrochemical deposition [18], sol-gel [19], SILAR method [20], chemical bath deposition method [21] and other methods have been used to develop undoped CdO thin films. The chemical bath method has an advantage over other methods because it is simple, does not require sophisticated equipment, operates at low temperatures, and has a low deposition cost. In this article CdO films were deposited on a silica glass substrate using a chemical bath technique and their sensitivity to nitrogen dioxide (NO₂) gas was tested for applications in environmental monitoring.

II. METHODS AND MATERIAL

All glass wares first washed in distilled water and HCl. 0.1 M concentration of cadmium chloride and 0.1M concentration of sodium hydroxide was prepared in 100 ml and 50 ml beaker respectively without any complexing agents. Drop by drop, NaOH solution was added to cadmium chloride solution until pH 10 was obtained at room temperature. The solution was then stirred with a magnetic stirrer after the well-cleaned glass substrate was rinsed in it for 3 hours using a thin film holder. After three hours, the substrate was removed from the solution and allowed to air dry at room temperature. On the substrate, a white-colored cadmium hydroxide film has formed. The film was annealed at 500 °C for 150 minutes to obtain pure CdO phase.

III. RESULTS AND DISCUSSION

A. Measurement of response

The sensor's gas response (S) is defined as the ratio of change in conductance to sensor conductance after target exposure (at same operating conditions).

$$S_r = \frac{I_g - I_a}{I_a} \text{ (for reducing gases) } \text{-----} \quad (1)$$

$$S_o = \frac{I_a - I_g}{I_g} \text{ (for oxidising gas) } \text{-----} \quad (2)$$

where I_a = the conductance of the sensor in air

I_g = the conductance on exposure of a target gas.

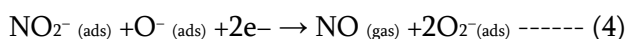
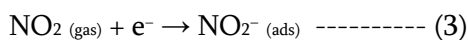
B. Gas sensing mechanism of CdO thin film towards NO₂ gas.

As we know, the key points of gas sensing phenomena are the morphology of the synthesised materials, oxygen vacancies, grain size, and the nature of the gas. The CdO layers were used for gas sensing measurements after they were physiochemically characterised. Most metal oxides-based gas sensors require high temperatures for oxygen chemisorption, which is the foundation for oxygen mediated transition metal oxide gas sensors. To determine the operating temperature for the CdO sensor, it was tested from 50 °C to 300 °C with an interval of

50 °C at constant gas concentration of 10 ppm of NO₂. As shown in Fig. 2, the responses of CdO samples initially increase with increasing operating temperature, reaching maximum sensitivity at 100 °C, and then decrease for higher temperatures.

Because the particles of NO₂ gas do not have enough energy to become active at low operating temperatures, the sensor's sensitivity is limited. The response decreases as the operating temperature exceeds 100 °C, which could be attributed to a decrease in NO₂ particles adsorption on the surface of the CdO thin films due to the decomposition of NO₂ gas into oxygen and NO gases at higher temperatures.

NO₂, N₂O, CO₂, and NO gases are oxidising, whereas, CO, CH₄, NH₃, SO₂ and H₂S gases are reducing [22]. When metal oxide surfaces are exposed to these oxidising gases they trap the more electrons from material surface resulting in an increase in resistance. [23] It is well known that oxygen molecules adsorbed O₂, O⁻, and O²⁻ ions depending on temperature in the air atmosphere.on the surface of CdO which is shown in Fig.1. The stable oxygen ions are O₂⁻ below 100⁰ degrees Celsius, O⁻ between 100 and 300 degrees Celsius, and O²⁻ above 300 degrees Celsius [24]. We can understand the by chemical reactions when CdO is exposed to NO₂ gas.[25, 26]



When the CdO films are exposed to NO₂ gas, the NO₂ gas reacts with the adsorbed O⁻ ions which is on the surface of the CdO films. This ions help the adsorbed NO₂ ions to take electrons from the conduction band of bulk CdO ,resulting concentration of electrons on the surface of the CdO film decreases and the resistance of the CdO film increases. However, as the temperature rises, the O²⁻ dominant at the surface, and the response of the CdO sensor further decreases. At the high temperatures, all species desorb gradually and the response decreases. The optimum working temperature for pure CdO thin film sensor towards a concentration of 10 ppm NO₂ was determined to be 100°C as shown in Fig.2. At this working temperature the CdO sensor had a response time of 125 seconds and recovery time of 175 seconds which is shown in Fig.3.

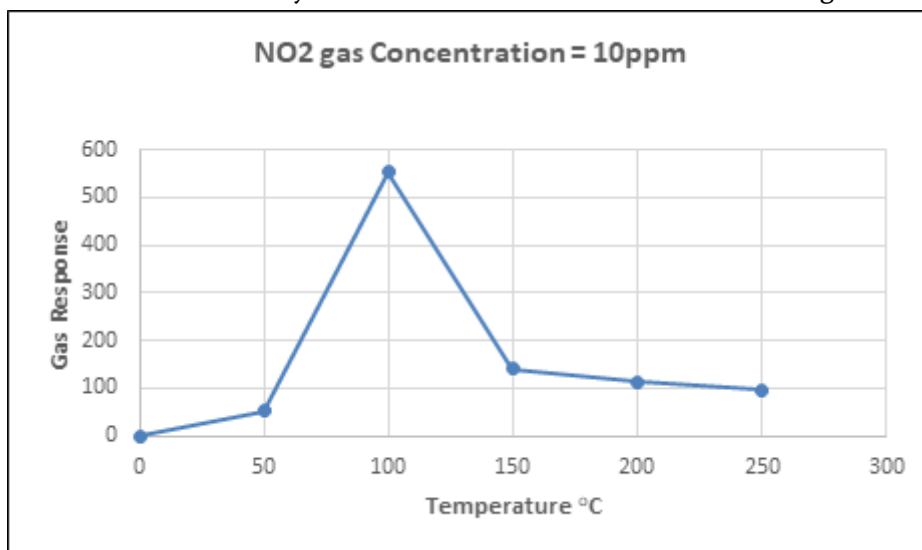


Fig.1 Gas Sensing mechanism of CdO thin film

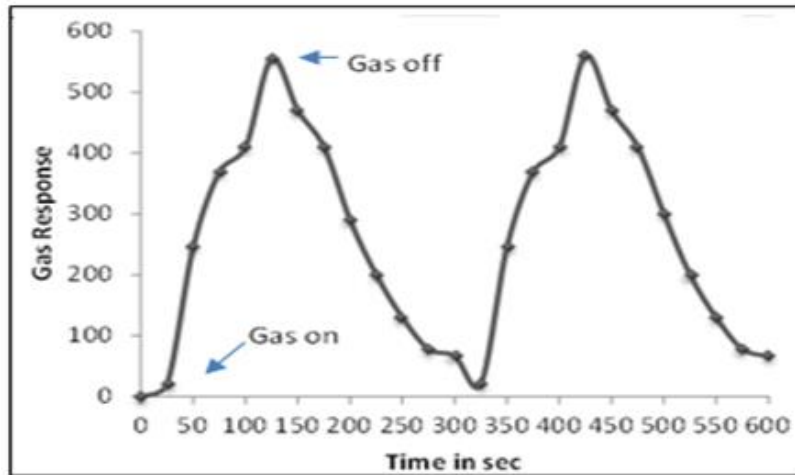


Fig.2 Variation of operating temperature with gas sensor response

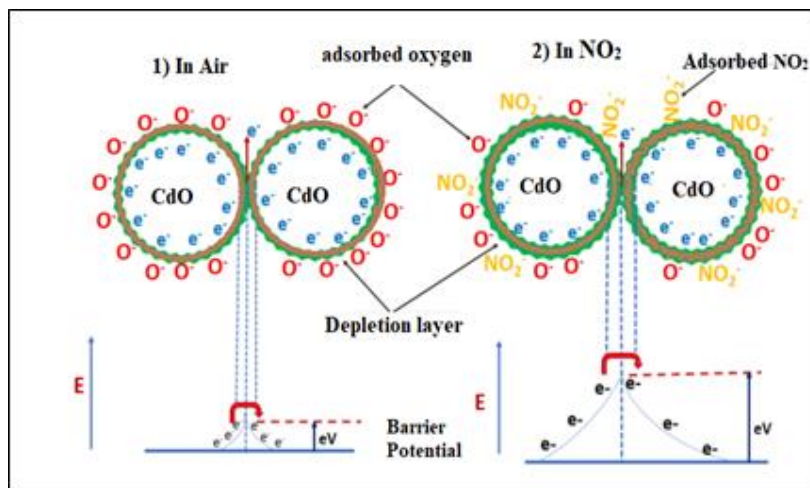


Fig.3 Response time and recovery time of CdO thin film operating at 1000C

IV. CONCLUSION

Pure CdO thin film was successfully deposited by chemical bath deposition method. Temperature dependent NO₂ gas sensing behaviour was studied towards a concentration of 10ppm. The optimal operating temperature was found to be 100°C with response and recovery times of 125 sec and 175 sec respectively.

V. ACKNOWLEDGEMENT

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A Study on the Role of ICT in the Digitalization of Education

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ABSTRACT

ICTs (Information and communication technologies) are now prevalent in many facets of daily life. Throughout the last 25 years, the usage of ICT has fundamentally altered the practices and processes of almost every type of corporate and governmental enterprise. Education is a profoundly social activity, and good instructors who spend a lot of time getting to know their students personally have historically been connected with effective education. Technology in education allows for a more student-centered learning environment. Yet as the world quickly transitions to digital media and information, the relevance of ICT in education is only going to increase throughout the course of the twenty-first century. This study provides research on the application of ICTs in education. ICT usage in education that is effective, as well as ICT use in the learning process, educational quality and accessibility, and learning motivation a setting for learning. Moreover, a summary of academic performance and ICT.

Keywords: Information communication technology, Education, E-learning.

I. INTRODUCTION

ICTs, according to Daniels (2002), have quickly evolved into one of the fundamental tenets of contemporary civilization. Understanding ICT and mastering its foundational skills and ideas are now widely seen as being essential components of education, alongside reading, writing, and arithmetic. ICTs, however, seem to be misunderstood to mean "computers and computing related activities" in general. Fortunately, this is not the case, as other technologies or systems also make up the phenomena that is often considered as ICTs, despite the fact that computers and their applications play a key part in modern information management.

According to Pelgrum and Law (2003), the word "computers" was superseded by "IT" (information technology) by the end of the 1980s, suggesting a change in emphasis from computing technology to the ability to store and retrieve information. After this, the term "ICT" (information and communication technology) was coined around 1992, when the general public first had access to e-mail (Pelgrum, W.J., Law, N., 2003). In accordance with a United Nations report from 1999, ICTs include network-based information services, commercial information providers, media and broadcasting, libraries and documentation centres, information technology equipment and services, Internet service providers, and other related information and communication activities. Information and communication technology (ICT), according to UNESCO (2002), can be thought of as the fusion of "Informatics technology" with other related technologies, notably communication technology. A

variety of ICT products, including teleconferencing, email, audio conferencing, radio broadcasts, interactive radio counselling, interactive voice response systems, audiocassettes, and CD-ROMs, among others, have been utilized in education for a variety of reasons.

The use of ICTs has clearly had an impact on teaching, learning, and research in the field of education (Yusuf, 2005). ICTs offer the potential to increase education, speed skill development, deepen knowledge, engage students, assist students connect their schoolwork to real-world situations, help future employees become economically viable, and more (Davis and Tearle, 1999; Lemke and Coughlin, 1998; cited by Yusuf, 2005). Basic education is necessary for someone to be able to obtain and use knowledge in a world that is changing quickly. ICTs must be a part of this ability in the global village.

Technology improving educational quality and accessibility

Technology makes education delivery more flexible, enabling students to access information from any location and at any time. When procedures are increasingly learner-driven and not Research Scholars-driven, it may have an impact on how students are taught and how they learn. In turn, this would enhance the learning experience for the students and better prepare them for lifetime learning. Technology-enabled educational programmes also eliminate many of the time restrictions that affect students with special needs in addition to geographic flexibility (Moore & Kearsley, 1996). Students are beginning to recognize how convenient it is to pursue education at any time, in any location.

Easy Access to Learning is one of ICT's most important contributions to education. Students now have easy access to resource people, mentors, experts, researchers, professionals, and peers throughout the world thanks to ICT, including e-books, sample examination papers, previous year papers, and more. Due to this increased availability of just-in-time learning, many more students who previously had other obligations were given the opportunity to learn (Young, 2002). Better teaching may result from more readily available best practises and best course materials in education that can be shared via ICT. ICT enables academic institutions to connect with underserved populations and brand-new global educational marketplaces.

Along with the ability to educate at any moment, instructors are discovering that it is opportunistic and can be utilized to their advantage. Mobile and seamless communication technology assist learning around-the-clock. Future instructors will have to make decisions about how much time will be used inside the 24x7 envelope and at what periods of time (Young, 2002). Thus, education that is supported by ICT will eventually become more democratic. Effective ICT usage in education has the potential to close the digital divide, particularly in emerging nations like India.

India has a population of over a billion people, a substantial percentage of whom are young, and a sizable formal education system. In emerging nations like India, where education is still seen as a crucial stepping stone for social, economic, and political mobility, demand for education has soared (Amutabi and Oketch, 2003).

Technology improving education Environment

ICT offers students a whole new learning environment, necessitating the development of new skills. Skills in critical thinking, investigation, and assessment are becoming more and more crucial as students must navigate through expanding amounts of information from many sources (New Media Consortium, 2007). By bringing life to learning settings, including virtual worlds for the purpose, ICT is altering the processes of learning. Using ICT to provide educational opportunities has the potential to be very effective.

Future learning settings that are not assisted in some manner by information and communication technologies are difficult, if not impossible, to envisage (ICT). ICT makes it possible to obtain a wealth of information from many sources and examine it from a variety of viewpoints, promoting the authenticity of learning settings. IT may also facilitate the comprehension of complicated processes through simulations, which again provide genuine learning settings. Therefore, ICT could help promote active learning and higher-order thinking (Alexander, 1999; Jonassen, 1999). The usage of ICT may promote collaborative learning and content reflection (Susman, 1998).

Moreover, ICT may be used as a tool for curriculum modification, offering chances to modify the learning objectives and assignments to each student's requirements and skills as well as delivering individualized feedback (Mooij, 1999; Smeets & Mooij, 2001). ICT may be included into a spectrum of teaching methodologies, ranging from conventional to cutting-edge, as noted by (Stoddart and Niederhauser 1993). Of course, access to technology is another factor that might have an impact on how ICT is used (Kennewell, Parkinson, & Tanner, 2000; OTA, 1995). This relates to both the quantity of computers as well as where they are located, such as in a classroom or a computer room, in order to optimize the chances for instructional activities, computers must be placed in the classroom.

Technology improving academic achievement

Due to the widespread use of ICTs in education, it became apparent that there was a need to dispel the misconception surrounding ICT use as a tool for learning and its effect on students' academic performance. ICTs are credited with enhancing educational quality, enhancing the relevance of education to the increasingly digital workplace, and extending access to education. The introduction of various ICTs into classrooms and other educational settings throughout the world during the past few decades, nevertheless, implies that the full potential of ICT for improving education has not yet been fully realised. In-depth research has been done over the past 20 years on the relationship between ICT use and students' academic achievement. Technology facilitates learning for pupils by enhancing interaction between them and their Research Scholars.

II. RESEARCH METHODOLOGY

the logical & scientific investigation of a topic called Research methodology. The objective of research method is simply to collect, analyze and systematically interpret facts.

III. OBJECTIVES

- To study role of Information Communication Technology in developing Education.
- To examine by which ways the Technology influence the educational behavior.
- To analyse that the use of Digitalization in education is improving learning experience of Research Scholars and students or not.

IV. DATA COLLECTION

Descriptive method was used for research in this research paper. As the area of research is vast and wide spread it is hard to collect data so survey method is adopted for this study.

Sampling Method: -

The process of sampling is selecting units from a set of peoples who are interested in studying the sample we may fairly generalize the results back to the population from the area that they have chosen. Data was collected from the Research Scholars and Students in Amravati city.

Primary Data: -

Primary data was acquired by online questionnaire. For online questionnaire Google forms was use as tool. Total 174 responses are collected, after scrutinization it becomes 168. From that 168 respondents 31 are Research Scholars and 137 are Students.

Secondary Data:

For study also use secondary data. The term "secondary data" refers to information that is acquired or retrieved from secondary sources of research data, including studies that have previously been conducted on the same or similar topics by multiple authors, or that can assist in achieving the goals and objectives of the researcher. While making comparison assessments to address research goals and study questions, secondary data is essential (Saunders et al, 1997). It can be gathered from sources like books and journals that have already been published, government annual reports as well as numerous privately published works by authors, research papers, newspapers, literature reviews, interactions and conversations with experts and people, and various Google websites.

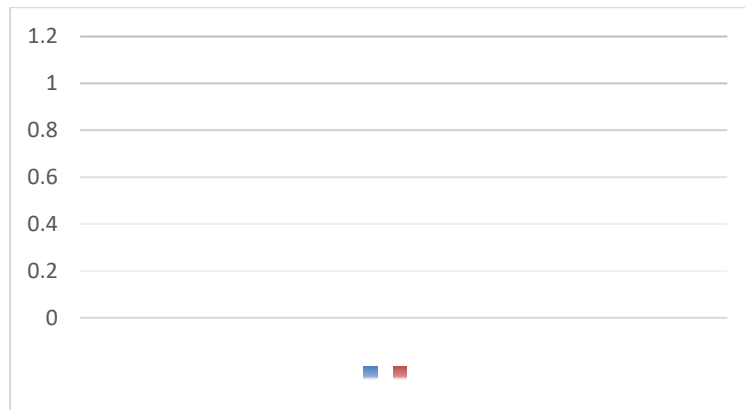
Sample Size:

Respondents	Frequency
Research Scholars	31
Students	137
Total	168

Questions:

- 1) After the use of digital technology in education is there any improvement in your teaching and learning experience?

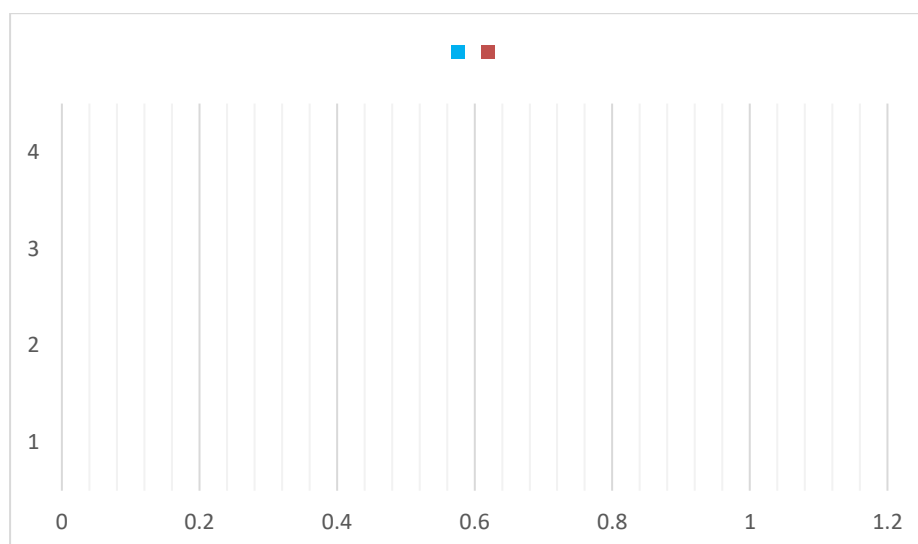
		Response	
		No	Yes
Respondents	Students	23	114
	Research Scholars	7	24



From the total 168 respondents 139 respondents are students and remaining 31 are research scholars. From total 139 students 23 students’ opinion is that, after the use of digital technology in education they don’t experience any improvement in their learning experience. And the remaining 114 students’ opinion is that, after the use of digital technology in education they experience an improvement in their learning experience. From the 31 Research scholars 7 says that the, after the use of digital technology in education they don’t experience any improvement in their learning experience. And remaining 24 says that the, after the use of digital technology in education they experience an improvement in their learning experience.

2) For what purposes you use Digital technology in education?

Description	Yes	No
To collect information for academic purpose	142	26
To update yourself with current information	107	61
To collect information for research purposes	93	75
To explore the new opportunities	70	98



From the all 168 respondents 142 respondents says yes that they use digital technology to collect information for academic purpose or 26 says no, 107 respondents says yes that they use digital information to update themselves with current information and remaining 61 says no, 93 respondents says yes that they use digital

information to collect information for research purposes and 75 says no, and 70 respondents says yea that they use digital information to explore new opportunities and remaining 98 says no.

Hypothesis Testing:

H0: There is no association between the use of digital technology in education and the improvement in learning experience of Research Scholars and students.

Ha: There is association between the use of digital technology in education and the improvement in learning experience of Research Scholars and students.

Crosstabulation				
Count				
		Response		Total
		No	Yes	
Respondents	Students	23	114	137
	Research Scholars	7	24	31
Total		30	138	168

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.578 ^a	1	.447
Continuity Correction ^b	.251	1	.617
Likelihood Ratio	.551	1	.458
Fisher's Exact Test			
N of Valid Cases	168		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.54.			
b. Computed only for a 2x2 table			

Interpretation of the Pearson Chi-Square measure.

The chi square statistic appears in the Value column immediately to the right of “Pearson Chi-Square”. In the study the value of the chi square statistic is 0.578. The p-value (.447) appears in the same row in the “Asymptotic Significance (2-sided)” column. The result is significant if this value is equal to or less than the designated alpha level (normally .05). In this case, the p-value is greater than the standard alpha value, so here accept the null hypothesis that asserts the two variables are independent of each other. To put it simply, the result is insignificant – the data suggests that the variables use of digital technology in education and the improvement in learning experience of Research Scholars and students are not associated with each other. It means from here it is concluded that

There is no association between the use of digital technology in education and the improvement in learning experience of Research Scholars and students.

V. FINDINGS

By giving users access to interactive exercises and simulations, rich multimedia information, and collaborative learning possibilities, technology may improve learning experiences. Also, it can make it easier for students to collaborate with one another and with Research Scholars. Students can benefit from tailored learning experiences using technology, which can increase their learning effectiveness and efficiency. By bridging the digital divide, technology can give all pupils access to educational possibilities. Efficiency gains and administrative cost savings can be achieved with the use of technology. Students can study both online and in-person by utilising technology to facilitate blended learning. Technology has made it possible for Research Scholars to develop more dynamic and interesting lessons for their pupils as well as to more accurately evaluate their progress.

Research students now have more access to a variety of materials and information thanks to information and communication technology technologies, which has expanded their research opportunities and helped them develop their independence as learners.

VI. CONCLUSION

The learning process in higher education and research has been completely transformed by technology. In addition to giving students additional opportunity to explore and advance their knowledge, it has allowed Research Scholars to design more dynamic and interesting learning experiences for their pupils. In-depth study may now be done by research students because to technology's expanded access to resources and data. In the end, technology use in education has enhanced the quality of learning for both instructors and students.

Teaching, learning, and research are all benefited by ICT acceptance and application in education. Technology has the potential to change how education is delivered and increase access to it. Also, it will provide flexibility so that students may access the education despite limitations related to time and location. It may have an impact on how pupils are taught and learn. It would give a rich atmosphere and incentive for the learning process, which appears to have a significant influence on the educational process by opening up new opportunities for students and Research Scholars. The performance and accomplishment of students may be impacted by these factors. In a similar vein, more accessibility to best practices and course materials in education, which may be shared via ICT, can support better higher student academic attainment. The body of research indicates that ICT integration in education has been successful.

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A Study on Botnets

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ABSTRACT

In this age of digital technology, internet has become an integral part of our life. It is the global system of interconnected computer networks which links the devices into one entity. It carries and provides an extensive range of information useful for all types of users. However some of the people identify and then exploit the weaknesses in a computer system through internet and gain unauthorized access to personal or organizational data. This negative approach mostly called as hacking. Hackers use the various software's or programs such as RAT (remote access Trojan), Botnet etc for gaining the unauthorized data from unknown users and becomes cyber criminals. In the present study we have described the working of botnet and preventive measures against the hacking of the systems.

Keywords: Software, Botnets, BotnetTypes, Hackers

I. INTRODUCTION

Internet is being a basic need of every one. Increase of speed and use of internet provides opportunity for hackers to perform the criminal activities [1]. Hackers used different softwares for illegal access of personal data. A botnet is basically a software that is being used by hackers on a very large scale. Botnets are networks of compromised computers, also known as "bots" or "zombies," that are under the control of a single attacker.[2]. Botnet includes two terms, Bot stands for Robot and net stands for Network. This software works in two places server side and client side. In this, hackers create a malicious application or software in exe format and send it to their target. And once it gets into the target's system, the hackers get remote access to that system. Botnets are networks of hijacked devices infected by a common type of malware and used by malicious actors to automate widespread scams and massive cyberattacks, It can be used for sending spam emails, launching distributed denial-of-service (DDoS) attacks, stealing sensitive information, and spreading more malware to other computersThey can also be used for political purposes, such as launching cyber-attacks on government websites or disrupting critical infrastructure. [3].

Each individual device on a botnet is known as a "bot". Individual threat actors or small teams of hackers can use botnets to execute much larger attacks than previously possible [4]. With little cost and time investments, botnets are both widely accessible and more efficient than traditional attack methods. By commanding every computer on its botnet to simultaneously carry out the same instructions at the same time, a malicious actor

can successfully launch attacks designed to crash a target's network, inject malware, or execute CPU-intensive tasks [5].

1. Working of Botnet

A botnet is automated computer software. Server side is the hacker's side on the server side an application or software is created in exe format which will work on the client side. While creating it, it has different features like it will not be uninstalled, admin access such features are turned on by hackers and make it. Once built, it needs to be deployed on the client side. Now normally people don't install any application or software. But a botnet that has a bot means this bot or this software is automatically on the silent side installs and assigns its remote access to the server side and thus a system is accessed and monitored. In this, hackers can take advantage of the hacked system[6]. It has a feature in which hackers bind the malicious app to another file and deliver it to the client side. ie from behind PDF or image, video. So that the target will not understand anything. When a bot-herder has successfully infected a sufficient number of bots, the next step is data collecting. The bot-herder sends commands to the infected devices, and the bots carry out the orders [7].

The working of a botnet can be studied in a stepwise and simple manner as follows:

- a. **Infection:** The attacker infects computers with malware, often through phishing emails, malicious websites, or exploiting vulnerabilities in software.
- b. **Recruitment:** The infected computers are then added to the botnet and become part of a network of compromised devices under the control of the attacker.
- c. **Command and Control:** The attacker uses a command and control (C&C) server to send instructions to the bots in the network. The C&C server can be located anywhere in the world, making it difficult to track down the attacker.
- d. **Malicious Activities:** Once the bots receive instructions from the C&C server, they carry out various malicious activities, such as sending spam emails, launching DDoS attacks, stealing data, and spreading malware to other computers.
- e. **Concealment:** Botnets are designed to remain hidden from the user of the infected computer, and often use techniques such as encryption and obfuscation to avoid detection by anti-virus and anti-malware software.
- f. **Persistence:** Botnets are designed to be persistent and difficult to remove. They often have mechanisms in place to evade detection and removal, such as periodically changing their C&C server or using multiple servers.

Botnets are a significant threat to computer and internet security, as they can be used to launch large-scale attacks that are difficult to trace back to their source.

2. Types of Botnets

There are basically two types of botnets. First one is client-server model and second one is peer to peer model [8].

A. Client-Server Model

First generation botnets usually operate on a client-server model, which means one command-and-control (C&C) server is used to operate the entire botnet. However, centralized models are more susceptible to a single point of failure due to the simplicity of their structure.(Fig.1) [9]

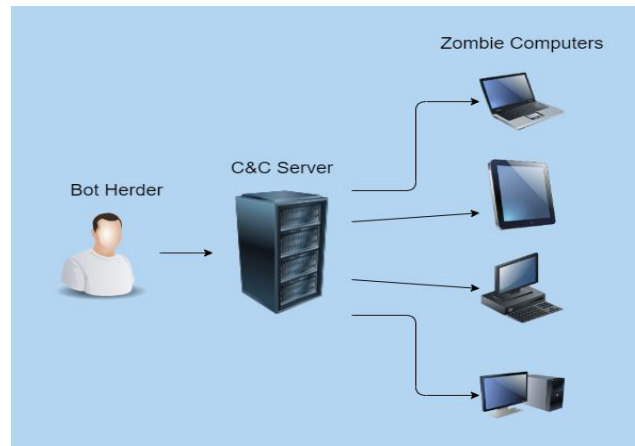


Figure1. Client Server botnet

B. Peer - Peer (P2P) Model

New generation botnets use predominantly peer-to-peer (P2P) models which allow bots to share commands and information with each other and without direct contact with C&C servers. P2P botnets are more reliable because they don't rely on a single centralized server. In a P2P model, each bot shares and updates information between devices by working as both a client and a server. (Fig.2)

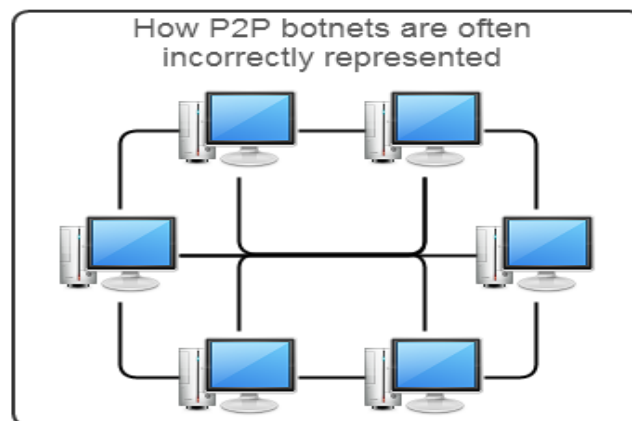


Figure 2. Peer - Peer (P2P) botnet

3. Common Types of Botnets

There are several types of botnets, each with different characteristics and purposes. Botnets are constantly evolving, and new types of botnets may emerge as attackers develop new techniques and strategies [10]. Following are some common types of botnets studied in this work:

1. **Spam Botnets:** These botnets are used to send large volumes of spam emails, often promoting scams or fraudulent products.
2. **DDoS Botnets:** These botnets are used to launch distributed denial-of-service (DDoS) attacks on websites or servers, causing them to become unavailable to legitimate users.
3. **Banking Botnets:** These botnets are designed to steal financial information, such as credit card numbers and bank account credentials.
4. **File-sharing Botnets:** These botnets are used to distribute pirated software or media files, often without the user's knowledge or consent.
5. **Click Fraud Botnets:** These botnets generate fraudulent clicks on online advertisements, allowing the attacker to earn money from ad networks.
6. **Ransomware Botnets:** These botnets are used to distribute ransomware, which encrypts the victim's files and demands payment in exchange for the decryption key.
7. **IoT Botnets:** These botnets are composed of compromised Internet of Things (IoT) devices, such as routers and security cameras, and are often used for DDoS attacks or cryptocurrency mining.
8. **Credential Stuffing:** Botnets can be used to test a large number of stolen usernames and passwords to gain unauthorized access to user accounts or sensitive data.
9. **Information theft:** Botnets can steal sensitive information, such as credit card numbers, login credentials, or personal data.

II. CONCLUSION

Internet users are increasing surprisingly, thereby increasing the possibility of cyber-attacks by using many software's. Amongst botnet is frequently and morely used software by the hackers. Botnet propagates itself time to time and changes its shape with time and increases criminal activities without knowing end users. Different types of botnets attacks and general solution as preventive measures have been presented. Any file received have to scan first before to open and if it is found infected should have to delete and block the person. Preventative measures include keeping software up-to-date, using strong passwords, and using anti-virus and anti-malware software. This reduces the possibility of botnet attacks.

III. ACKNOWLEDGEMENT

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Use of ChatGPT System in Education

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ABSTRACT

The paper focus on the application of ChatGPT technology in academic and education sector. ChatGPT is a public tool developed by OpenAI in November, 2022. It has gain popularity in technological world in very little spam of time. It is an AI technology which can answer any questions asked to it. The papers also highlight on the advantages and disadvantages of ChatGPT technology. ChatGPT can be very useful in teaching, learning, research activities of any institution. ChatGPT can be a valuable tool for libraries to enhance their services and provide assistance to library users in innovative ways.

Keyword: ChatGPT, AI, Artificial Inelegance,

I. INTRODUCTION

There is a movie Robot & Robot 2.0. In these films, a robot called Chitti is created by Rajinikanth. He gives all the tasks and information he is told. Chitti has all kinds of programming. He works on artificial intelligence. Also somewhat realistically, Microsoft has launched a ChatGPT (AI) powered language model on artificial intelligence called "Microsoft OpenAI GPT-3" in collaboration with the company OpenAI.

The use of new tools and technologies in education is rapidly expanding. Now a days academicians are using Artificial Intelligence system in the field of education. One of the most popular and newly invented AI technologies used to support teaching, learning and other activities of the education is the ChatGPT system. ChatGPT can be considered as very helpful discovery to facilitate learning within the educational context. In the post Covid era, educator can perform teaching either through the physical classroom platform or through an online platform using various technological tools such as AI or newly invented ChatGPT system. This research papers highlighted on an online educational platform where students can learn using ChatGPT technology. The use of ChatGPT technology in academic intuition is one of the most important approaches to enhancing and promoting a more personalised learning and teaching experience for the student, faculty and researcher.

What is ChatGPT

ChatGPT is success to gain attention of whole world with its unique features to answer every public question. ChatGPT is Chat Generative Pre-Trained Transformer. OpenAI has developed a chatboat called ChatGPT a public tool which is based on the GPT language model technology. ChatGPT is an artificial intelligence system

that listens, learns, and challenges. GPT is an AI language-processing model which gain a huge the popularity in internet in very short time period. This new system can generate written text and that too is highly consistent. Reading the text, one wonders whether any human wrote it, so precise and accurate. ChatGPT is basically a virtual robot (chatbot), which answers various questions, performs typing tasks, communicates fluently and also advises on personal problems. This new system still has errors and shortcomings. However, the system has generated a mixture of curiosity and fear around the world. According to a New York Times article, this new system is expected to create major problems in areas such as creativity, education, work, digital security and democracy. Despite being some lacunas, which can be overcome. ChatGPT can be gamechanger for the student, academican and researcher. According to SEO.ai's tests, ChatGPT is available in almost 100 languages. However, the performance of this model varies by language. So far it has been seen that it works best in English.

History

The football final in Qatar on November 30, 2022 was in full swing, while the technology world was taking a revolutionary step in the field of artificial intelligence. That step is ChatGPT. ChatGPT was developed by OpenAI, a company founded in 2015 by Sam Altman and Elon Musk. ChatGPT reached millions of users within five days of its launch. According to the OpenAI company, Usage during the testing and research phase will be free and open to all.

How does ChatGPT work

The best text-based AI programs store massive amounts of data, then use algorithms to predict the best phrasing of a sentence. These are called Large Language Models (LLMs). Alvaro Machado Díaz, a neuroscientist and professor at UNIFESP, says that during software training, the chatbot is asked questions and gives detailed answers. If the chatbot's response is wrong, the correct answer is fed into the system and it gives the correct answer next time." ChatGPT has learned to speak almost human-like. Machado Dias says that what makes this system unique is that it works by understanding the technical side of how language works. The system learns through human response (RLHF). Engineers use 'feedback' and 'learning' methods to teach the system. This shows the interaction very well. This is a great 'tuning' process. "In reality, engineers prioritize the responses given by the algorithm according to their relevance and encourage the program to learn the priorities set to increase the relevance of the text output," says the UNIFESP professor. ChatGPT is trained to admit mistakes, challenge false assumptions, and reject inappropriate requests.

ChatGPT is a computer program. Knowledge cut off for CHAT GPT is September 2021. This means that by September 2021, training has been provided to process and provide the world's big data. He is not aware of any information or events that occurred after September 2021. If it is updated then the information after September 2021 may be available in the future.

II. HOW TO USE CHATGPT

A platform has to be selected

ChatGPT is available on multiple platforms, including web-based chatbots and messaging apps. such as chatbots on websites, virtual assistants on your phone or messaging applications like Facebook Messenger or WhatsApp.

Others include GPT-3 Playground, Hugging Face and DialogGPT. You need to open an account on a platform. Sign up for an account: Once you identify the platform, you need to sign up for an account. Some platforms may require payment or have usage limits, so be sure to check the details. Use the free version web site-based platform. <https://chat.openai.com/> Sign up first. verify. Login. And start using.

Ask follow-up questions during the conversation

Continue the conversation by responding to ChatGPT's messages and asking follow-up questions (one question, another related question, etc.) (Sequentially asking a question, followed by another related question) ChatGPT will continue to generate responses based on the context of the conversation.

Give feedback on the information received

If you find that ChatGPT's responses are not helpful or accurate, you can provide feedback to help improve its responses in the future. This feedback can be used to train ChatGPT to provide more accurate and relevant responses.

Information received through ChatGPT should be verified.

It is important to remember that ChatGPT is an AI language model. It can be a useful tool, but it is not perfect and can sometimes give incorrect or irrelevant responses. It is important to use your own judgment and verify information where possible.

Ask question in simple language

If you don't get the response, you expect or need more information, you can rephrase or simplify your question and try again.

Benefit of Chat GPT | Power of Chat GPT

1. Chat GPT is available 24/7. Just get an internet connection and it's done. Can be used from anywhere in the world. Which makes it convenient for users to get information or have a conversation.
2. ChatGPT can act as a conversational assistant, answering questions, giving advice, making recommendations and engaging in small talk.
3. Can help people find answers to their questions or help with tasks.
4. ChatGPT can learn from past interactions and provide more personalized responses over time, which can improve the overall user experience. He will be available to you as a friend. He responds to you in the future by understanding you from the conversations you have had.
5. It will be available to you as a friend at any time. it responds to you in the future by understanding you from the conversations you have had.
6. ChatGPT can quickly answer simple questions or basic inquiries, saving time for both users and customer service representatives.
7. ChatGPT can accept and handle a large number of requests or commands simultaneously, making it a scalable solution for businesses that receive large volumes of inquiries.
8. ChatGPT can be trained to understand and respond to specific topics, enabling personalized responses to users.

9. ChatGPT provides consistent response to users, which can help maintain high levels of customer or individual satisfaction and trust.
10. Chat GPT can reduce the cost of customer support and other services by automating repetitive and routine tasks, allowing human operators to focus on more complex issues.
11. ChatGPT can be integrated into customer service systems, providing fast and efficient responses to customer inquiries and reducing the need for human agents to handle routine inquiries.

Limitation of using ChatGPT

1. This change is like a hanging sword on employment. Information-dependent fields such as journalism can undergo major changes. Jobs in this sector can be affected directly.
2. Students can use this system to prepare assignments. So, within a month of ChatGPT's launch, some US cities banned the system.
3. This system is feared to have a structural impact on human learning. For example, writing an essay is done using creativity. However, this system can have consequences.
4. Currently the answer provided by this tool is not 100 percent accurate.
5. Currently, we can only ask questions in English language, as this tool does not understand some other languages properly.
6. Currently this tool is free for all but in coming time it may launch paid version of this tool
7. There are many questions that cannot be answered.
8. You cannot rely on their answer, it is better to take their answers as suggestions only.
9. This tool only has data up to 2021. So, the latest information is not stored in the database of this tool.

Use of ChatGPT in education

ChatGPT is an artificial Intelligence that does have the power to change education. The industry has yet to find out whether it is for better or worse. While it can be valuable tool for teachers and students, it can also be an easy way to plagiarise and cause an over-reliance on technology. As teacher and students learn more about ChatGPT, hopefully the good outweighs the bad, and AI will help improve education day by day

Use in Learning

ChatGPT can be a game changer for the student. Student can get all the information they want. It can help them to complete many tasks in their school life. Many academicians think that This system is feared to have a structural impact on human learning. Despite being some concerned this technology can be widely use for the classroom leaning. ChatGPT can help students to access information faster, to improve writing skills personalise leaning experience and 24/7 availability of education resources for them.

Use in Teaching

Teaching can be more effective using AI like ChatGPT. ChatGPT can create assessments. Teachers can input information into the AI program and provide context, and ChatGPT will output a result. While it might take some tweaking, it can be a great starting point for teachers to use when creating assessments from scratch. Teachers can get new information from it. Teacher can use it to teach vocabulary, to provide example, to create

math problem, to generate basic lesson plan, to find basic way to help slow learner, generate question for discussion. ChatGPT can also be helpful for teacher to detect plagiarism from the student assignment.

Use in Research

ChatGPT can improve research quality. Following is some key factor where it can be used in research.

- 1) To generate research Problem- ChatGPT can help beginners to formulate research problem.
- 2) Literature review- ChatGPT can help researchers to search relevant information on any topic by generating providing a list of relevant papers or generating summarise research articles on given keyword.
- 3) Text Generation/ Drafting- ChatGPT can generate text or help researcher to draft in any tone for the research article or research proposals.
- 4) Data analysis- ChatGPT can help researcher to get data and it will also assist to analysis that data.
- 5) Language Translation- ChatGPT used machine translation to access all the research information in multiple language.
- 6) State of the art- ChatGPT can automatically summarize scientific papers, reports, or other documents and make it available for researcher to get him updated on the latest information of his field.
- 7) Answering any question- ChatGPT can be fine-tuned to provide answer to domain specific questions, making it a powerful tool for scholars to find answers quickly and efficiently.

Use in Library

AI technology and ChatGPT can be a gamechanger for the libraries. Libraries and information centre are facing the problem of information explosion and fund. ChatGPT can be used in libraries to provide assistance to library users in various ways.

- 1) Chatbot for Reference Services: ChatGPT can be used to create a chatbot that can assist library users with reference questions. The chatbot can be programmed to answer common questions related to library resources, services, policies, and procedures. This can help reduce the workload of reference librarians and provide quick assistance to library users.
- 2) Personalized Recommendations: ChatGPT can be used to create a recommendation engine that can suggest books, articles, and other library resources based on users' interests, reading history, and search queries. This can help library users discover new resources that they may not have found otherwise.
- 3) Virtual Book Clubs: ChatGPT can be used to facilitate virtual book clubs and reading groups. Library users can interact with ChatGPT to discuss books, share their thoughts, and ask questions. This can help foster a sense of community among library users and promote reading.
- 4) Language Learning: ChatGPT can be used to create language learning programs that can help library users learn new languages. ChatGPT can be programmed to provide language lessons, quizzes, and practice exercises. This can be a valuable resource for language learners who may not have access to traditional language learning resources.

Overall, ChatGPT can be a valuable tool for libraries to enhance their services and provide assistance to library users in innovative ways.

III. CONCLUSION

In conclusion, this paper provides all the information about the ChatGPT technology. There are many AI technology available in the but it can be a real gamechanger for the educational sector. ChatGPT can change the whole teaching learning experience. But there are some limitations for it. This technology must be used in wright manner. Chat GPT original will not harm anyone because it is a quantum computer program which cannot give correct answers to current questions.

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Two Fluid Cosmological Model in Teleparallel Gravity

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ABSTRACT

In this paper, we have investigated Locally Rotationally Symmetric (LRS) Bianchi type-I space time with two fluid in the $f(T)$ theory of gravitation. The field equations are solved by using some physical assumptions and conservation laws. Some physical and kinematical aspects of cosmological model like expansion scalar θ , shear scalar σ^2 , average Hubble parameter H are studied.

Keywords: Bianchi type-I, $f(T)$ Theory, Torsion, Two Fluid.

I. INTRODUCTION

Recent experiments like high redshift supernovae type-Ia [1-4] indicate that the universe is under accelerated expansion. This late time accelerated expansion had been explain by two different approaches. The first approach implies that this acceleration is due to an exotic energy with negative pressure known as dark energy (DE). The second approach deals with modifying the gravitational action. This approach is adopted by modifying the standard theories of gravity. Thus modified theories of gravity have gained a lot of interest in last few years. One of the simplest and most discussed modifications is the $f(T)$ theory of gravity, where T is the torsion scalar.

The $f(T)$ theory of gravity was firstly introduced by Ferraro and Fiorini [5]. Bengochea and Ferraro [6] studied that the late time acceleration of the universe can be explained by modifying Teleparallel equivalent of General Relativity. This $f(T)$ theory is an extension of the Teleparallel theory of gravity. Recently $f(T)$ theory of gravity has attracted many researchers. The $f(T)$ theory of gravity uses the weitzenböck connections which have no curvature but only torsion. Here torsion is responsible for the accelerated expansion of the universe. Wu and Yu [7] have stated that this theory produces field equations of second order and hence easy to solve as compared to the fourth order equations of $f(R)$ theory. Dawande, Adhav and Nerkar [8] have studied the LRS Bianchi type-I universe in $f(T)$ theory of gravity by using a conservation laws.

Sharif and Rani [9] have studied $f(T)$ models with perfect fluid in Bianchi type-I universe. The exact solution of Bianchi type-I are obtained by Nashed [10]. Dawande, Adhav and Khan [11] have studied plane symmetric universe with dark energy in the context of $f(T)$ theory of gravity. Mahanta and Sarma [12] have studied LRS

Bianchi type-I space-time in $f(T)$ gravity. Mete and Raut [13] have derived some exact solutions of Bianchi type-I space-time in the context of $f(T)$ theory of gravitation.

Adhav [14] investigated two fluid cosmological model in Bianchi type-III space-time. Mete *et al.* [15] have discussed two fluid cosmological model using plane symmetric Bianchi type-I metric. Mete, Umakar and Pund [16] have studied Kasner cosmological model with two fluid. Dagwal and Pawar [17] have studied two fluid FRW cosmological model in $f(T)$ theory of gravity. Coley and Dunn [18] have studied Bianchi type-VI₀ cosmological model with two fluid. Samanta [19] have investigated two fluid anisotropic Bianchi type-III cosmological model with variable gravitational constant G and cosmological constant Λ in the context of General relativity.

With the motivation from above mentioned work, we have investigated LRS Bianchi type-I cosmological model with two fluid in $f(T)$ theory of gravity.

II. $f(T)$ GRAVITY FORMALISM

The action of the $f(T)$ theory of gravity is defined by generalizing the action of Teleparallel theory of gravity given by

$$S = \int [f(T) + L_{matter}] e d^4x \tag{1}$$

Here, $f(T)$ denotes the differentiable function of the torsion scalar T and L_{matter} is the matter Lagrangian, where $e = \sqrt{-g}$.

The field equations of the $f(T)$ theory of gravity is obtained by varying the action with respect to the tetrads in the following form

$$[e^{-1} \partial_\mu (e S_i^{\mu\nu}) - h_i^\lambda T^\alpha_{\mu\lambda} S_\alpha^{\nu\mu}] f_T + S_i^{\mu\nu} \partial_\mu T_{TT} + \frac{1}{4} h_i^\nu f = \frac{1}{2} h_i^\alpha T_\alpha^\nu \tag{2}$$

where T_α^ν is the energy momentum tensor, $f_T = \frac{df}{dT}$ and $f_{TT} = \frac{d^2f}{dT^2}$.

III. FIELD EQUATIONS

We consider LRS Bianchi type-I space-time of the form

$$ds^2 = dt^2 - A^2(t)dx^2 - B^2(t)[dy^2 + dz^2]. \tag{3}$$

We obtain the tetrad components as follows

$$h^i_\mu = \text{diag}(1, A, B, B) \text{ and}$$

$$h_i^\mu = \text{diag}(1, A^{-1}, B^{-1}, B^{-1}). \tag{4}$$

The energy momentum tensor for the two fluid sources given by

$$T_{ij} = T_{ij}^{(m)} + T_{ij}^{(r)}, \tag{5}$$

where $T_{ij}^{(m)}$ is the energy momentum tensor for matter field with the energy density ρ_m and pressure p_r , $T_{ij}^{(r)}$ is the energy momentum tensor for radiation field having energy density ρ_r and pressure $p_r = (1/3)\rho_r$. The $T_{ij}^{(m)}$ and $T_{ij}^{(r)}$ are respectively given (Dagwal and Pawar, 2020) as

$$T_{ij}^{(m)} = (p_m + \rho_m)u_i^{(m)}u_j^{(m)} + p_m g_{ij}, \quad (6)$$

$$T_{ij}^{(r)} = \frac{4}{3}\rho_r u_i^{(r)}u_j^{(r)} + \frac{1}{3}\rho_r g_{ij}. \quad (7)$$

The four-velocity vectors are given by

$$u_i^{(m)} = (0, 0, 0, 1) \text{ and } u_i^{(r)} = (0, 0, 0, 1) \text{ with}$$

$$g^{ij}u_i^{(m)}u_j^{(m)} = 1 \text{ and } g^{ij}u_i^{(r)}u_j^{(r)} = 1. \quad (8)$$

The components of the torsion tensor are defined by

$$T^{\alpha}_{\nu\mu} = \Gamma^{\alpha}_{\nu\mu} - \Gamma^{\alpha}_{\mu\nu} = h^i_{\nu}(\partial_{\mu}h^i_{\nu} - \partial_{\nu}h^i_{\mu}), \quad (9)$$

which gives

$$T^{41}_{41} = \frac{\dot{A}}{A}, T^{42}_{42} = \frac{\dot{B}}{B}, T^{43}_{43} = \frac{\dot{B}}{B}. \quad (10)$$

The components of the corresponding contorsion tensor are defined as

$$K^{\mu\nu}_{\alpha} = -\frac{1}{2}(T^{\mu\nu}_{\alpha} - T^{\nu\mu}_{\alpha} - T^{\mu\nu}_{\alpha}), \quad (11)$$

which gives

$$K^{41}_{41} = \frac{\dot{A}}{A}, T^{42}_{42} = \frac{\dot{B}}{B}, T^{43}_{43} = \frac{\dot{B}}{B}. \quad (12)$$

The components of the skew symmetric tensor are

$$S_{\alpha}^{\mu\nu} = \frac{1}{2}(K^{\mu\nu}_{\alpha} + \delta^{\mu}_{\alpha}T^{\beta\nu}_{\beta} - \delta^{\nu}_{\alpha}T^{\beta\mu}_{\beta}), \quad (13) \text{ which gives}$$

$$S_1^{14} = \frac{\dot{B}}{B}, S_2^{24} = \frac{1}{2}\left(\frac{\dot{A}}{A} + \frac{\dot{B}}{B}\right), S_3^{34} = \frac{1}{2}\left(\frac{\dot{A}}{A} + \frac{\dot{B}}{B}\right). \quad (14)$$

Using (10) and (14), we get torsion scalar $T = S_{\alpha}^{\mu\nu}T^{\alpha}_{\mu\nu}$ as

$$T = -2\left(2\frac{\dot{A}}{A}\frac{\dot{B}}{B} + \frac{\dot{B}^2}{B^2}\right). \quad (15)$$

The field equations (2) for the metric (3) are obtained as

$$f + 4f_T\left[\frac{\dot{B}^2}{B^2} + 2\frac{\dot{A}}{A}\frac{\dot{B}}{B}\right] = 2(\rho_m + \rho_r), \quad (16)$$

$$f + 4f_T\left[\frac{\ddot{B}}{B} + \frac{\dot{B}^2}{B^2} + \frac{\dot{A}\dot{B}}{AB}\right] + 4\frac{\dot{B}}{B}\dot{f}_{TT} = 2\left(p_m + \frac{\rho_r}{3}\right), \quad (17)$$

$$f + 2f\left[\frac{\ddot{A}}{A} + \frac{\ddot{B}}{B} + \frac{\dot{B}^2}{B^2} + 3\frac{\dot{A}\dot{B}}{AB}\right] + 2\left(\frac{\dot{A}}{A} + \frac{\dot{B}}{B}\right)\dot{f}_{TT} = 2\left(p_m + \frac{\rho_r}{3}\right). \quad (18)$$

Here an overhead dot denotes derivative with respect to cosmic time t .

The physical quantities which are important in cosmological investigation are listed below:

Directional Hubble parameter along x , y and z axes are $H_1 = \frac{\dot{A}}{A}$, $H_2 = H_3 = \frac{\dot{B}}{B}$. (19) The

mean Hubble parameter

$$H = \frac{1}{3} \left(\frac{\dot{A}}{A} + 2 \frac{\dot{B}}{B} \right) \tag{20}$$

The scalar expansion $\theta = \left(\frac{\dot{A}}{A} + 2 \frac{\dot{B}}{B} \right)$. (21) Deceleration parameter $q = \frac{d}{dt} \left(\frac{1}{H} \right) - 1$. (22)

Shear scalar $\sigma^2 = \frac{1}{3} \left(\frac{\dot{A}}{A} - \frac{\dot{B}}{B} \right)^2$. (23)

Anisotropy parameter $A_m = \frac{2}{9H^2} \left(\frac{\dot{A}}{A} - \frac{\dot{B}}{B} \right)^2$. (24)

IV. COSMOLOGICAL SOLUTION

To solve the field equations (18) - (20), we need some additional constraints. One of the commonly used additional constraints is that the expansion scalar θ is proportional to shear scalar σ which leads to:

$$A = B^m \tag{25}$$

Using this, field equations (16) – (18) reduces to

$$f + 4f_T(1 + 2m) \frac{\dot{B}^2}{B^2} = 2(\rho_m + \rho_r) \tag{26} \quad f + 4f_T \left[\frac{\ddot{B}}{B} + (1+m) \frac{\dot{B}^2}{B^2} \right] + 4 \frac{\dot{B}}{B} \dot{T} f_{TT} = 2 \left(p_m + \frac{\rho_r}{3} \right) \tag{27}$$

$$f + 2f_T \left[(1+m) \frac{\dot{B}^2}{B^2} + (1+m) \frac{\ddot{B}}{B} \right] + 2(1+m) \frac{\dot{B}}{B} \dot{T} f_{TT} = 2 \left(p_m + \frac{\rho_r}{3} \right) \tag{28}$$

Now, $f_T = \frac{df}{dT} = \frac{\dot{f}}{\dot{T}}$ and

$$f_{TT} = \frac{d^2 f}{dT^2} = \frac{\dot{T} \ddot{f} - \dot{T} \dot{f} \left(\frac{1}{\dot{T}} \right)}{\dot{T}^2} \tag{29}$$

Subtracting (28) from (27) and using (29), we get

$$\frac{\ddot{B}}{B} + (1+m) \frac{\dot{B}^2}{B^2} + \frac{\dot{B}}{B} \frac{\dot{F}}{F} = 0 \tag{30}$$

where $F = f_T$. Now, $F = f_T = \frac{\dot{f}}{\dot{T}}$ and the scale factor B both are functions

of the cosmic time t , so without loss of generality we take a relation between F and B (C. Mahanta and N. Sarma, 2018) as

$$F = kB^{1+m}, \text{ where } k \text{ is the constant} \tag{31}$$

Using this in (30), it follows that

$$\frac{\ddot{B}}{B} + (2 + 2m) \frac{\dot{B}^2}{B^2} = 0 \tag{32}$$

Integrating above equation, we get

$$B = \{(3 + 2m)(c_1t + c_2)\}^{\frac{1}{3+2m}}. \tag{33}$$

Now, (25) gives

$$A = \{(3 + 2m)(c_1t + c_2)\}^{\frac{m}{3+2m}}. \tag{34}$$

Thus metric given in (8) reduces to

$$ds^2 = dt^2 - \{(3 + 2m)(c_1t + c_2)\}^{\frac{m}{3+2m}} dx^2 - \{(3 + 2m)(c_1t + c_2)\}^{\frac{1}{3+2m}} [dy^2 + dz^2]. \tag{35}$$

From (15), we get

$$T = -2 \left[\frac{(1 + 2m)}{(3 + 2m)^2} c_1^2 (c_1t + c_2)^{-2} \right]. \tag{36}$$

Now, we take Equation of State (EoS) which gives

$$p_m = (\gamma - 1)\rho_m, \quad 1 \leq \gamma \leq 2. \tag{37}$$

Conservation law separated for radiation and matter field are

$$\dot{\rho}_m + [H_1 + 2H_2](\rho_m + p_m) = 0, \tag{38}$$

$$\dot{\rho}_r + [H_1 + 2H_2]\left(\frac{4}{3}\rho_r\right) = 0. \tag{39}$$

Using (37) in (38) and using the values of H_1, H_2 we get

$$\rho_m = (c_1t + c_2)^{-\frac{2+m}{3+2m}\gamma}, \tag{40}$$

$$p_m = (\gamma - 1)(c_1t + c_2)^{-\frac{2+m}{3+2m}\gamma}. \tag{41}$$

Solving (39), we get

$$\rho_r = (c_1t + c_2)^{-\frac{2+m}{3+2m}\left(\frac{4}{3}\right)}. \tag{42}$$

Since $p_r = \frac{1}{3}\rho_r$, we get

$$p_r = \frac{1}{3}(c_1t + c_2)^{-\frac{2+m}{3+2m}\left(\frac{4}{3}\right)}. \tag{43}$$

Using (25), (33), (34), (40) and (42) we get

$$f = \frac{1}{T^{1/2}} \int \left[\frac{1}{(c_1t + c_2)^{\frac{2+m}{3+2m}\gamma}} + \frac{1}{(c_1t + c_2)^{\frac{2+m}{3+2m}\left(\frac{4}{3}\right)}} \right] T^{-1/2} dT. \tag{44}$$

Using (20) – (23) we get

The mean Hubble parameter

$$H = \frac{1}{3} \left\{ c_1 \frac{(2 + m)}{(3 + 2m)} (c_1t + c_2)^{-1} \right\}. \tag{45}$$

The scalar expansion

$$\theta = \left\{ c_1 \frac{(2 + m)}{(3 + 2m)} (c_1t + c_2)^{-1} \right\}. \tag{46}$$

$$\text{Shear scalar } \sigma^2 = 2 \left(\frac{m-1}{2+m} \right)^2 . \quad (47)$$

$$\text{Deceleration parameter } q = \left(\frac{6m+9}{2+m} \right) - 1 . \quad (48)$$

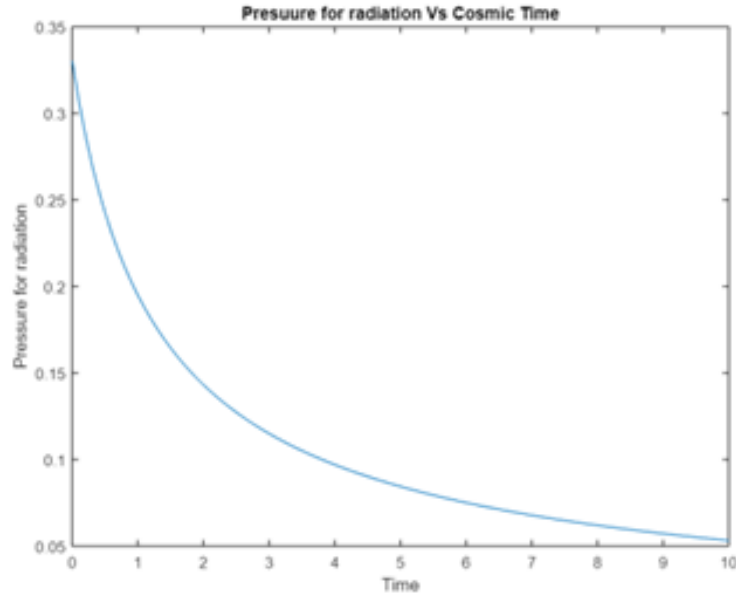


Figure (1): Pressure for radiation verses cosmic time at $c_1 = 1, c_2 = 1, m = 2$.

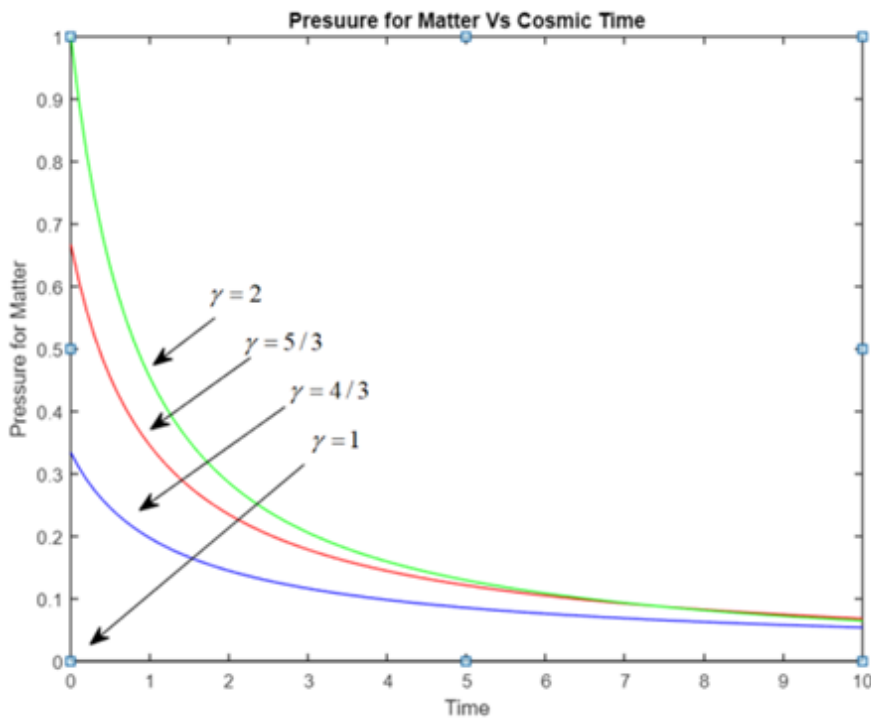


Figure (2): Pressure for matter verses cosmic time at $c_1 = 1, c_2 = 1, m = 2, \gamma = 1, \frac{4}{3}, \frac{5}{3}, 2$.

V. CONCLUSION

In this paper, we have investigated LRS Bianchi type-I space-time with two fluid in $f(T)$ gravity. We have flowing concluding remarks:

- From (45), (46) & (47), we conclude that parameters H and θ are infinite at the initial stage and at $t = -c_2/c_1$. It means that there is a singularity at $t = -c_2/c_1$ in the model also Hubble parameter, scalar of expansion and shear scalar are vanishing for large value of cosmic time.
- From (40) and (42), we conclude that energy density for matter and radiation approach toward zero for large value of cosmic time and the energy density for matter and radiation diverge initially and at $t = -c_2/c_1$.
- From figure (1) and (2), we conclude that pressure for matter approaches toward zero as t approaches to ∞ and the pressure for matter diverge at $t = 0$ and at $t = -c_2/c_1$.
- Sign of q indicates whether the model expanding or not. The observations of Type Ia Supernovae and CMBR indicate accelerating model. From (48) we conclude that our model is in agreement with these observation for $m < -1.4$.
- From (35), we conclude that our model has a singularity at $t = -c_2/c_1$.
- From (46) & (47), we have $\frac{\sigma^2}{\theta^2} = \text{constant}$, thus we conclude that model does not approach isotropy throughout the whole evolution of the universe.

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Cyber Crime and Cyber Security: An Overview

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ABSTRACT

In the present age of Information technology, internet has become an integral part of everyone's life. It is the global system of interconnected computer networks, which links the devices worldwide. It carries an extensive range of information resources and services. However, some of the peoples use the internet to harm the individuals who becomes victims and affects the national security. Such cyber-Crimes and online criminal activities have increased in multiples after COVID-19 pandemic. So, this is a serious challenge to the society to increase the Cyber security and aware the people from the techniques of the criminals. In the present study, various types of cybercrimes such as Phishing, Scams, Online harassment, Identity Theft, Financial Theft, Malware, Ransomware, Spyware, Virus, Worm, Trojan programs in the cyber world have been described. Various domains of cyber security and Preventive measures against the cybercrime have been presented for national security.

Keywords: Internet, Cybercrime, Cyber security, Preventive measures, National security

I. INTRODUCTION

Information technology has changed the modern way of living life. The internet provides us with many benefits and touches almost all aspects of our lives. It can be used for communication, real time updates and recent news, financial transactions, online booking, shopping, blogging, job searching, finding life partner, business, social networking, entertainment, education and research [1]. However, it also makes us vulnerable to a wide range of threats. A minor negligence in managing our digital lives can open the door to cyber criminals due to which new and powerful cyber-attacks are striking the internet and disturbing the life [2]. Cyber crimes can perform by many ways. It has been increased from COVID-19 pandemic and increasing day by day in multiples [3]. So there is a need to reduce the risk of cyber threats and criminal activities, Cyber security is most important [4]. Cyber security is also called as Computer security or IT security. It includes the protection of personal data and computer systems from the theft or damage to the hardware, software or disruption of the services. [5]

1.1. CYBER CRIME

Online or virtual criminal activities carried out through internet using computer, or networking devices are known as Cybercrimes. Cybercrimes have wide range of activities. Cyber crimes are committed by

cybercriminals for financial benefits or for accessing intentionally unauthorised personal or institutional data. Cyber criminals are usually skilled computer programmers, find the weaknesses of the users and perform the crime with number of ways. Some of the common cyber crimes are described in brief in this presented work [6-8].

1.1.1. Hacking

Hacking is identifying the negligence in computer systems and/or networks and exploiting it for gaining the unauthorised access of the system passing the login algorithm.

1.1.2. Identity theft

It is the act of wrongfully obtaining someone's identity proof without his or her permission. This may include their name, phone number, address, bank account number, Aadhaar number or credit/debit card number etc.

1.1.2.1. Gaining access to social media accounts

The Cyber criminal gains access to the social media accounts and can then harm the victim by misusing their personal information and photographs. He can also post offensive content on victim's profile.

1.1.2.2. Misuse of photo copies of identity proofs

The attacker misuses the photo copies of identity proofs of the victim. These can be PAN Card, Aadhaar Card or any other identity proof of the victim. The attacker can use these photo copies to steal money or cause harm to the victim.

1.1.2.3. Skimming of debit or credit cards

Skimmer is used to duplicate the Debit or Credit card, which can be used to withdraw the money from the ATM. The Debit or Credit card is swiped through a skimmer and captures all the details.

1.1.3. Psychological tricks

Hacker used psychological tricks by offering profit making schemes and traps the user. Once trapped, he can exploit the victim by either stealing money or stealing sensitive personal data. Recently Lottery scam (Congratulations! You just got Rich!), Nigerian Scam (Help me move Money and I will dip you in Cash!), Astrology Scam (..I can See your Future!), Work from Home Scam (Hello, I make you Rich!), Job Related Frauds (offering a job with an attractive salary!) /Debit Card Frauds (your card has been blocked!), WhatsApp Calling Invitation Scam, Snapchat Nude Photos Leak , -eBay, iCloud Leaks, can be done using psychological tricks.

1.1.3.1. Phishing

Hacker sends fake emails to many peoples to impersonate real systems with the goal of capturing sensitive data. E mail might come from a bank or other well known institution with the need to verify your login information. Some greedy people will reply and trapped.

1.1.3.2. Vishing

Phishing by phone is also called Vishing. Recently, Fraudsters have started phishing using the telephone as their new pawn. Victim will receive a phone call from a person posing as an employee of a bank or any other known organization. The caller instructs the victim to call another number. The attendant will ask the caller for their bank account details.

1.1.3.3. Smishing

It is the SMS equivalent of phishing. Text messages will be sent and asks the recipient to visit a websites or weblinks or call a phone number. The victim is then tricked into providing sensitive personal information.

1.1.4. Social media related attacks

No any mobile user can think without Social Media as it is the new and easy way of communication. We share our day to day information, photographs and live locations on social media. One can understand the entire history of an individual through their social media profile and it becomes easy for cyber criminal to access the important data. So there is a need to protect the social media accounts and use it in an appropriate manner.

1.1.4.1. Sympathy fraud

With frequent interactions, the criminal becomes friends with the user on social media. After getting sympathy extracts money and harms the user.

1.1.4.2. Honey trap

After gaining the victim's affection through social media, the criminals makes fake video calls and records them and exploits the victim physically or financially or emotionally.

1.1.4.3. Cyber stalking

Cyber Criminal continuously follows the activities of targeted users through electronic communications and harasses a victim sending SMS, E-mails, messages posted on a website.

1.1.4.4. Cyber bullying

Cyber bullying can occur through sending negative, harmful SMS, posting or sharing, false content about someone else on social media,

1.1.4.5. Photo morphing

Personal photos of the user posted on the social media can be edited smoothly from one image to another by small gradual steps using computer animation techniques. Using these photos fraudsters can blackmail or harass the person.

1.1.5. Attacks through mobile applications

Use of smartphones increases the use of android applications. These applications are widely used not only for entertainment but also for the convenience to perform day-to-day tasks such as bill payments, bank accounts management, service delivery etc. Cyber criminals infect the applications with malicious software, called

Trojan. Trojan can get access to your messages, OTP, camera, contacts, e-mails, photos etc. for malicious activities and extract data and money.

1.1.6. Online banking frauds

Online banking services such as account statement request, funds transfer, cheque book request, preparing demand draft etc. can be done sitting at home. Due to these online services, cyber frauds related to banking are also increasing. Hence, protection of bank accounts with strong passwords becomes highly essential.

1.1.6.1. Hacking of bank account due to weak password

Criminal used a program to guess commonly used passwords and hacks the victim's account and perform an illegal transaction by stealing the money.

1.1.6.2. Digital payments applications related attacks

Digital payments have become very common in today's life. However, they do pose a threat if the account is hacked.

1.1.6.3. Hacking of multiple accounts due to same password

If same password is used for multiple accounts, then hacking of one account may also lead to hacking of other accounts.

1.1.7. Malware attacks on personal computer

We used to store important information in the personal computers or laptops. Protection of data is highly essential. A virus is a program that replicates to erase or damage the data.

1.1.7.1. Malware attack through external devices

A virus can enter the computer through external devices like pen drive or hard disk etc. This virus can spread across all the computer files.

1.1.7.2. Attack by downloading files from un-trusted websites

When we download the files from un-trusted websites, virus can enter the computer and spread across all the computer files. The virus can be hidden in the form of music files, video files or any attractive advertisement.

1.1.7.3. Malware attack by installation of malicious software

The virus can enter into the computer by installing malicious software from un-trusted sources. The virus can be an additional software hidden inside unknown game files or any unknown software. This virus can spread across all the computer files.

1.1.8. Worm and Trojan horse attack.

Worm and Trojan horse are also used to harm the computer without 'run' manually. Worms spread automatically in whole network. Trojan is used for gaining admin access of target.

1.2. CYBER SECURITY

India stands fifth in worldwide ranking of countries affected by cybercrime. Cyber Security plays an important role in reducing the crime and developing information technology as well as internet services. Cyber-security can be described as a combination of technologies and methods, to protect the privacy, and integrity of computer systems, networks and data from unauthorized access [9-11].

Cyber security usually refers to three characteristics of information systems, 1. Confidentiality (privacy of information), 2. Integrity (computing processes have not been destroyed), 3. Availability (assurance of service availability when needed). These characteristics needs protection.

Continuous development of new security initiatives and strategies to keep pace with criminals is necessary. It is essential to enhance the cyber illiteracy and aware the people about its security and current developments in the Cyber Security domain. Sub domains of Cyber security have been studied as follows [12-13]

1.2.1. Network security

Effective network security includes hardware and software systems to protect networks and infrastructure from unauthorized access, disruption, and misuse.

1.2.2. Mobile security

Mobile security means protecting the data stored on mobile devices such as cell phones, laptops, tablets, etc. from various threats.

1.2.3. Cloud security

Cloud Security is concerned with the security of data stored by service providers such as AWS, Google, Azure, Rackspace, etc.

1.2.4. Data security

Data security involves the implementation of a robust information collection system that ensures the security of the data at rest and in transition.

1.2.5. Application security

The implementation of various techniques against a variety of threats to all software's and services used in an organization is application security. The techniques used are secure code writing, robust data input authentication, threat modelling, etc. These can minimize the possibility of any unauthorized access or alteration of resources in the application.

1.3. SECURITY MEASURES

There are many simple and effective online securities available in the market. The available technological security measures such as Firewalls, antivirus software, and other technological solutions for safeguarding personal data and computer networks are essential to ensure the security. Some of the major cyber security measures are described as follows [14-22].

1.3.1. Think before you click

Hacker sends the password recovery links either by email or on social media or by websites. Clicking these links, hacker gains access to personal data and account details. So do not click unknown links.

1.3.2. Use strong and varied passwords

It is easy to use and remember the same password for all accounts but it makes account more insecure. So use distinct and strong passwords for all different accounts. Use passwords with more than 8 characters with at least one uppercase letter, one lowercase letter, one number, and a few symbols other than &, #, @, etc. Change password often and reset it.

1.3.3. Use password manager tool

The password manager is a software application that is used to store and organize the passwords encrypted. User can create a strong master password for accessing the entire password database.

C.4.Set up two-factor or multi-factor authentication

Two-step verification enables extra security layers to online verification. In this MFA method, we have to authenticate twice and required to enter more than two credentials such as password, code, fingerprint, OTP etc. while logging in. This keeps the account more secure by making it more difficult for hackers to access your data.

1.3.4. Keep your systems updated

At workplace, user must keep all browsers, software, and operating systems up-to-date. Updating will prevent attackers from exploiting them for enough time until new updates.

1.3.5. Use firewalls and anti-viruses

Hacker can gain access of the systems and networks through different attacks such as, malware, viruses, trojans, spyware, phishing attacks, etc., Antivirus software and firewalls detects and eliminates the viruses and protects the system from being infected or hacked. We have to scan external devices before use and run virus scans on your computer frequently. Use licensed antivirus and keep it updated, avoid using torrent sites.

1.3.6. Don't use public Wi-Fi without VPN

We should not use public Wi-Fi unless it will not be urgently needed. Whenever we have to use it, use Virtual Private Network (VPN) along with it. VPN allows your device to be secure as it encrypts the traffic between the server and your device. This increases the difficulty of hackers when they try to access your personal data. Turn off Wi-Fi, Location Services and Bluetooth when not in use.

1.3.7. Take data backup regularly

Cyber attacks may lead to data loss and file damage in the system or network. Backups are nothing but a copy of the files or network's data for the purpose of restoration in case of damage or loss. So users always take a backup of important data.

1.3.8. Avoid useless downloads

Cyber attackers use the tricks of downloads to access the systems or networks. So user should avoid downloading of unnecessary software and browser extensions. For safe downloading, choose the process of custom installation and follow the steps carefully. During installation process, Pop-ups for any extensions or add-ons, must be declined.

1.3.9. Stay careful on social media

Every user is trying to reconnect or remained in touch with friends and family through various social media platforms over the internet, Hackers can access easily a lot of information from your social media pages and profiles. However, there is need to be careful about online sharing of the data. Avoid making your personal information public on social media.

1.3.10. Avoid online use of debit cards

For online purchasing and online transactions, instead of debit cards for paying the bills, use applications which will provide more protection to your bank accounts. Avoid saving your credit/debit card information on websites and web browsers.

1.3.11. Know about phishing attacks

In order to avoid phishing attack, do not open emails with malicious links from unknown people or sources. Check the mails carefully and links for any type of grammatical errors and the ID of the sender. Such links may be malicious and unsafe. This sigle click may lead cyber attack. Educate your friends and family about such types of errors so that they avoid opening such emails or forward them to you without any knowledge

1.3.12. Avoid unfamiliar websites

If any one of your friends sends new sites, be cautious of visiting them because some of them may contain drive-by download attacks, Such attacks does not required to click on anything in order to get the computer infected. It attacks your system by injecting malicious code as soon as you click on the link of the website. So, try to avoid such websites and visit only well known, well-established and familiar websites. Avoid checking 'Keep me logged in' or 'Remember me' options on websites.

1.3.13. Watch frequently and online transactions

Keep a check continuously on your bank statements: Keep an eye on your bank statements and query any unfamiliar transactions with the bank.

1.3.14. Safety tips for camera:

Avoid geographical tagging, disable location sharing, upload pics of resolution 72 or watermark them, check changing room / trial room, avoid sharing personal pics.

1.3.15. Secure Your Data

We must have awareness about Cyber Security so that we would be capable of securing personal data and systems safe from any type of cyber attacks from external threats.

1.3.16. Cyber Security Measures in brief

- Permanently delete all documents downloaded on computers in cybercafé.
- Never provide details or copy of identity proofs to unknown person/ organization.
- Be careful while using identity proofs at suspicious places.
- Do not share sensitive personal information and photos on public platforms.
- Do not give your card to swipe to any one and leave your credit, debit or ATM card receipts behind, in places such as a bank/ATM or a store; never throw them away in public.
- Do not share your PIN, CVV, OTP with anybody. Bank will never ask for.
- Do not respond to suspicious e-mails or click on links. Beware of the fake calls.
- Do not transfer money to any un-trusted unknown account.
- Always verify the domain names of websites. Govt. websites have “.gov.in” or “.nic.in” as part of their web address.
- Proper spam filters must be enabled in your e-mail account.
- Be careful while accepting friend request from strangers on social media. Always inform to family members about social media friends and your internet practices.
- Restrict access to your profile.
- Avoid sharing your location on Social media.
- Always install mobile applications from official application stores or trusted sources. Free applications may be malicious.
- Scrutinize all permission requests for application to be downloaded.
- Register personal phone number and e-mail with bank and subscribe to notifications, which will alert after transaction quickly.
- Always check “https” appears in the website’s address bar before making an online transaction. The “s” stands for “secure” and indicates that the communication with the webpage is encrypted.
- Never download or install free and pirated software’s. Always read the terms and conditions before installation.
- Always use virtual keyboard to access net-banking facility from public computers and logout from banking portal/website after completion of online transaction. Also ensure to delete browsing history from web browser after completion of online banking activity.
- Cell phone has IMEI code keep it noted in a safe place. The operator can blacklist/ block/trace a phone using the IMEI code, in case the cell phone is stolen.
- Try for optimal use of internet. Always follow cyber safety tips and be aware about cyber crimes and security. Spread the awareness in the society. Your single effort can help for national security.
- Do not involve in the cyber crime and avoid the punishment as per cyber law against the crime.
- If online account has been hacked, immediately log in and change the password to a strong, unique password.
- Unfortunately, if any incident of cyber crime will happened, report to nearest cyber police station and lodge the complaint on National cyber crime reporting portal: <https://cybercrime.gov.in>

II. CONCLUSION

In the present study, we have described the various methods of cyber crime and cyber attacks which helps to overcome the several loopholes in the computer operating systems and networks. The study has been started with the aim 'Prevention is always better than cure'. The main objective of this study was to explore the cyber safety and security measures while operating the internet. Author believes that this study must support to enhance the cyber security awareness and to reduce the risk of cyber crimes in the country.

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Variations in Sensing Response of Cladding Modified Fiber Optic Intrinsic Biosensor with The Interaction Between Gox and Glucose

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ABSTRACT

In the present investigation, a cladding modified fiber optic intrinsic sensor using biomolecules has been developed. In this original cladding is removed mechanically and modified it with the polymer-polyaniline, which is suitable to incorporate and bind the biomolecules in its porous structure. The biomolecules used are enzymes-glucose oxidase (GOx) and used to detect the analyte-glucose. The sensitivity of developed sensor has been studied by measuring intensity or power versus time. During the interaction between GOx and glucose; there are variations in sensing response of sensor. A type of uniform pattern or plateaus has been observed. It shows an ON and OFF i.e. starts and ends of reaction between GOx and glucose.

Keywords: Sensor, Cladding Modified Optical Fiber, Immobilization, Glucose Oxidase

I. INTRODUCTION

In the year 1969 a sensor was developed by Clark of the children's hospital in Cincinnati, Ohio, which was used for sensing the biomolecules called as biosensor [1, 2]. It was investigated with the development of enzyme electrodes. After that ample of mature, reliable, fast and more sophisticated biosensors were developed by researchers throughout the World. In last 30-40 years a simple commercially available small, disposable, single-use, glucose sensitive electrode and the corresponding handheld-sized portable meter containing the integrated circuit (IC) and liquid crystal display (LCD) biosensing device was developed for the testing of blood glucose [3-7]. Biosensors are useful in various fields such as medicine, agriculture, biotechnology, military, environmental analysis, food analysis, health care, biochemical industries etc. [4-11]. Those sensors were the electrochemical biosensors. Due to the advanced properties of optical fibers such as light weight, small size, operated in hazardous environments, without any electromagnetic interference, wide bandwidth, propagation of light over long distances with little loss in intensity and continuous light intensity etc., researchers were investigated the optical fiber biosensors [12].

An optical fiber based sensor; needs a light source, optical detector and sensing element (probe) for the detection of different analytes (which is to be measured). The information of analyte in these sensors is due to change in polarization, phase, amplitude, frequency, intensity or combination of these things. The designing

and development of sensing element in optical fiber sensors decides the type of sensor. In various types, cladding modified approach is the simplest and effective method of designing of optical fiber sensor. Its principle is based on the modulation of optical power / intensity in terms of absorption or interaction of light in the evanescent region.

For the development of such a biosensor; original passive cladding of an optical fiber is removed from a small portion and coated it with a thin layer of suitable matrix/material which can hold or capture the biomolecules without affecting it. For the cladding modification polymers like polyaniline, polypyrrole, polyindole, polythiophene etc. are found suitable and sensitive active cladding materials. It offers a porous matrix like cauliflower to hold or immobilize the biomolecules [13-17].

In the present investigation, variations in the sensing response of a cladding modified fiber optic intrinsic biosensor (FOIB) have been studied. This biosensor is developed by modifying the original cladding of optical fiber with polymer-polyaniline as an active cladding. Then it was incorporated with glucose oxidase (GOx) cross-linked via glutaraldehyde for the detection analyte-glucose. The sensitivity of developed biosensor has been studied by measuring intensity or power versus time. It has been observed that there is a type of uniform pattern or platues are formed, during the interaction between GOx and glucose. It shows an ON and OFF i.e. starts and ends of reaction between GOx and glucose. The results are reported.

II. METHODS AND MATERIAL

Aniline (monomer) and ferric chloride (oxidant) were purchased from Fisher Scientific used for the synthesis polyaniline.

1m long plastic cladded silica core optical fiber (core/cladding-960/40 μ m) was taken to develop a fiber optic intrinsic biosensor (FOIB). Both the ends of the optical fiber were cut and polished using polish paper. Two SMA connectors were connected to both the ends of the optical fiber. The sensing element of the FOIB was prepared by removing a small portion (1 cm) of original cladding mechanically of an optical fiber and deposited it with a thin layer of active cladding of polyaniline. It was synthesized by chemical polymerization method using monomer-aniline and oxidant-ferric chloride (FeCl_3) in an aqueous medium at room temperature. For the purpose, 0.2 M aniline and 0.05 M FeCl_3 stock solutions were prepared, separately, in double distilled water. 10 mL solution of aniline was taken in a beaker. The oxidant solution was added drop by drop in it with constant stirring and cladding removed portion was submerged in it during the polymerization to deposit a thin layer. After deposition, sensing portion was washed several times with distilled water. Then the sensing element immobilized with GOx prepared in phosphate buffer of pH 7.4 cross-linked via glutaraldehyde solution.

He-Ne laser (λ - 632.8 nm, power-1mW) was used as a source to illuminate the light at one end of the FOIB. At the other end; the sensing response of FOIB was recorded using a charge-coupled device (CCD) camera (Mels Impex America, Inc.) as a detector. Optical microscope AxioCam ERc 5s was used to record images of optical fiber at various stages in the experiment. Figure 1 shows the experimental arrangement of FOIB.

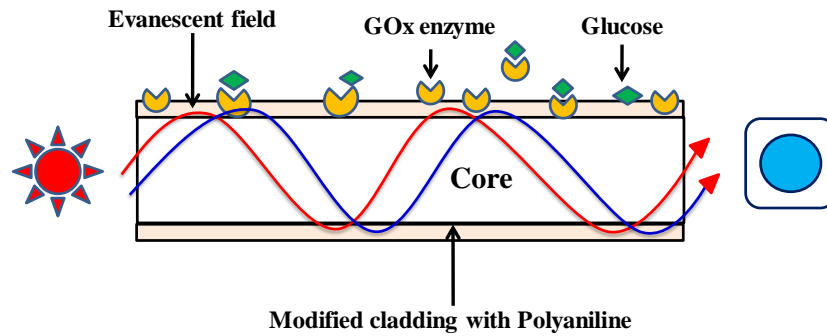


Figure 1 Experimental arrangement of FOIB.

III. RESULTS AND DISCUSSION

A. Optical Micrograph of Sensing Element

Figure 2 shows the sensing element of FOIB in various magnifications (4x and 10x). Figure 2 (a, b) shows the images of the sensing element before removal of cladding. Figure 2 (c, d) shows images of sensing element after removal of cladding. Figure 2 (e, f) shows images of sensing element after deposition of thin layer of polyaniline. As discussed earlier, polyaniline offers a porous matrix to accommodate the biomolecules like enzyme used for sensing analyte as shown in Figure 2 (e, f).

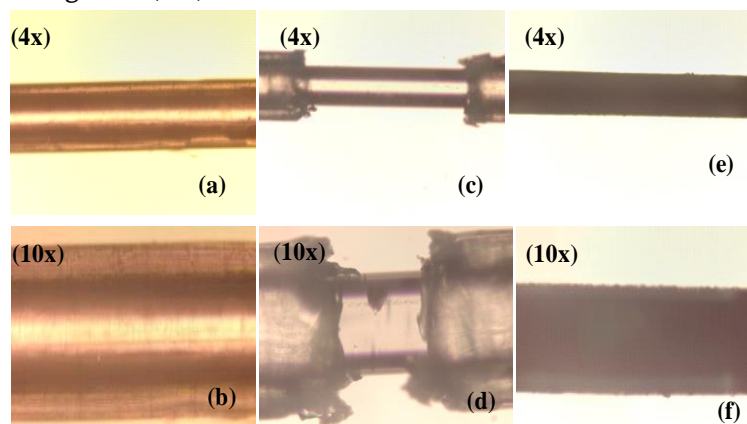


Figure 2 Optical microscopic images of optical fiber (a, b) with original cladding; (c, d) with removed cladding and (e, f) with polyaniline modified cladding

B. Sensing Response

Figure 3 shows the sensing response of FOIB for phosphate buffer solution (pH 7.4). It shows that there is no variation in power with respect to the time. It may shows that there is no interaction or reaction between enzyme-GOx and phosphate buffer solution.

Figure 4 (a, b) and figure 5 (a, b, c) are the sensing response of FOIB after adding the glucose solution in the cell enclosed with sensing element immobilized with GOx. Figure 4 (a) shows the interaction between GOx and glucose solution. It's a type of ON and OFF i.e. starts and ends of reaction and shows the uniform pattern or platues of it. It's in ON condition, while starting the reaction between GOx and glucose. After completion of the reaction it leaves behind Gluconolactone and hydrogen peroxide (H₂O₂), this condition is the OFF condition of reaction as shown in figure 4 (a, b). Again the enzyme GOx ready to interact with another glucose molecules and the reaction starts again. In this way power goes on increasing with respect to time and after the

interaction with all the glucose molecules, the power goes on decreasing as shown in figure 5 (a, b and c). Figure 5 (a) shows the increase in power during the interaction between GOx and glucose and the power starts decreasing as shown in figure 5 (b). Whereas, figure 5 (c) depicts the completion of interaction between GOx and all the molecules of glucose solution.

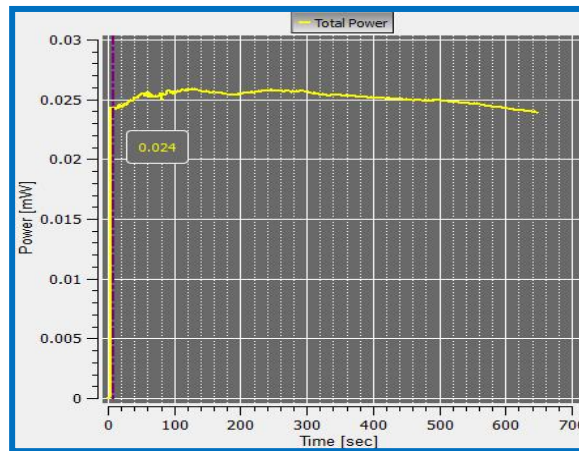


Figure 3 Sensing response of FOIB for buffer solution.

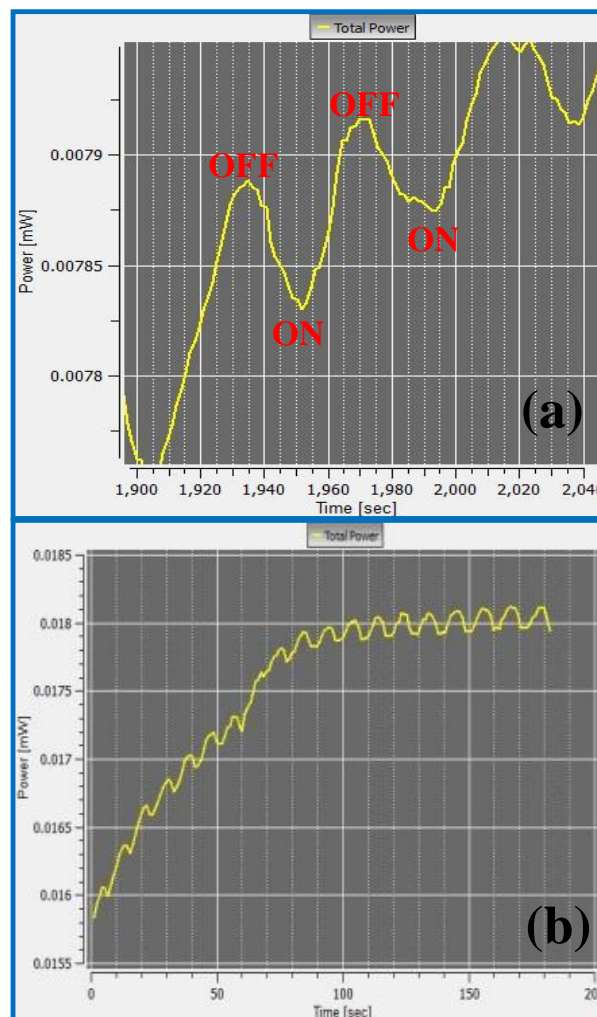


Figure 4 Sensing response of FOIB during the interaction between GOx and Glucose.

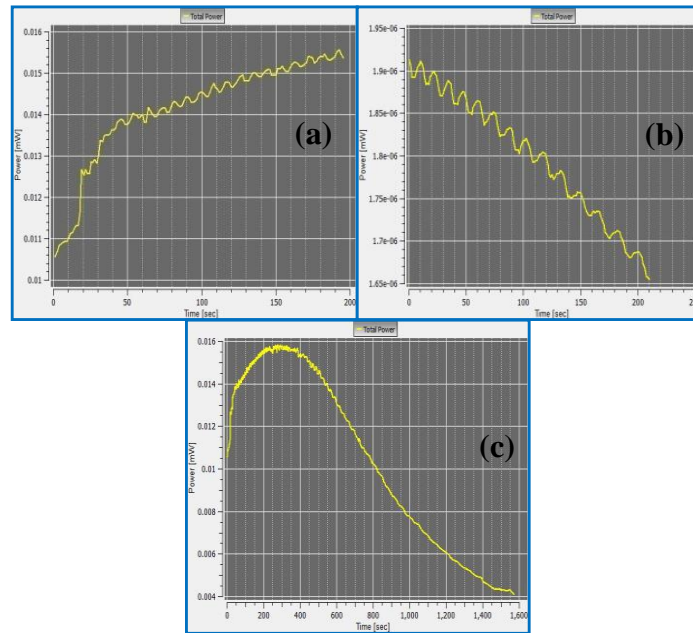


Figure 5 FOIB Sensing response (a) increasing, (b) decreasing and (c) completion of interaction between GOx and glucose.

IV. CONCLUSION

In the present investigation, a cladding modified fiber optic intrinsic sensor using biomolecules has been developed successfully. Polyaniline founds a suitable matrix for the immobilization of enzymes-GOx. Cladding modified FOIB has been successfully detected the glucose and shows sensing response or variations during interaction between GOx and glucose. At time of sensing, a type of uniform pattern or plates has been observed. It shows an ON and OFF i.e. starts and ends of reaction between GOx and glucose. It confirms the possible use of FOIB for immobilization of various biomolecules and detection of different analytes. It can also be effectively used in various fields.

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Synthesis of PPy-AA Film for Sensor Development

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ABSTRACT

Conducting polymers have been used extensively for sensor development. In the present study, PPy-AA thin film was synthesized at room temperature using chemical polymerization technique. PPy-AA thin film was deposited on PMMA substrate by oxidation of pyrrole (doped with Acrylic Acid) at room temperature by optimized process parameters. Synthesized film was characterized by FTIR, UV-Vis. Spectroscopy. Scanning electron microscopy shows suitable morphology for sensor application. Sensing behavior of the film for ammonia gas was studied by indigenously developed gas sensing chamber in the laboratory. The PPy-AA film shows good response to 10-20 ppm of ammonia gas at room temperature.

Keywords: Conducting Polymer, Polypyrrole, Acrylic Acid, Ammonia, Sensor

I. INTRODUCTION

Recently, conducting polymer, Polypyrrole (PPy) have been used as sensitive material for the development of gas sensors [1-9]. Chemical polymerization is the simple method to synthesize the PPy film [10-15] It is easy technique and can be controlled by suitable process parameters. The synthesized thin film found to be porous, stable, sensitive, and gives significant change in resistivity when exposed to ammonia gas [16-18]. Monomer Pyrrole (Py), dopant Acrylic Acid (AA) and oxidant ferric chloride (FeCl_3) have been used for chemical polymerization of PPy at room temperature and optimized the process parameters [19,20] These synthesized PPy-AA films on PMMA substrate were characterized by FTIR, scanning electron microscopy (SEM), ultraviolet-visible (UV-vis) spectroscopy. The sensitivity of the film to ammonia gas was studied by indigenously developed sensing chamber (Figure 1) in the laboratory [21-23].

II. EXPERIMENTAL

Py, AA and FeCl_3 were of analytical reagent grade were used to synthesized the thin film at room temperature ($29^\circ\text{C}\pm 0.5$) in 12 minutes. Monomer and oxidant solutions (with AA) were prepared separately with different concentrations (optimized parameters) in de-ionized water. After mixing the solutions slowly, polymerization takes place and PPy-AA thin film deposited on the PMMA slide rinsed with de-ionized water and dried in air. It was further exposed to ammonia gas and change in resistivity was measured using four probe instrument. (Figure 1) [24-29].

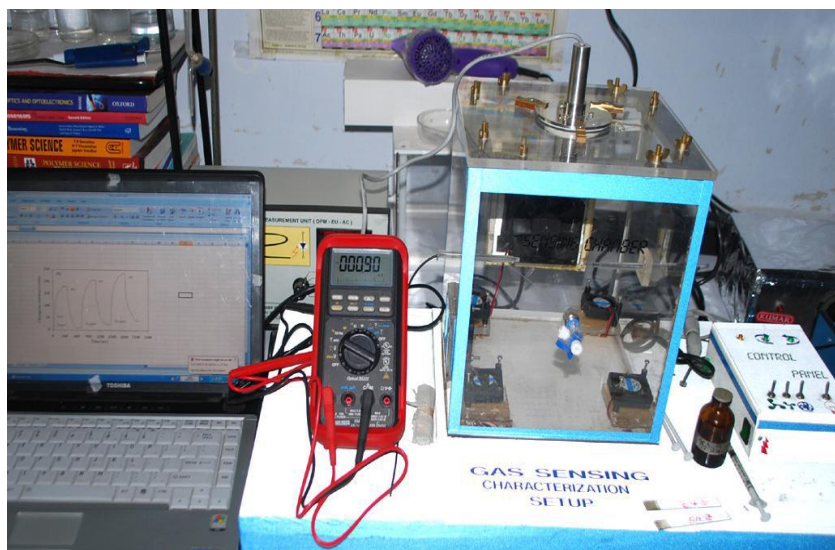


Figure1. Computer controlled gas sensing chamber

III. RESULTS AND DISCUSSION

In the present study, we have synthesized the PPy-AA films on PMMA substrate using optimized process parameters. Its physical and chemical properties along with surface morphology was studied using different characterisation techniques.

3.1. UV-visible spectroscopy

The UV-vis. spectrum recorded (by Chemito-UV-2100 spectrophotometer) in the range 350-800 nm for PPy-AA film in figure 2. It shows the absorption between 350 to 460 nm and absorption around 650 nm indicates the formation of PPy and its conducting nature.

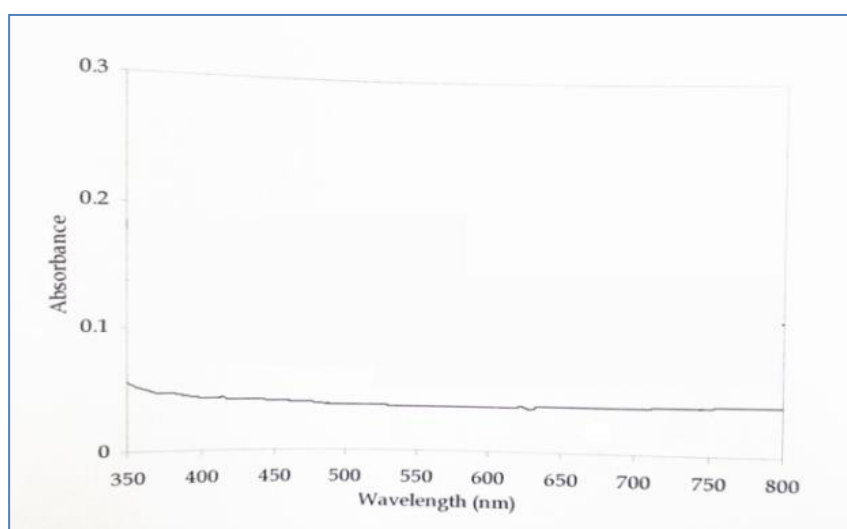


Figure 2. UV-Vis. Spectrum of PPy-AA film

3.2. FTIR Analysis

Infrared spectroscopy recorded in the range 500-4000/cm (Figure 3) shows the absorption or transmittance of the PPy as a function of wave number. Functional groups in PPy is indicated by absorption at different Frequencies. The broad peaks around 3732/cm shows N-H stretching. PPy ring stretch was observed around 1527/cm to 1546/cm. The peaks at 3180/cm and 2960/cm assigned to $-H_3$ and $-CH_2$. All these characteristic bonds represents the formation of PPy in the thin film.

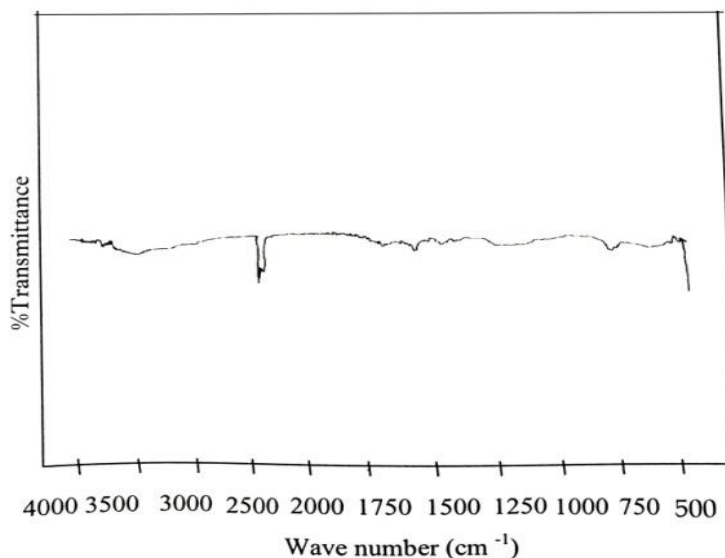


Figure 3. FT-IR Spectrum of PPy-AA film

3.3. SEM Analysis

Scanning Electron Microscopy of the synthesized PPy film was studied by using JEOL-JSM-6360A machine (Figure 4). The PPy-AA film observed to be uniform and adhesive. The micrographs show granular and porous surface morphology, suitable for gas sensing applications.

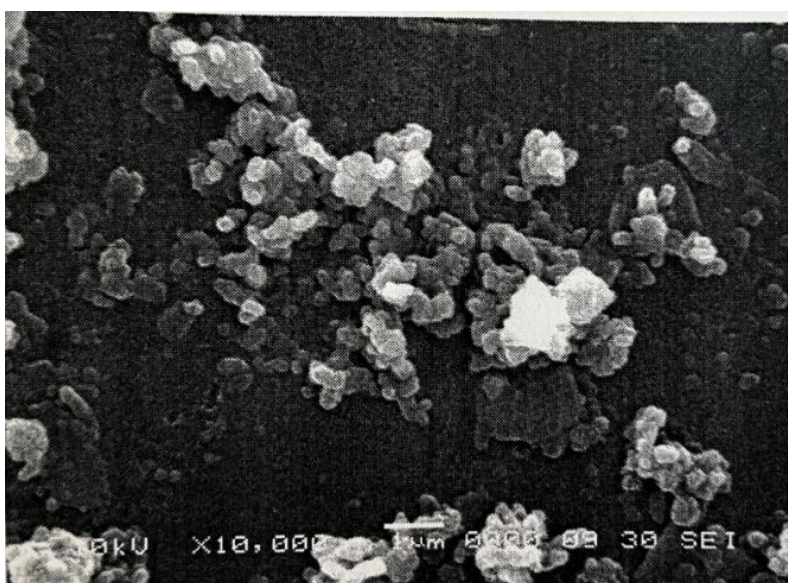


Figure4. SEM image of PPy-AA thin film

3.4. Sensing characteristics of Ammonia

Sensing Chamber with Four Probe instrument was used to study the sensing characteristics of Ammonia (Figure 4). An ammonia-air mixture with different concentrations was taken from the bottle containing ammonia solution and injected in the chamber. Interaction of ammonia with PPy-AA film increases the resistivity. The sensing behaviour in terms of change in resistance when exposed to ammonia gas (5-20 ppm) is shown in figure 5. It shows good response to 10-20 ppm of ammonia.

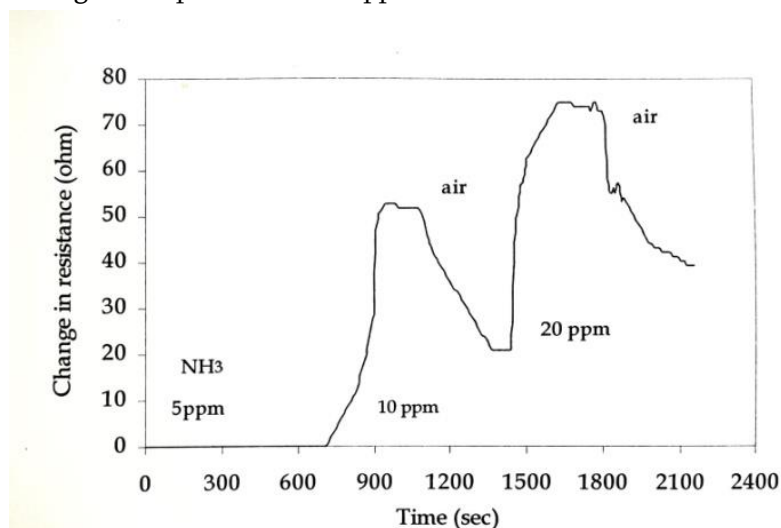


Figure 5. Sensing reponse curve of PPy-AA thin film to 10 -20 ppm of ammonia

IV. CONCLUSION

In this proposed research work, the PPy-AA film has been successfully synthesized on PMMA substrate by oxidative chemical polymerization at room temperature $29^{\circ}\text{C} \pm 0.5$. UV-vis., FTIR analysis confirms the formation of conducting PPy. SEM shows the uniform, adhesive and porous surface morphology. It was observed that the film shows good response to 10 to 20 ppm of ammonia. This supports the functioning of the proposed mechanism as sensor.

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A Comparative Study of Bio-Electric Power Obtained From Bio-Galvanic Cell Arrangement Using Onion, Lemon, Orange and Aloe-Vera for Green Power Source

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ABSTRACT

A battery or wet cell stores chemical energy and converts it into electrical energy when proper electrodes are used. Fruit or plant as a battery consists of electrolyte solution which conducts current if proper electrodes are inserted. This work is focused on comparative study of bioelectricity obtained from Onion bulb, Lemon, Orange and Aloe vera plant for the development of Eco Friendly- sustainable power batteries using a Direct Galvanic Cell (DGC) type arrangement. The natural organic elements selected to make Biogenic Galvanic Cell (BGC) or battery contain electrolyte or gel type solutions containing acids which form a battery after insertion of positive and negative electrodes. Open circuit voltages obtained from all galvanic cell arrangements were found near about 1V. Lemon BGC was found to have better output power providing capacity. But Onion BGC has shown sustainable continuous and constant power providing more capacity than Lemon BGC even after 40 days. Power conversion efficiency of Lemon BGC was found to be 0.2857 whereas for Onion BGC it was 0.1417.

Keywords: Electrode, DGC, BGC, Power, Lemon.

Ethics and Social Responsibility of Social Media in India

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ABSTRACT

The media is a fundamental Institution of the society. It plays a very vital role in democracy. It is the voice of democracy against illegal activities. Freedom of media in India is one of the important aspect for the nourishment of Fundamental Rights enshrined in the constitution of India. The media's role in society includes acting as a Watchdog and enhancing the free flow of information to public, therefore media is called the fourth pillar of the state. Although, the role of media in a democratic system has been widely debated. Being a largest democracy in the world and media has a powerful presence in the country. In recent times, Indian media has been subject to a lot of criticism for the manner in which they have disregarded their obligation to ethics and social responsibility. The Social Media has also become the integral part of human being at present. In today's society, the use of social media has become a necessary daily activity. Social media is typically used for social interaction and access to news and information, and decision-making. It is a valuable communication tool with others locally and worldwide, as well as to share, create and spread information. More than 86% of all business have a dedicated social media platform as part of their marketing strategy. Social Media is a big platform not only for promotion or marketing but one can also reach out millions of people and share their views, through social media, every person is aware of what is happening around them. But like any other theory social media platform have certain disadvantages. On the social site you will get easy to read false and baseless news. The government is still not regulating the ethical aspect of the social media and there is no control over the flow of information in social media. Some people create religious hysteria and hatred, through their thoughts and expression, on social site. Prank videography has become a fashion among teenagers, they have been totally forgotten decency and morality and serving vulgar and obnoxious scene before the viewers, consequently sexual sensuality are taking birth in young children and pushing them into criminal activities. Facebook, YouTube and many other sites are openly disseminating the horrible and offensive scenes on their screen, besides this you can find the advertisement regarding, treatment of incurable diseases, occultism, Magic remedies and many misleading things. Many people get cheated by coming under pretense. Due to prevalence of social media, online fraud and Cyber crimes are increasing day by day in society. Hence a strong legislation is required, by which a reasonable restriction could be imposed on social media. This paper with discuss about the role of social media in context of ethics and social responsibility

Key Words: Social Media, Ethics, social responsibility, cyber crime

Review on Security-Based LEACH Protocol for Wireless Sensor Network

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ABSTRACT

Wireless sensing nodes emerged as a response to the growing demand for ubiquitous monitoring of particular environments, enabled by advances in communications and IT. It's cheap, versatile, compact, and energy efficient, but only in moderation. One of the most pressing issues in wireless sensor networks is how to extend the network's operational lifespan. Many different routing protocols have been developed, each with its own set of advantages and disadvantages. It is preferable for low-energy and long-lived networks because routing protocols can be relied upon to find the most efficient channel of communication between the transmitter and the receiver. The goal of this study is to compare and contrast various routing protocols and highlight their advantages and disadvantages.

Keywords—Energy efficiency, Hierarchical routing protocol Residual energy, Wireless sensing nodes, LEACH

I. INTRODUCTION

The idea behind wireless sensor networks (WSN) depends on eliminating the need for human intervention at each stage of the data collection and transmission process [1]. WSN is composed of a large number of relatively small autonomous sensing nodes that collaborate to gather data about their immediate surroundings and process it before transmitting it to a central station. Random sensor nodes are placed in inaccessible regions. Though most of the uses for this network include war and disaster management, such as earthquake and fire detection, it also has numerous peaceful uses, including as air traffic control, healthcare, electronic selling points for a variety of businesses, and more [1]. To "route" anything is to choose the best path between a starting point and an endpoint. On order to ensure high reliability and rapid performance, this is done in the network layer to direct and transport data.

Because of how inconvenient it is to go to the sensor nodes' publishing locations, it's crucial that they stay operational for as long as possible to ensure reliable monitoring. Batteries, which are contained in such nodes, are known to have a finite lifespan. Therefore, avoiding the premature energy depletion of sensor nodes is a key and essential aspect of prolonging the lifespan of the network as a whole. Numerous routing protocols, such as those based on geography and those based on clustering, have been created in recent years, each of

which may be further subdivided into a number of subcategories. hybrid routing protocols, data-centric routing protocols, and other such protocols [3]

Additional groups may be found in [2][4], which are as follows (according to the initiator of communications, according to the operating mode, according to the protocol operation and according to the design of network flow). Section II covers the remaining research. Topics include obstacles in route, Routing in WSNs Methods and common routing protocol descriptions, Section III; Section IV. Section V. different LEACH-type routing protocols is the last chapter of this paper. Section IV. low-energy adaptive clustering hierarchy Final Thoughts and Citations.

II. TOPICS OF ROUTING CHALLENGES

Due to limited energy, arithmetic, and basic units like memory and others, the design of this network is influenced by numerous issues, including the inability to scale, lack of awareness of energy level, and lack of complexity in the routing protocol that we consider excellent in WSN [2].:

A. Deployment of the sensor node

The efficiency of the routing protocol is heavily influenced by the deployment strategy for the sensor nodes, which in turn is determined by the kind of application being used. There are two main methods for deploying sensor nodes: randomly (self-organizing), as we discussed before, or carefully and precisely. Energy efficiency is heavily dependent on the positioning of the sensor nodes, particularly the cluster head and base (monitoring) station..

B. Network traffic status

Due to the simplicity of regulating them and defining the proper routing protocol, ordinary sensing nodes other than the group's (cluster's) head or monitoring station are preferred to be (static) non-moving. However, there are cases when a moving sensor node is necessary..

C. Tolerance of Faults

When a sensor node fails, the routing protocol must establish new connections to prevent the network from losing data about the surrounding area..

D. Scalability of the WSN

The potential for dozens or perhaps millions of sensor nodes routing protocols need to be able to deal with a large density of nodes, perhaps in the tens of thousands, in the region being monitored.s.

E. Constraints on hardware

All units that make up the sensor node must be present as small as possible and consume the lowest possible power and examples of these units are: GPS, communication, sensor, power, memory, etc.

F. Information Transfer

In most cases, data is sent wirelessly, which is susceptible to interference and results in a weaker signal than a wired transfer would.

G. Conservation of energy

When the network is first being constructed, energy efficiency is a major factor in deciding which paths to take. assuming that the network's reliance on radio transmission power decreases at a rate proportional to the square of the distance squared or greater in the presence of interference and obstructions, Single-hop is efficient for low-density networks with close-by sensor nodes, whereas multi-hop uses less energy while adding to the network's problems..

H. Models for data delivery

Continuous, event-based, inquiry-specific, or a hybrid of these modes of data delivery to the monitoring station are all possible. Every sensor node transmits data on a periodic basis if the process is continuous. However, in the second and third types of delivery, the node is engaged when an event happens or when the data source requires specific information. This method of distribution impacts the routing protocol, particularly with regards to the problem of low power usage..

I. Aggregation / fusion of information

It is the process of aggregating information from several sensor nodes with the aim of thwarting any possibility of repetition. Packets are collected from various sensor nodes by the network in an effort to lessen the amount of data sent and, by extension, the amount of power required for the transmission.

III. WSN ROUTING METHODS AND EXPLANATIONS OF COMMON ROUTING PROTOCOLS

Reactive routes calculate the pathways when the true need is only, whereas proactive paths calculate the paths in advance of when they are really needed, and mixed paths do both. As the network often consists of hundreds of sensing nodes, mixed protocols integrate them, whereas proactive calculates all pathways in advance of the true requirement for them and keeps these paths in a routing table for each node, rendering proactive worthless.

Generally speaking, routing protocols may be categorised into three broad groups: flat-routing, hierarchical, and location-based. routing. the first one (in flat-based routing) all of the nodes perform the identical function so data is transmitted from each sensor node with a high redundancy of data [2].

Hierarchical Protocols, this type of protocol is intended to raise the efficiency of the network, extend its lifetime, increase the scalability, and cover a larger field of sensor nodes based on two steps: the first is to select the head of the cluster and the second for routing. Clusters are created in this type of protocol [2].

Location-based protocols, there is a correlation between the distance between two sensing nodes and the energy needed to transfer data between them, so sometimes we need to know the location of the node and we can do this either through GPS or other methods [2]. See Figure 1.



Fig. 1: Types of routing protocols.

The conventional wisdom holds that each sensor node should send its data directly to the base (monitoring) station; this method is known as Direct Transmission (DT), but it does not guarantee a fair distribution of power consumption among the nodes, which eventually results in the death of the sensors (MTE). Therefore, emphasis was placed on hierarchical protocols that save more power than flat routing.

When using a WSN's clustering techniques, the sensor network is partitioned into a number of clusters, with one node in each cluster being designated as the "cluster head" by the other nodes in the network. This node's responsibilities as cluster head will be shared among the other nodes in the network in accordance with the routing protocol's chosen algorithm. At present, the cluster header delivers a single signal packet to the base (monitoring) station by combining and collecting data from many packets [5].

Elections are broken up into numerous rounds in clustered routing; modifications may be made after each round to provide a more optimal distribution of energy use in a wireless sensor network. By dividing the clusters into smaller networks, the overall network's size is reduced via the process of clustering.

Advantages of the Cluster Process are discussed below [6]:

- Clustering divides the network's nodes into smaller groups; the cluster's leader handles communications with the base station so that everyone in the group may focus on their own tasks..

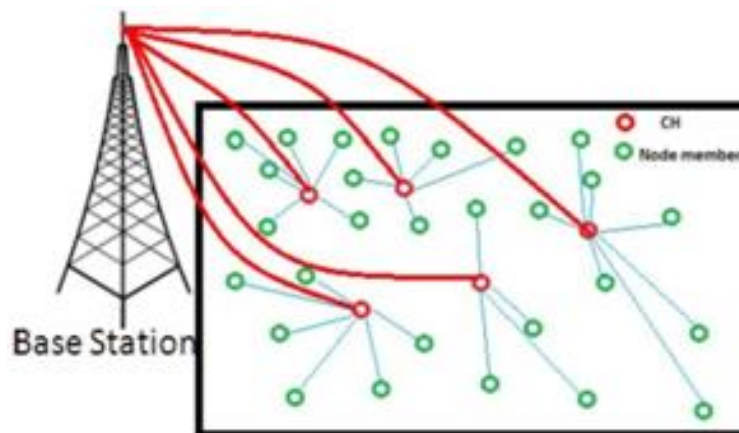


Fig. 2: Creation of clusters. [5]

- To sum up: • Unlike with conventional routing protocols, the base station only communicates with a small subset of the network's nodes; the remainder of the cluster's members need not even interact with the base station at all..
- The allocation of loads should be regulated: the result of dividing the wireless sensor network into groups is the final functions are spat, which ultimately helps to ensure the same power dissipation between all sensor nodes. Consequently, every sensor node has a specific work to do at a specific time, while the nodes that fall away from the monitoring station die faster in flat routing protocols, losing their energy faster than the nearby nodes and thus increasing the energy consumption of the entire network.
- Information aggregation / fusion: Nodes transmit data signals to cluster headers, which aggregate the data to either eliminate duplication or combine the data signals into a single signal.
- By switching the cluster leader around and minimising the chances of failure for the far-flung nodes, the network's lifespan is increased and made more reliable.
- Since only the cluster leader communicates with the base (monitoring) station, collisions are avoided, unlike in the flat model where all sensor nodes relay their data to the central hub..

IV. LOW ENERGY ADAPTIVE CLUSTERING HIERARCHY (LEACH)

It has been suggested by W.B.Heinzelman in [3], LEACH is the original hierarchical routing system for sensor networks, LEACH is an adaptive clustering method which uses randomized cluster head rotation to evenly distribute the energy load between the sensor nodes in the network. It is a very flexible and random (self-organizing) protocol. LEACH utilizes a one-hop routing.

Every WSN is split into clusters and each cluster consisting of a cluster header and normal cluster nodes. In this protocol, the head of the cluster is randomly chosen and this role revolves around the rest of the sensor nodes to check the power balance of the network. The head of the cluster is directly connected to the monitoring station and stops the rest of the nodes as much as possible to reduce energy use, as stated in this protocol, Operation LEACH is split into various rounds, and each of these rounds consists fundamentally of two phases: one is the Setup phase and the next is the Steady phase.

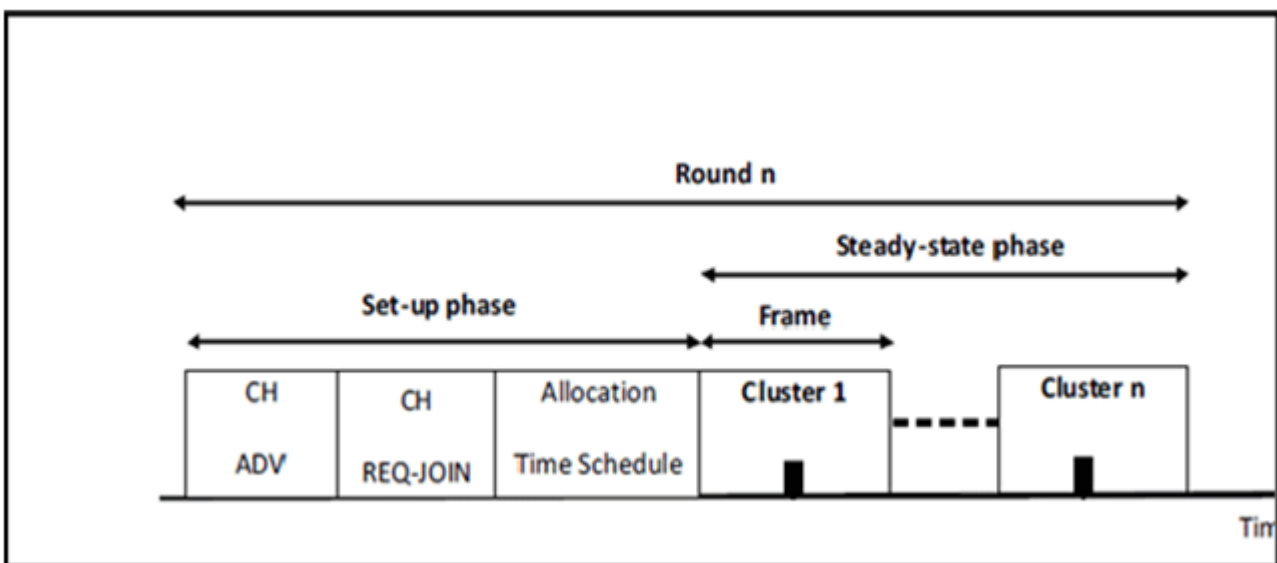


Fig.3: Operation of LEACH [12].

Initially, the node will choose a random number (n). Whether this number (n) is less than the threshold defined in the first equation T(n), then the node is chosen as the header of the cluster.

$$(n) = \left\{ \begin{array}{ll} \frac{p}{1 - p * (r \bmod \frac{1}{p})} & \text{if } nc \ G \\ 0 & \text{otherwise} \end{array} \right\} \quad (1)$$

While p is the likelihood of the cluster head, G is the collection of nodes that will never be selected as cluster-head nodes before 1/p round.

After the heads of the cluster have been chosen, each cluster header node will send its data to the other nodes via CDMA (Code Division Multiple Access), and the normal nodes will connect the closest head to it. Then the cluster head nodes use TDMA (Time Division Multiple Access) to provide time for the transmission of data for each node attached to them.

In the second stage, data is transferred from the normal nodes to the head attached to it and processed (combined and assembled) at the head of the cluster, and then the head of the cluster sends it to the monitoring station.

According to [7][3], the most prominent disadvantages of LEACH are:

Because the LEACH protocol does not account for the initial energy of each node, each node has an equal chance of becoming the cluster leader, which is unacceptable. If a node with low energy is randomly selected, that node will die rapidly, bringing the whole network down with it.

- Unacceptable distribution for cluster heads: due to the random, non- studied selection of the cluster head, it generates an imbalance in the network load, the distance, and other metrics.

Not considering the distance between the cluster's leader and the central hub prevents the network's energy from being optimised, which is a major issue.

There is added responsibility for the cluster's leader node, which must gather data from the regular nodes and relay it to the control centre in a single hop (hop). We can predict that it will run out of juice sooner than typical nodes. Once the cluster's leader passes away, the rest of the nodes will soon follow.

- Because of the delay it causes, it is incompatible with the time-sensitive application.

It can't be connected to a wide-scale sensor network.

- As we've established, data transfer to the monitoring station may take many forms, including a constant stream, a burst of information in response to an event, a specific query, or a combination of these. However, the LEACH protocol is best suited for the continuous form of delivery.

Since randomly created clusters might vary in size, some could have a lot of sensing nodes while others have very few. As a result of these disadvantages of the LEACH protocol, we will show in section five some of the protocols that have been found in order to solve these issues.

V. VARIOUS ROUTING PROTOCOLS OF TYPE LEACH

Various routing protocols of type leach listed below:

A. LOW ENERGY ADAPTIVE CLUSTERING HIERARCHY CENTRALIZED (LEACH-C)

LEACH-C is based on the LEACH basic protocol and also made up of rounds and is split into two-phase, it is a centralized protocol, this protocol assumes the following:

- Each sensor node can compute its energy level and send it to the monitoring station.
- Each sensor node can send its location exactly monitoring station.

Information about the location and energy of each sensor node is sent to the monitoring station by the nodes. Then the station chooses the nodes to have more energy than the average total power of the network as a cluster head, and create the best clusters depending on the minimum distance [6].

B. LEACH-Balanced (LEACH-B)

LEACH-B this revised version of the LEACH protocol gives a second choice for cluster heads at the Setup stage in each round in order to keep the cluster heads number constant and closer to optimal (Based on what was mentioned in [10] the optimal value for the number of cluster heads ranges between 3 percent and 5 percent) and thus reduce energy consumption, it is decentralized protocol, LEACH-B has improved energy efficiency compared to the original LEACH protocol [3].

C. Advanced Low Energy Adaptive Clustering Hierarchy (A- LEACH)

We also know that the head of the cluster is the one what collects data from the normal nodes and transfers them to the monitoring station so that its energy is quickly drained relative to the normal nodes, in the Advanced-LEACH protocol increases the period of stability (The time previous to the demise of the first node) and reduces the probability of death of the head of the node, each sensor node the beginning of each round is known by a synchronized clock.

We assume that (n) is the full number of nodes while (m) is the number of nodes that carry more energy than normal nodes name CGA nodes (nodes chosen as cluster heads or gateways) and the rest is (n)*(1-m) represents normal nodes, and these nodes remain sent to the monitoring station even after the normal nodes fails [4].

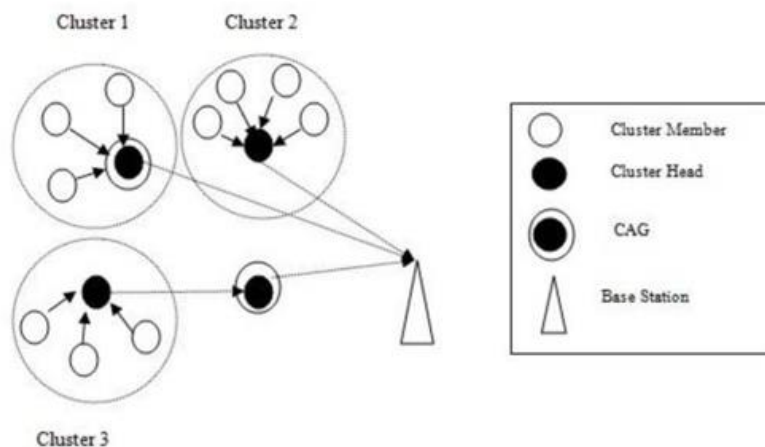


Fig.4: LEACH -A system [4].

D. Energy Low Energy Adaptive Clustering Hierarchy (LEACH-E)

Based on the LEACH protocol, E-LEACH ensures that all nodes consume an equal amount of energy. This is especially important in hierarchical routing protocols, where the number of cluster heads has a significant impact on the protocol's ability to function correctly: if there are many cluster heads, the protocol will run inefficiently and reduce the lifespan of the network as a whole, while if there are few cluster heads, each will have to handle a larger area, which increases the likelihood of failure.

E. Fixed Number of Clusters LEACH (LEACH- F)

Like the LEACH-C protocol, this protocol is a centralized approach, the clusters are fixed, and the rotation is only for the header of the cluster within the same cluster. The steady-state is identical as the original LEACH since the number of clusters has been determined in advance, the energy required for re-clustering is provided, but it is not flexible in the event of adding, removing or dying a sensor node [4].

F. Vice Cluster Head LEACH (V- LEACH)

V-LEACH this revised version of the LEACH protocol,

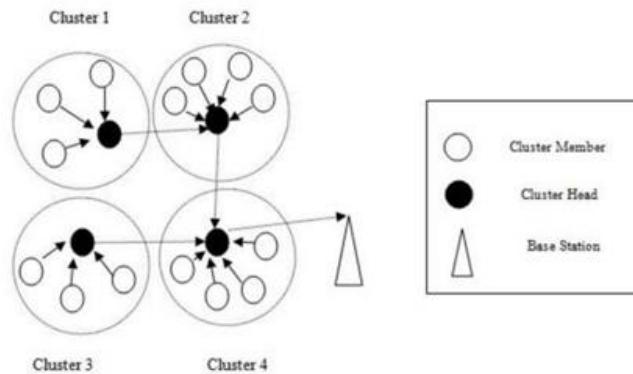


Fig.5: LEACH -E system [4].

We also know that the cluster leader's energy is rapidly depleted in comparison to the regular nodes since it is the leader that gathers data from the normal nodes and passes it to the monitoring station. As a result, you'll perish before the rest of the nodes, and once it dies, the whole cluster loses relevance since it can't send data back to the base station. This protocol was designed to prevent this from happening. When the CH's life is taken, another character takes up their duties. As a result, all information will reach the monitoring station, extending the network's overall lifespan; yet, should the vice- CH die, the protocol will still be helpless to resolve the resulting issue. [7].

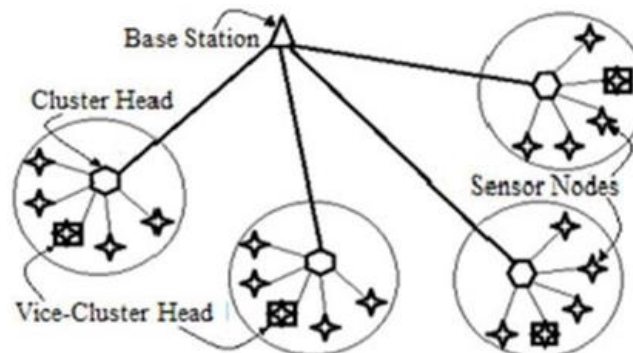


Fig.6: LEACH -V system [13].

G. Cell Low Energy Adaptive Clustering Hierarchy (Cell- LEACH)

This is a revised protocol from the original LEACH protocol, the entire network is split to several clusters and each cluster is split to seven sub-clusters called cells and each cell has a head whose task is to collect data from the normal nodes (it is chosen at the beginning and in the later stages each old cell head makes calculations dependent on the remaining energy, a new cell head is selected) and the heads of the cells and the heads of the clusters are contacted directly [8].

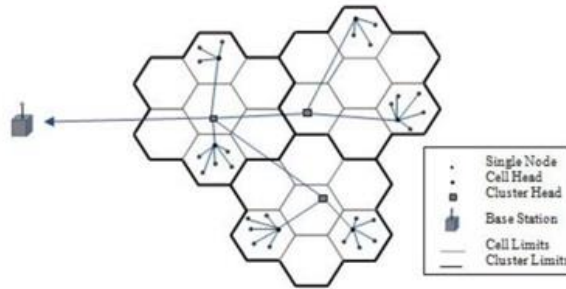


Fig.7: LEACH -Cell system [2].

H. Multi-Hop LEACH

The cluster head of an intermediate cluster is used in the LEACH protocol to shorten the distance between the sensor nodes and the monitoring station, saving a lot of energy. This is referred to as multi-hop communication. The cluster leader that is physically closest to the monitoring station collects data from the other cluster leaders and transmits it to the station; this uses less power and takes use of the most direct route between the cluster leader and the monitoring station [9]. Knowing that in the original LEACH protocol, any sensor node can become a cluster head, and that becoming a low-energy node of a cluster head signals the death of the entire network, an adjustment was made to the choice of the head of the cluster based on its energy; to increase the likelihood of the sensor with the most energy becoming a cluster head and thus increase the network's lifespan. [9].

To get the best exploit of the free TDMA, TDMA schedule is improved in the steady state. In some protocols for a specific event to happen, some sensing nodes may not have data that you want to send so the TDMA slot is lost. Each sensor node looks at its role in the current round if the node has data to send then send it and if it does not have data, the TDMA slot is given to another sensor node as Fig 8 [9].

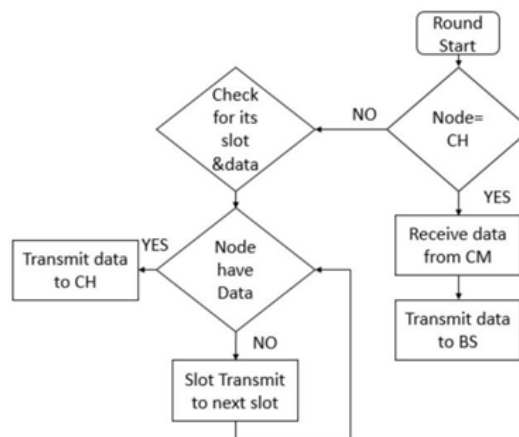


Fig 8: The new revised TDMA outline [9].

VI. CONCLUSION

The rapid development of subjects like multiple computing, novel nanotechnology, and a wide range of contemporary applications means that this kind of study is far from being exhausted. We share some findings from our investigation into the various routing protocols and attempt to show how doing so reduces the network's overall power usage. We found that the Multi-Hop LEACH protocol improves upon LEACH by making three changes: allocating the dormant TDMA node to the next node if the previous node has no data to offer; carefully selecting the head of the node; and increasing the number of terms in the original equation. The introduction of procedures other than LEACH is something I want to do in my future research.

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The Review: The Contemporary Era's Technological Advancements and the Current Economic Crisis

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ABSTRACT

The importance of the fresh perspectives on the technological advancement is emphasised in the essay. It created a fresh understanding of technological innovation in contemporary society (from 1600 AD). Based on advancements in informatics and telecommunications, the most recent fifth generation is just about to come to end. The current economic crisis (2023) must also be viewed as the disaster of the innovation cycle's conclusion. A post-informational technology revolution that could begin around 2030 might be able to defeat it.

Keywords: Economic Crisis, innovation, invention, technological revolution, technological progress.

I. INTRODUCTION

The word "information revolution," which became popular from 1960 to 1980, emphasised the extent to which computers and information technology had permeated society and the economy. This revolution was once thought to represent a profound shift in social structure comparable to the early nineteenth-century Industrial Revolution. Since 1980, the term "post-industrial society" has been used to describe the society that has emerged as a result of this transformation, owing to the influence of American sociology professor Daniel Bell (born 1919)³. Because of the influence of Heidi and Alvin Toffler, the terms third generation society⁴, super-industrial society, and information society became commonplace. In accordance with their concept.

The coal and steam age (1780-1840), enabled by the first generation of the industrial revolution, was the first of the cycles identified by Kondratieff and later by Schumpeter and their contemporaries²⁷. This was followed by the railroad and mass production eras (1840-1890), the second industrial revolution, and the era of electricity (1890-1940), which began with the so-called technical revolution. Theorists later included the age of electronics and microelectronics (1940-80), which began with the so-called scientific-technological revolution, as a fourth generation. The information and telecommunications revolution²⁸, which began around 1980, should be considered the catalyst for the current era.

II. STAGES OF HUMAN DEVELOPMENT

It seems sense to divide human growth into four stages for the reasons outlined above:

- Typical agrarian society.
- Today's societyThe following phenomena²⁹ can be used to describe our current modern society.
- The advancement of the natural sciences, the use of science in technology.

- Development of contemporary governments.
- Capitalism
- Industrialism
- Slavicism (freedom from religious concepts in politics, economics and science).
- improvement of education.
- Economic expansion and development
- Development of democracy
- Wealthy society
- Liberalism

III. TECHNOLOGICAL INNOVATION

The distinction between inventions and innovations should be explained first: The term "innovation" refers to the economic (and social) aspects of any novelty, whereas "invention" refers to the technological and scientific aspects of any novelty. The novelty (new discoveries or new patents) is socially and economically relevant when it is in a form that can be used in industry and social life and society is ready to use it (in this moment they become innovations). The frequency and radicality of technological advancements do not follow a consistent pattern over time. Revolutionary innovations in modern society tend to occur in generations rather than continuously. ³⁸ Each of these generations has an invention phase.

Because most discoveries and reforms are motivated by a desire to improve something, solve a problem, outperform a competitor, increase productivity, or perform a task more efficiently, among other things, this acceleration and slowing of technical growth is the result. However, because they are interdependent, it is necessary to carry out more inventions at nearly the same time during the innovation phase (a spinning machine and a weaving machine or a personal computer and an internet). A "chain of innovations" is something we can talk about. This system and the chronology of the idea of technological innovation generations provided in this article have some similarities. Freeman pioneered the "computerised economy" in the 1960s and 1970s (during a "shadow phase"), but the true boom didn't begin until a few years later. This is most likely due to his enthusiasm for the potential of this new industry. He also misunderstood the nature of the 1800-1815 crisis, stagnation, and economic issues, leading him to divide the Industrial Revolution into two generations, 1 and 2. However, non-technological and non-economic factors, such as the Napoleonic Wars and the fact that the then-existing modern capitalist economy was in its infancy, contributed to this stagnation.

	Technological revolution	Period of technological revolution	Length of the whole generation of technological innovations	The leading sectors
1.	Financial-agricultural revolution	1600–1740	180years	Finance agriculture, trade
2.	Industrial revolution	1780–1840	100years	textile, iron, coal, railways, channels
3.	Technical revolution	1880–1920	60years	chemistry electro technical industry, machinery

4.	Scientific-technical revolution	1940–1970	45years	air-industry, nuclear industry astronautics synthetic materials, oil industry cybernetics
5.	Information and telecommunications revolution	1985–2000	30years?	Telecommunications cybernetics informatics internet

IV. THE REVOLUTION IN FINANCE AND AGRICULTURE

Few people are familiar with the industrial revolution or the subsequent revolutions. The steam engine, railroads, telegraphs, mass production, and other innovations were born during the industrial revolution. The technological revolution, also known as the "second industrial revolution," gave birth to the radio, automobile, aeroplane, electrical devices, and modern chemical industry. Nuclear energy, electronics, space travel, and other innovations are the results of the scientific and technological revolution. We now have the internet, mobile phones, satellite broadcasting, thanks to the information and communications revolution. The agricultural revolution, which served as a precursor to the industrial revolution, is still in its infancy, but knowledge of its significance is growing slowly. At the end of the seventeenth century, the activity began in Flanders and Holland, but eventually spread to Britain.

The changes in trade and financing were also strongly related to the agricultural revolution. The "financial revolution" has been used to characterise this phenomenon. In the seventeenth century, Holland was where the modern approach to managing money and finances first appeared. It entailed separating household management from business management. Reliance on metal currency started to decrease. The acceptance of the legality of collecting interest on loans and credit coincided with the development of banking and its fundamental tools and practises. Credit began to be regarded as a source of capital (rather than loans for consumption).

V. THE REVOLUTION IN INFORMATION TECHNOLOGY

An easy and appealing reminder of this upcoming surge of innovation and modernisation can be found in the information society, or even better, the information technology revolution. There will probably still be time to find a better name. It would be helpful to make predictions about the fields of science and technology that will grow most rapidly during this anticipated generation of innovation and provide the best returns on investments:

The pharmaceutical, biotechnological, and biomedical sciences are likely to advance the most because of genetic engineering, cloning, new medications, and the possibility of direct connections between machines and living organisms, which will allow for the modification and improvement of the characteristics of living things, including people.

The growth of biotechnology, which uses living organisms in the production process, and nanotechnology, which allows for the molecular manipulation of objects, is fundamentally altering how we think about both medical treatment and industrial production.

An increased focus will be placed on numerous environmentally friendly alternatives to the current production methods.

Alternative fuels will supplement and, recently, replace traditional fuels (diesel, gasoline) (hydrogen and fuels made from agricultural produce and vegetable waste). Of course, this won't be any "cheap" fuel. For instance, switching to hydrogen and oxygen as the primary fuel for transportation will result in higher power usage for their generation from water. Although the hydrogen engine has already been developed.

Nonetheless, the globalisation is probably the key factor explaining why industrial robots are (and will be) less common than anticipated in the 1970s and 1980s (Japan being the exception). To this day, it is still less expensive to relocate less efficient and polluting production processes from the USA and Europe to Asia, South America, and former socialist countries, or to hire less expensive labour from underdeveloped nations (immigrants), Yet, every technological advancement in the past has altered the relative positions of nations in the global economy¹⁰², and the freedom to introduce robotics into mass production may be a factor in the possible "peripheralization" of the Western economy.

This imagined technological revolution in the future could be referred to as the biological-hydrogen revolution.

VI. EFFECTS OF THE LATEST TECHNOLOGICAL BREAKTHROUGH GENERATION

As with every technological revolution, there will be significant social, political, and economic ramifications. It might result in a decline in the significance of oil as a factor in world politics and economy. As developing nations, China and India may continue to consume heavily, at least in the industrialised Western states. Concerns are especially strong about procedures and methods that could lead to specific changes in human nature, such as extending human life, enhancing traits, or developing new channels of communication. We are currently unable to fully comprehend the potential breadth of social and economic exploitation that this could lead to right now.

Instead of stifling scientific and technological progress in the name of preserving the status quo or clinging to antiquated ideologies, it is preferable to accept some degree of social change, even apparent crises, and come to terms with them through social transformation. There is a risk that the post-informational technological revolution will begin but will be temporarily slowed by artificial legal and political measures because potential rapid advancement will occur in morally and politically sensitive areas. There is also genuine concern that Western nations will be unable to maintain industrial production, with social tensions serving as the primary impediment to their adoption of new robotics-based industrial production techniques.

VII. AN OUTLOOK FOR THE FUTURE

The biomedical-hydrogen revolution would be an appropriate name for the next generation (sixth) of technological advancements, which are expected to begin between 2015 and 2020. However, technological advancements may be so rapid that this technological revolution will not even last 15 to 20 years, and its application phase will be completed by 2035. Furthermore, a subsequent generation of inventions, in this case the seventh, could begin after 2035-2040. The current economic downturn should be viewed as the end of the fifth generation of technological innovation, which began around 1985 with the information and telecommunications revolution (or as the end of one of Kondratieff's economic "long generations").

The lesson for their national government is clear: if their long-term goal is to rank among the most developed countries (or to remain in this group), they should focus not only on cutting-edge technology from the recent past (the automobile industry) or the present (infrastructure technology), but also on technologies from the future: nanotechnology, biomedical sciences, transhumanism, biotechnology, the pharmaceutical industry, and alternative energy. They should take advantage of this opportunity. Any technological innovation can be viewed as a transfer of power and an opportunity for outsiders to overcome technical limitations¹⁰⁵. The countries now have a much better chance of improving their standing in the global economy..

VIII. CONCLUSION

New technologies improve the efficiency of usage of existing natural (and human) sources, is meaningful long-term economic growth without additional sources from "outside" feasible. The rate of this advancement varies, though. There are times when new ideas advance quickly, and other times when innovation and new inventions are more focused on practical applications. These historical eras can be divided into five generations of technical invention, each with two stages: the initial technological revolution and the next stage of application.

The financial and agricultural revolution was the first of these technical revolutions, though its significance is still not fully appreciated. In economic and technical history, the earlier technological revolutions are well recognised. As of 2008, we are in the application phase of the fifth generation of technology, which came after the Information and Telecommunications Revolution (1985-2000).The sixth generation, which would bring about a technological revolution, may begin around 2015 and end quite quickly (in around 20–25 years?).The fields of biological sciences, nuclear technology, hydrogen engineering, and possibly robots will advance at the fastest rates, according to expectations. The 7th generation following 2035–2040 and the generations that follow (8th, 9th etc.).The best advice for governments looking to get out of the current crisis is to encourage scientific and technological advancements in order to hasten the emergence of the sixth generation of post informational technology.

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ICT Role in Higher Education

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ABSTRACT

This Paper endeavours to focus on the role of ICT in higher education for the 21st century. Specifically the Paper had contended that ICT's have affected on educational Practice in education training to date in very little ways yet that effect will develop impressively in years to come and that ICT will turn into a solid specialist.

For change among numerous instructive practices. It is obvious from the study that use of ICT in higher Education expanding quickly in different states of India. A stand out amongst the most widely recognized issues of utilizing Information and communication

Technologies (ICT's) in education is to base decisions with respect to innovative conceivable outcomes instead of education needs.

In developing nations where higher education is laden with genuine difficulties at several levels, there is expanding strain to guarantee that innovative potential outcomes are seen with regards to instructive requirements. The utilization of ICT in training fits more understudy Forward learning setting and regularly this makes somewhere in the range of pressure For a few educators and understudies. Be that as it may, with the world moving quickly into computerized media and data the part of ICT in higher education is ending up increasingly imperative and this significance will proceed to develop and create in the 21st century.

Keywords: ICT, Higher Education, UGC, AICTE and DST.

I. INTRODUCTION

It Education is one of the real supporters of financial prosperity and advance of humanity. It encourages financial developments and causes a country to attract job and investments.

Education In addition is one of the Prime factors that decide lifetime Profit Importance of education in all kinds of different backgrounds has expanded with the help of information and communication technologies (ICT). The previous 20 years, the utilization of ICT has generally changed the working of education training. In the present condition conscious world the significance of education and adequacy of ICT as a social need has been expanding.

The emphasis on higher education in India can be understood by the number of Universities. currently present in India and the quality of education they provide. AS OF 2020, India has over 1000 universities, with a breaking of 54 Central universities, 416 state universities, 125 deemed universities, 361 Private universities and 159 institutes of National Importance which include AllMS, IIMS, IIITS, IISERS, IITS and NIT'S among. The

last two decades have witnessed the inclusion of development in ICT, in higher education systems around the world. Even then the challenge to develop a higher education system that is flexible and dynamic so as to holistically integrate the technology in the management and delivery of learning Programs is daunting.

The First Section Presents briefly the present. Peofit of higher education in India. The objectives represent in the second section. The third section explores the growth of higher education in India. In last section we present benefits and challenges of ICT.

II. GROWTH OF ICT IN INDIA

Higher education systems have grown exponentially in the last five decades to meet the demands of quality education for all. This aspect has further gained momentum due to swift advancements in Information and communication Technology (ICT). Demand for skilled and competent labor is ever increasing in the. Contemporary globalised society. In this backdrop access to quality in higher education for all has emerged as determining factor of economic growth and development. In order to increase the access to higher education and improving its reach to the remotest parts of the country, contribution of pen and distance learning. Facilities is on the increase.

The information and communication Technology (ICT) is an umbrella term that Includes ant communication device or application, encompassing radio, television. Phones, computers, network hardware and software, satellite system and so on as well as the various services and applications associated with them such as videoconferencing and distance learning. When such technologies are used for educational purposes, namely to support and improve the learning of students and to develop learning environments, ICT can be considered as a subfield of Educational Technology. ICTs in higher education of being used for developing course material, delivering content and sharing content, communication between learners, Teachers and the outside world creation and delivery of Presentation and. textures, academic research administrative support, student enrolment etc. It is the processes, tools and techniques for.

- 1) Gathering and identifying information.
- 2) classifying and organizing
- 3) Summarizing and synthesizing
- 4) analyzing and evaluating
- 5) Speculating and predicting.

III. ROLE OF ICT IN HIGHER EDUCATION

Presentation of ICTs to the higher education has significant for the entire educational process extending from venture to utilization of technology in managing key Issues of access equality equity administration, effectiveness, teaching method, quality research and development. ICT applications give establishments' an aggressive edge by offering improved services to students and staff, driving more Prominent efficiencies and making enhanced learning encounters and experiences.

- **ICT in Teaching and learning**

Teaching and learning can further be improved by replacing of conventional teaching instead of the usual age old method of chalk and talk for teaching by Innovative methods like PowerPoint Presentation and animation, modeling and simulations, video clips and wing AV aids, LCD Projectors etc.

- **ICT in Administration**

ICT in administration of educational institutions play a major role in efficient utilization of existing resources and simplifies the administration tasks by reducing the paper work on and replaces the manual maintenance of record keeping to electronic maintenance of records which helps in easy retrieval of any information of students, staff and general with in a fraction of seconds can access the required information.

- **ICT In Research**

Integration of ICT in higher education enhances the quality of research work and more number of individuals enrolled in the research work in various fields. ICT Facilitates the links across the world. In all Subject matter and made Social networking It saves time, money and effort to the researchers in their research studies.

- **ICT as a change Agent In Higher Education.**

The evolution of higher education In India Combined with the need to sustain and be competitive in a global Scenario requires decisions to be taken quickly and effectively

- **ICT as a change agent in society**

The last two decades have seen a critical examination of the role higher education institutions in economic growth and social development In addition to teaching and research, contributing to regional economic growth through... Innovation is now perceived by the third role of universities.

IV. CHALLENGES OF ICT

Although the government is committed to implementing ICT in higher education, the process is hindered by a number of barriers and challenges.

- **ICT Supported Infrastructure and Lack of Resources**

The effective use of ICT would require the availability of equipment which are not available in all the educational Institutions. Besides ICT requires up to date hardware and software.

- **Insufficient Fund.**

Effective implementation of technology into education system involves substantial funding. ICT supported hardware, software, internet, audio visual aids, teaching aids and other accessories demand huge fund. These costs are in most cases substantially high and cannot be provided by the stake holders.

- **Political Factors.**

The most notable of the barrier to the use of ICT in education. In developing countries seems to be the "Political will of the people in the "corridors of power.

- **social and cultural Factors**

Currently seems to be one of the major social barriers to the implementation in rural areas Found that stack of developmentally appropriate software (DAS) is one of the difficulties faced by teachers. and students.

- **Corruption**

corruption is one of the strong barriers to the implementation of ICT in education. The misuse of government funds which could have been used to develop other "Sectors like the integration of ICT in education is channeled in other direction.

- **Teachers Attitudes and Beliefs about ICT**

Teachers attitudes have been Found to be major predictor's of the use of new technologies in instructional, setting Teachers, beliefs about teaching and learning with ICT are central to integration.

- **Lack of knowledge and skill**

The success of educational innovations depends largely on the skills and knowledge of teachers. Teachers lack of knowledge and skill is one of the main hindrances to the use of ICT in education both for the developed and underdeveloped countries.

V. BENEFIT OF ICT IN HIGHER EDUCATION

The various benefits of ICT in education to various stakeholders are Summarized as follows:

- **To student**

- Increased access
- Learner-centered approach
- Flexibility of content and delivery
- Combination of work and education.
- Higher quality of education of New ways of interaction.

- **Employees**

- High quality cost effective professional development in the work place
- upgrading of employee skills, increased productivity
- developing of a new learning
- sharing of costs and of train time with the employees

- **Governments**

- Increase the capacity and cost effectiveness of education and training systems.
- To reach target groups with limited access to convention of education and training
- To support and enhance the quality and relevance of existing educational Structure
- To Promote innovation and opportunities for lifelong learning

VI. CONCLUSION

In this research main focus on the role of ICT In higher education for the 21st century. The utilization of ICT has generally changed the working of higher education universities and institutions. In the present condition conscious world, the significance of information and communication tools is important to enhance the mobility in the general public and increment the pitch for value and social equity. This paper discussed the evolution of ICT in India. ICT played very effective role for students teachers research and administrative staff in higher

education. This research is also focus on ICT as g change agent in Society and higher education This paper discussed challenges and benefits of ICT in higher education, Based on all above discussion ICT is more applicable and effective platform for higher education.

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A Review on: "Synthesis and Characterization of Organometallic Transition Metal, RE Complexes: Special Reference to Photoluminescence Properties."

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ABSTRACT

Information on several organometallic compounds and rare earth minerals, which have luminescence properties and are employed for numerous applications in many disciplines, is gathered for this review. Luminescence and its various types are introduced here, along with basic definitions, and past research is studied with the aid of a review of the literature. Synthesis methods such as the combustion method, the solid-state method, the hydrothermal method, the co-precipitation method, and Sol-gel are also used to study the phenomenon. A number of characterization techniques, including FT-IR, UV-Vis, TGA, DSC, PL, NMR, DTA, XRD, SEM, Element Analysis, and Mass spectrometry, are used to examine the synthesized material before the potential uses and future applications are discussed.

I. INTRODUCTION

This review focuses on how investigations of this kind have been used to produce useful information on the excited-state processes of these compounds and discusses the luminescence properties of organometallic Transition metal complexes, rare earths. The main goal of this study is to connect various research reports, approaches, substances, and applications in order to lay the groundwork for further research in this field. This review highlights the incredibly diverse luminescence behavior displayed by organometallic compounds and rare earth materials. It also describes studies that have characterized different aspects of emission phenomena, including multiple luminescence, such as Photoluminescence (PL), FTIR, UV-Vis, TGA, DTA, NMR, and element analysis. Only organometallic transition-metal and RE complexes are discussed in this review.

II. BASIC DEFINITIONS

Organometallic compounds, which include alkaline, alkaline earth, transition, and rare earth metals as well as metalloids like boron, silicon, and tin, are chemical compounds that have at least one chemical bond between a carbon atom of an organic molecule and a metal. Luminescent materials are substances that, in addition to black-body emission, transform incident energy into the emission of electromagnetic waves in the ultraviolet

(UV), visible, or infrared parts of the spectrum. Any form of materials can emit light through a process known as photoluminescence (PL) after absorbing photons (Electromagnetic radiation). It is one type of luminescence among several. In order to create a coordination complex, a ligand must attach to a central metal atom via an ion or molecule (functional group).

III. LUMINESCENCE AND TYPES

Designation	Excitation	Trigger	Acronym
Photoluminescence	UV, visible photons	–	PL
Radioluminescence	X-rays, gamma rays, charged particles	–	RL
Cathodoluminescence	Energetic electrons	–	CL
Electroluminescence	Electric field	–	EL
Thermo-luminescence	Photons, charged particles	Heat	TSL
Optically/photo-stimulated luminescence	Photons, charged particles	Visible/IR photons	OSL, PSL

IV. REVIEW OF LITERATURE

There are many distinct application domains for inorganic luminescent materials, and their attributes are described, according to C. Ronda et al. in Difficulties in Application of Luminescent Materials, a Tutorial Overview.[1]There are many distinct application domains for inorganic luminescent materials, and their attributes are described, according to C. Ronda et al. in Difficulties in Application of Luminescent Materials, a Tutorial Overview.[2]According to M. Bredol et al., the number of traditional phosphor materials is not anticipated to increase any further. As a result, the research approach has changed. Research has focused on manipulating the material features of phosphor systems, such as their hygroscopic nature or shape, rather than hunting for new "traditional" phosphor materials.[3]According to M. Bredol et al., the number of traditional phosphor materials is not anticipated to increase any further. As a result, the research approach has changed. Research has focused on manipulating the material features of phosphor systems, such as their hygroscopic nature or shape, rather than hunting for new "traditional" phosphor materials.[4]In New Developments in the Field of Luminescent Materials for Lighting and Displays, T. Jüstel et al. reported on the use of luminescent materials, also known as phosphors, in a variety of commonplace products, including cathode ray tubes (CRTs), projection televisions (PTVs), fluorescent tubes, and X-ray detectors.[5]Persistent luminescence is a phenomenon in which fluorescence is maintained for minutes to hours without an excitation source, according to H. Tan et al. in Critical Breakthrough of Functional Persistent Luminescence Materials for Biological and

Information Technology Applications. A variety of persistent luminescent materials (PLMs) have been created and are frequently used in many fields, including bioimaging, phototherapy, data storage, and security technologies, as a result of their distinctive optical characteristics.[6]The discovery of electroluminescent conjugated polymers, a type of fluorescent polymer that emits light when excited by the flow of an electric current, was reported as a recent advancement in the field of light emitting polymers by M. S. Alsalhi et al in the Recent Advances in Conjugated Polymers for Light Emitting Devices.[7]The inherent white light emission from hybrid light emitting diodes made utilizing an inorganic-organic hybrid junction grown at 50 °C on a paper substrate was demonstrated by G. Amin et al. in ZnO Nanorods-polymer hybrid white light emitting diode produced on a disposable paper substrate.[8]In their review paper on an overview of organic light-emitting diodes, P. Birwa et al. stated that an organic light-emitting diode is a solid device that contains thin sheets of organic molecules that emit light when electricity is applied.[9]M. Bansal et al. reported in the Carbon nanotube-based organic light emitting diodes that carbon nanotubes are standing today at the nexus between inorganic electronics and organic electronics and posing a serious challenge to the big daddies of these two domains in electronics, namely silicon and indium tin oxide. Carbon nanotubes are revolutionary and fascinating from a materials point of view and exceedingly sensational from a research point of view.[10]

V. EXPERIMENTAL/SYNTHESIS METHODS

Combustion process One of the well-known low-temperature synthesis methods is combustion synthesis. The final products are consistent, pure, and highly crystalline. For this technique, various reducing and oxidizing agents are needed. A high-temperature method for mass-producing materials is the **solid-state approach**. Most synthetic materials have a pure phase and are microcrystalline. Yet, the aggregation of particles can occasionally cause the emergence of subsequent phases as well. This synthesis technique is uncontrolled by morphology. One-dimensional elongated structures chosen over other nanostructures for device applications include nanowires, nanorods, nanotubes, nano prisms, and nano discs can be created using the **hydrothermal method**, a low-temperature synthesis technique. The **co-precipitation method** is an advantageous chemical strategy since it is simple to synthesize on a big production level, takes an environmentally favorable approach, and is inexpensive. Nano-size particles with a uniform size distribution, excellent purity, and crystallinity are produced using the **sol-gel synthesis technique**. [11]Reflux method, coupling reaction, condensation method, addition reaction, Fried Lander Synthesis, substitution reaction, elimination reaction, and other methods are also available for synthesis.

VI. CHARACTERIZATION TECHNIQUE

FT-IR (Fourier Transform Infrared Spectroscopy)

In order to comprehend the structure of individual molecules and the make-up of molecular mixtures, industry and academic laboratories use the analytical technique known as FT-IR (Fourier Transform Infrared Spectroscopy). In general, FTIR spectroscopy is used to determine the functional groups present in organically changed material. It is a highly versatile and valuable technology.

UV-Visual Spectroscopy Via the absorption of varied concentrations, it is used to examine the electronic structure, clarify the materials, and assess how well-prepared organic compounds operate. Fluorescence

spectroscopy deals with transitions from the excited state to the ground state, whereas absorption measures transitions from the ground state to the excited state, making absorption spectroscopy supplementary to fluorescence spectroscopy.

TGA (Thermogravimetric Analysis)

A technique called thermogravimetric analysis measures how a substance's mass changes with temperature. When a sample is heated or cooled in a furnace, its weight is measured using a Simple TGA.

DSC Analysis (Differential Scanning Calorimetry)

The physical and chemical properties of a substance can change as a function of temperature or time, and DSC is used to evaluate enthalpy changes resulting from these changes. You can identify and categorize materials using the approach. When a sample is heated, cooled, or maintained isothermally at a constant temperature, DSC analysis evaluates the heat flow that is created in the sample.

PL Analysis (Photo-luminescence)

Analyses PL (Photo-luminescence) The spontaneous light emission from a material under optical excitation is known as photoluminescence (PL), and it is used to investigate the optical characteristics of materials. Many material parameters can be characterized via PL research. Electrical (as opposed to mechanical) characterization is provided via PL spectroscopy, which is also a very sensitive and selective probe of discrete electronic states.

Nuclear Magnetic Resonance (NMR)

A useful tool for characterizing structures is NMR spectroscopy. It can be used to figure out how each atom in a specific molecule is related to the others. In addition to studying the physical, chemical, and biological aspects of matter, this is accomplished by looking at the chemical environment of a particular nucleus.

Differential Thermal Analysis (DTA)

In which the temperature difference between the sample and the reference material is programmed while the temperature of the sample is measured against time or temperature. a method for detecting and quantitatively assessing a substance's chemical makeup by keeping an eye on a sample's thermal behavior when it's heated.

Analysis of Elements The measurement of an element's concentration in a sample, commonly expressed as a weight percentage, is the definition of elemental analysis. Many procedures are more or less effective for the elemental analysis of an interesting sample since different elements can be found in a wide variety of samples.

XRD analysis to establish the material's amorphous structure. A non-destructive test method used to examine the structure of crystalline materials is X-Ray Diffraction, or XRD for short. By identifying the crystalline phases that are present in a material, XRD analysis, a technique for studying the crystal structure, can provide information on its chemical composition. Phase identification is accomplished by contrasting the obtained data with that found in reference databases.

High-resolution imagery from **SEM analysis**, also known as scanning electron microscopy, is excellent for examining diverse materials for surface fractures, defects, impurities, or corrosion. helps to identify contaminants or unknown particles, the reason for failure, and how different materials interact.

Mass spectrometry is a potent analytical technique that may be used to quantify known materials, identify unidentified chemicals in a sample, and clarify the structure and chemical characteristics of various molecules. The material is transformed into gaseous ions, with or without fragmentation, and is then identified by their mass-to-charge ratios (m/z) and relative abundances. This method essentially investigates how molecules are

affected by ionizing energy. The consumption of sample molecules during the creation of ionic and neutral species depends on chemical events occurring in the gas phase.

VII. APPLICATIONS

- The main uses are in LEDs, fluorescent lighting, and emissive displays.
- In the latter category of applications, high-energy photons excite luminescent materials, and some of this excitation energy is employed to produce visible light.
- We use organic luminous materials and OLEDs in a wide range of applications every day.

Some significant applications are: -

- Luminescent materials are used in LCD screens for background light to display the image. In other words, on an OLED screen, each pixel has its own “background light,” and thus it renders its light and color independently.
- These materials consume less power and provide a high-quality display. The current technology provides remarkable color fidelity and operation stability. It replaced CRTs (Cathode Ray Tubes) or LCDs (Liquid Crystal Displays).
- The modified luminescent materials used in OLED technology brings the advantages of thinner and curved display form factor to wearable devices like Fitness band.
- Top-emission structures have merits for the production of OTFT-OLED displays.

VIII. FUTURE SCOPE

Due to their potential usage in optoelectronic devices, organometallic Transition Metal, RE Complexes materials represent an appealing study area. It is exciting and difficult to design stable and highly luminous materials. It is suggested that organic, organometallic, or carbon-based luminous compounds be synthesized and studied in this work. Existing luminous materials as well as brand-new luminescent materials are on the preliminary list of materials suggested for the research in this work. The emphasis will be on trying out new synthesis techniques and enhancing the luminous features of the existing materials. Also, it is suggested to look for novel materials with luminous qualities that match the best-reported materials. Due to its structural adaptability and prospective uses in sensing, biological imaging, security systems, and logic gates, long-lived luminous metal-organic frameworks (MOFs) have drawn a lot of interest. Also, future technology has a lot of potential for electroluminescence, photoluminescence, cathode-luminescence, and bio-luminescence.

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Laser and UV Radiations Impact On Seed Germination and Growth of Sunflower and Soybean Seeds – A Review

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ABSTRACT

LASER stands for Light Amplification by stimulated emission of radiation. It has seen that Laser technology has tremendous applications in the field of agriculture. Also, it has observed the UV radiation's intensity is increasing day by day because of depletion of Ozone layer. The use of UV radiation in the field of agriculture also has shown positive results. Application of UV and Laser radiation in agriculture is the current and important topic of research. Laser and UV radiation are used as bio-stimulator where seeds are treated with low intensity. The pre-sowing physical treatment to seeds are low cost and better option. The promising effects of these radiations leads to new dimensions towards producing high quality agriculture products. Oilseeds are one of the most important determinant of our Indian economy. This review paper represents important oilseeds and Laser as well as UV radiation's impact on germination of Sunflower and Soybean seeds.

Keywords: Laser, UV, bio-stimulator, Sunflower, Soybean.

I. INTRODUCTION

The laser is one of the most important rays used in the past and to this day in leveling the earth for cultivation. The word laser is an acronym made up of the first letters of the phrase (light amplification by stimulated emission of radiation). This technique is now well known and accepted by growers. Meanwhile, this technology has also been shown to be not so costly and within the reach of a farmer for his specific requirements (1). Nowadays, some equipment is complemented by space age technologies that allow farmers to grow their crops in more precise and efficient way to cultivate. These technologies include global positioning systems (GPS), geographic information systems (GIS), yield mapping, variable rate application technology, controllers, lasers, and remote sensors. Precision agriculture (the art of using these technologies to control soil leveling, increase yields and profits while protecting the environment) is becoming more prevalent in agriculture. The results obtained in the application of laser irradiation of plant organisms continue to attract scientific interest - in the past by He-Ne lasers and nowadays by semiconductor lasers (2).

There are several ways to promote seed germination, such as the environmentally friendly irradiation of seeds with ultraviolet light-emitting diodes (LEDs) before sowing (3,4). This photoelectric technology is inexpensive and harmless to humans because it is based on natural mechanisms (5,6). In addition, UV irradiation of seeds accelerates the synthesis of active compounds by stimulating phenol metabolism in plant cells (7). A literature review and previous studies show that irradiation of seeds of agricultural plants with UV radiation has beneficial effects and improves germination rates (8-10).

Studies on improving germination rates of seeds by UV irradiation before planting are aimed at increasing the reproductive capacity. The effects of UV irradiation have not been sufficiently studied for the seeds. Therefore, it is a scientifically relevant problem to analyze the effects of UV LEDs in the preparation of seeds before sowing. The aim of this study is to investigate how ultraviolet radiation affects seed germination rates.

II. LITERATURE REVIEW

- Although the oilseeds are energy-rich crops that require higher inputs and better management practices, more than 85% of the area under oilseeds are energy-rich crops requiring higher inputs with better management practices, but more than 85% of the area under oilseeds is rain-fed and managed under low-energy conditions with low inputs and poor management practices, as all the genetic potential of the crops remains unused, which explains the wide variability and poses a high risk.
- Due to the greater importance given to field cereals, progress is not very great, and these crops are usually grown in marginal areas and underwater, where soil fertility for growing field cereals is low, so farmers use these crops only to leave the land fallow.

In addition, these crops are usually grown by farmers in marginal areas who are not irrigated and use poor management practices. Also, input use is very low and farmers are not adapted to new technologies, and due to declining land ownership, mechanization is not very popular.

- These crops are highly affected by pests and diseases. Pests such as aphids and diseases such as powdery mildew and rust cause production losses of up to 50%.
- Technology transfer from the laboratory to the farm is insufficient. The supply of farmers with the technologies and inputs desired by agricultural institutions is very low.

Soybean:

- Drought stress is a major constraint to soybean production and yield stability. For developing high-yielding cultivars under drought conditions, the most commonly used criterion has traditionally been direct selection for yield stability at multiple locations. However, this approach is time and labour consuming because yield is a highly quantitative trait with low heritability and is influenced by differences resulting from soil and environmental heterogeneity.
- Complete flooding at the early seedling stage is a common environmental problem for soybean production worldwide.
- According to MoFA (2006), soybean is harvested when 90% of the pods are yellow or dry. If harvest is delayed beyond this time, it will result in seed bursting, especially in late-planted soybeans whose seeds are mature when the weather is completely dry.

Canola and mustard:

- Flowering and grain filling are the most vulnerable stages to damage from temperature stress, likely due to vulnerability during pollen and grain development, anthesis, and fertilisation, resulting in lower crop yield. High temperatures in brassicas promoted plant development and caused flower abortion and poor grain filling with noticeable losses in seed yield. A 30°C increase in daily maximum temperature (21-24°C) during flowering and grain filling resulted in a 430 kg/had decrease in canola yield.
- The low yield potential of mustard is due to the fact that 30- 50% of mustard flowers do not develop into mature pods. This means that the potential number of fruits or seeds is usually much greater than the actual number produced by the plant community. During the reproductive phase, flowering, fruiting, and vegetative growth to physiological maturity occur simultaneously. Therefore, developing reproductive sinks compete with vegetative sinks for assimilates.

Peanut:

Groundnut, popularly known as peanut, is one of the most popular and universal crops in the world, grown in more than 100 countries on six continents.

- The occurrence of pests and diseases is the main problem in peanut production, causing more than 25 percent of yield losses.

Solute leakage as a result of membrane damage is a common response of peanut tissue to various types of stresses, such as low or high temperatures, low soil moisture, or high soil salinity. There is much evidence to suggest that calcium is required to maintain membrane integrity.

Sunflower:

The main physiological limitations in sunflower production are excessive vegetative growth, lack of photosynthetic activity during the seed filling period, poor translocation of photosynthesis, and poor seed set in cultivated hybrids.

Sesame:

Sesame is able to withstand drought by developing an extensive root system, although it suffers significant yield losses during drought when grown on marginal and low-rainfall land. The effect of drought is more pronounced on seed yield of sesame than on other morphological traits (11).

Effects of He-Ne laser on growth of sunflower:

Seeds of sunflower treated with He-Ne laser showed different effects on seed germination rate at different times: As the duration of laser irradiation increased, the seed germination rate first increased and then decreased. Seed germination rate was higher compared to control at irradiation times of 60, 120 and 180 seconds, and the maximum germination rate was 77% at 180 seconds. This indicates that the He-Ne laser can promote the seed germination rate at irradiation time of 60 to 180 seconds. On the other hand, He-Ne laser inhibits the germination rate of sunflower seeds when the irradiation time exceeds 180 seconds. This study demonstrated the effects of He-Ne laser irradiation on the protein content of sunflower seeds at different irradiation times. As the duration of laser irradiation increases, the protein content first increases and then decreases at an irradiation time of 240 seconds. The germination rate of seeds at 120 and 180 seconds was higher than that of the control. The protein content in the seedlings reached a maximum of 1.3 mg/ml at 180 seconds, which was 1.9 times that of CK (control group). When the irradiation time of the laser exceeds 180 s,

the protein content decreases sharply. The results of the t-test were highly significant and therefore proved to be very reliable (12).

Effects of UV radiation on growth of sunflower:

Another study proved that when Sunflower seeds were treated with UV radiations it significantly enhanced the leaf biomass.

Chlorophyll contents were higher at vegetative stage as compared to flowering stage. Total soluble proteins, total soluble sugars and total phenolics were increased after UV treatment. Moreover, flavonoid contents were increased by all pre-sowing, but reverse was displayed by anthocyanin at vegetative stage and no effect was noted at flowering stage. However, oil contents showed decreased in response to UV radiation treatment. In conclusion, physical seed pretreatments proved pragmatic option to improve growth and metabolite accumulation especially at vegetative stage in sunflower. Moreover, lower dose of UV treatment improved the yield in term of achenes per capitalism along with achene oil percentage (13).

Effects of Nd- YAG laser on Soybean:

The effect of pre-sowing laser treatment on soybean seeds was studied using a neodymium-doped yttrium aluminium garnet (Nd-Yag) laser source at a wavelength $\lambda = 532$ nm. Uniform soybean seeds (*Glycine max* L.) were irradiated with laser for 5, 10, 30, 60, and 120 min. The growth potential of the 4-week-old seedlings was progressively increased with increasing duration of laser treatment. In this study, the protein binding patterns of the leaf pools of the irradiated and non-irradiated control plants were examined to clarify the role of the laser at the molecular level. The obtained results clearly showed that vegetative growth of soybean seedlings (4 weeks old) was significantly increased after Nd-Yag laser treatment.

Effects of 660 nm laser irradiation of soybean seeds on germination, emergence and seedling growth:

The aim of the experiments was to investigate the influence of irradiating soybean seeds (*Glycine max*, cultivar BRS 537) with a 660 nm laser diode array. The seeds were treated with laser light delivered by a device assembled for the experiments with an output power of $I = 3.5 \pm 0.2$ mW cm⁻². The effects of biostimulation were analyzed by determining the germination percentage and dry mass of normal seedlings in a germination experiment. In addition, seedling emergence percentage, emergence rate, and mean emergence time were determined in a greenhouse experiment. Irradiation of seeds with laser light showed a positive effect on bio stimulation in two of the three treatments with light compared to the control (without irradiation). The light dose of 1.6 J cm⁻² ($t = 457.14$ s) significantly increased the germination percentage (5.5%), dry mass (58%), and emergence rate (29%) of normal seedlings and decreased the mean emergence time by 10%, while a dose of 3.2 J cm⁻² ($t = 914.28$ s) significantly increased the dry mass (84%) and emergence rate (13%).

III. CONCLUSION

laser irradiation at 660 nm is able to increase the germination potential of seeds if the light dose is appropriate. Some of the positive effects of laser biostimulation occur in the initial stages of seedling growth, increasing the rate of development of seedling structures and consequently their dry mass. Irradiation of seeds with laser light

of 660 nm may have negative effects on growth if the light dose is not appropriate. The results suggest that laser irradiation of seeds before sowing can increase the rate of seedling emergence and thus shorten the mean time required for them to emerge from the soil.

The application of empirically selected algorithms for laser irradiation of soybean seeds resulted in a significant increase in germination. The best germination rate resulted from photo-stimulation of seeds with a 632.8 nm laser light. Irradiation with 514 nm laser light resulted in the greatest increase in soybean seedling biomass. Sunflower seeds treated with He-Ne laser showed different effects on germination rate at different times . As the irradiation time of the laser radiation on the seed was increased, the seed germination rate first increased and then decreased.

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ICT and Education

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ABSTRACT

The revolution and information and technology is resulted in a drastic change in every aspect ICT made ridiculous change in education specially in higher education from teaching to learning ,evaluation techniques from the admission to results at every stages ICT is playing very important role. Very traditional form of teaching and learning integrated with ICT the use of ICT in education analytical study of the role of ICT in higher education the study is based on primary as well as secondary data

I. INTRODUCTION

The study found that teachers and students are using always play ICT for teaching and learning process it is also helpful to the student for solving their doubts and gaining knowledge of current events and also providing global connectivity and competitive student will learn various required skills for employability through various online courses online courses which will beneficial and is helpful to increase their employment.

At the same there are many issues and challenges arises such as networking collaboration and industry for internship properly anything system make little difficult food so the role of ict in higher education development.

II. REVIEW OF LITERATURE

For the present research paper various online Research Articles published has been studied some of them are mentioned in review of literature.

Age and ICT-Related Behaviours of Higher Education Teachers in Nigeria by Philip OluJegede The study examined ICT attitude, competence, and use pattern of teacher educators. It also examined the effect of age of educators on time used in interacting with ICT.

Findings of this study revealed that age was not a factor when considering the attitudes, competence and use pattern of teacher educators. In addition, age was not found to affect the time used on ICT by higher education teachers in Nigeria.

This study concluded that age was not a factor considering ICT use, skills and time spent in designing curriculum in higher education in Nigeria. But it is only applicable to teachers educators. Age might be a factor in ICT related behaviour of other professionals or group of people.

ICT in Higher Education – A Study by A.R.Nadira Banu Kamal and A Thahira Banu

The future trends of internet and multimedia will influence and change the traditional methods of teaching and learning and enlarge the sphere of dissemination of knowledge and information. The demand of computer technology in education and training has enhanced the ability of quality education in various educational organizations and training institutes. Educators strongly feel that ICT is the most valuable tool to overcome the problem of illiteracy. Academics are now being challenged by the rapidly growing new information technologies of multimedia, internet, WWW and other virtual computer technologies, which demands changes in the styles, attitudes and skill towards information handling. This paper presents the results of the study conducted on the impact of ICT for teaching learning process in college and the assessment in using the developed CAI package by the students and faculty of the selected colleges in Tamil Nadu.

Result of the study reveals that ICT was used in various facets of teaching and learning Computer literacy is a required module for every student of the college and it has been integrated into the curriculum for earning credits. Outsourcing has given students the facility of “Virtual Classrooms”. Use of ICT - nature and purpose of use by the students ICT is used by all departments. Students are required to submit assignments online, use LCD/PPT for presentations at seminars and conferences, browse web sites for downloading materials for presentation and for class discussion. They also use e-mail to interact with all teaching members of the faculty who have e-mail ID of their own. Student projects are often prepared with the assistance of the Department of Computer Science.

Conclusions of this study includes many factors are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest we will soon see large scale changes in the way education was planned and delivered as a consequence of the opportunities and affordances of ICT. Conventional teaching has emphasized content. For many years course have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favouring curricula that promote competency and performance. Curricula are starting to emphasize capabilities and to be concerned more with how the information will be used than with what the information is. This paper has explored the likely changes we will see in education as ICT acts as a powerful agent to change many of the educational practices to which we have become accustomed.

A Review of Literature on Knowledge Management using ICT in Higher Education by Prof. Ms. Ulka Toro (Gulavani) Dr. Milind J. Joshi

The objective of this paper aims to survey the role of Knowledge Management (KM) using Information and Communication Technology (ICT) in higher education by conducting literature review and classification of articles from 2000 to 2012 in order to explore how KM technologies and applications have been developed in this period.

The technology to succeed in the usage of knowledge management in higher education, it is necessary that, the mind-set of people should change from my knowledge to our knowledge concluded by the researcher. It is also

concluded by the researcher that the requirement was proper cooperation, coordination and collaboration among the employees in the higher institution.

III. OBJECTIVE OF STUDY

For the purpose of present research paper following objectives are formed:

- 1) To analyse the overall effect of ICT in higher education
- 2) To evaluate the issues and challenges related to ICT from the Student point of view
- 3) To evaluate the issues related to ICT from teachers point of view
- 4) To suggest some remedies for effective use of ICT

IV. RESEARCH METHODOLOGY

The study is best on primary as well as secondary data sample of 100 students from the faculty of Arts , Commerce and Science and 20 teachers there given questionnaire based on the responses of the questionnaire data has been analysed and findings and conclusions are drawn.

Analysis and interpretation of data :

From the collected filled in questionnaire various tables have been prepared and from that interpretation has been drawn. On the basis of that overall effect of ICT on higher education from students and teachers point of view has been mentioned in findings of the study.

Overall Effect of ICT on higher education:

From the given questionnaire responses received from the respondents following table has been prepared.

Particulars	No. of responses %	
	Yes	No
Is it helpful for the teaching process	69	21
More interesting than offline classes	72	18
Can see reference material as and when required	75	25
Suitable for all types of students	55	45
Is it an interactive process	63	27
Any other		

When there is any natural or some personal problem of teacher as well as students ICT can be used to stop educational losses of the students.

It is very much helpful to teachers as well as students when students are not able to join the offline classes they can join the class in online mode so that there is not any educational loss of students will happen.

It has been stated from the table that maximum 75 % of students have given Yes responses to can see reference material as and when required.

72 % of students fill that it is more interesting than offline classes.

Teachers make records of all their teaching materials which will be useful for teachers as well as students.

It will help to students to learn as per their pace. They can see materials provided by teachers at any time anywhere which is very much helpful for them.

55 % of respondents fill that it is suitable for all types of students.

In any other column following has been stated by the respondents few of them is written as under:

- Those students who don't have internet facility they suffer in this mode of teaching.
- It is expensive for below average earning people.
- In urban and semi urban area there is problem in internet facility so ICT is not beneficial for them.
- Students are not much familiar to use ICT facility.

From the responses received from teachers about ICT

Particulars	Agree	Neutral	Not agree
Responses received in %			
Teachers are not so friendly with the use of ICT	39	10	51
Internet connectivity	35	15	50
Less interaction between students	59	27	14
Class is not so lively as in physical classroom education	68	08	24
Training should be required to train students to use new ICT techniques	74	12	14
Teachers should always be available where ever they are	58	20	22
It affects on personal life of teacher	40	12	38

Maximum 74 % teacher respondents are for the training should be required to train the students to use new ICT techniques .

68% of the respondents are agree that for class is not lively as in physical classroom education. Followed by it 59 % teacher respondents agree that there is less students interaction.

51% of teacher respondents are not agree that teachers are not friendly with the use of ICT.

50 % responses have been recorded to reflect teachers' disagreement with the issues with internet connectivity.

Minimum 8% of the respondents are neutral about classroom is not so lively as in physical classroom education

Findings of the study :

- a) **From students view:** From the above study it reveals that students are much more interested to use ICT in teaching. Following are the findings of this study
- i. Internet connectivity is the major problem students facing in ICT
 - ii. It effectson students their mental and physical health.
 - iii. Eyes related problems are increased due to use of smartphone or technical devices all the time.
 - iv. Students are not focussed on teaching because there are so many things to distract them from teaching.
 - v. For overall development of students it is useful when ICT is used with the classroom teaching.
 - vi. It detract students from social interactions
 - vii. It foster students to do cheating because many resources are available online and teachers have not control over it so that it foster for cheating.
 - viii. Not all students have equal access

- b) From teachers view: From the present study following are findings from teacher's point of view:**
- i. It is difficult for teacher to maintain classroom decorum in online mode.
 - ii. Some of teachers are not so much techno savvy so that they are unable to use ICT in effective way.
 - iii. Training for teachers should be organised to make them familiar with the use of ICT
 - iv. ICT is helpful for teachers to organize teaching contents is advance.
 - v. ICT improves quality of teaching
 - vi. The classroom management is out of control if ICT is used in teaching.

V. CONCLUSIONS

It is concluded from the above study that ICT is today's requirement there is need to solve teachers well as students problems in real time and make the best use of ICT in teaching, learning and evaluation. It is best that some part of regular classroom teaching should be done on ICT mode so that students as well as teachers are get habit to use it. Training is to be organised for teachers as well as for students to make them familiar about its uses.

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The Practices of ICT in Seventeenth Lok Sabha Election : A Festival of Democracy

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ABSTRACT

The 17th Lok Sabha Election in India, held in 2019, was one of the largest democratic exercises in the world. With over 900 million eligible voters, it was a true festival of democracy. This paper examines the various aspects of this election, including the electoral process, voter turnout, and the role of Information and Communication technology (ICT) in conducting free and fair elections. The paper also explores the challenges faced by the Election Commission and the measures taken to ensure the integrity of the electoral process. And uses of ICT in election. Overall, the 17th Lok Sabha Election was a celebration of democracy and demonstrated India's commitment to free and fair elections.

Keywords: Lok Sabha, Election, Democracy, India, Voters, Political Landscape

I. INTRODUCTION

India, the world's largest democracy, conducted the 17th Lok Sabha election in 2019. The elections are a celebration of democracy, where every citizen of India has the right to vote and elect their representatives. The Lok Sabha elections are considered a significant event in the Indian political system. This paper discusses the importance of the 17th Lok Sabha election as a festival of democracy. The paper also highlights the challenges faced by the Election Commission of India in conducting the elections and ensuring a fair and peaceful electoral process. India is the world's largest democracy, with a population of more than 1.3 billion people. The Lok Sabha is the lower house of the Indian Parliament, consisting of 543 members elected by the people through a direct vote. It was the largest democratic exercise in the world, with more than 900 million eligible voters. This research paper highlights the significance of the 17th Lok Sabha election as a festival of democracy. The election was held against the backdrop of a complex political landscape, marked by a range of social, economic, and political challenges.

II. OBJECTIVES

This paper aims to provide a comprehensive analysis of the 17th Lok Sabha election, exploring its significance in the context of Indian democracy. The paper aims to highlight the key issues, challenges, and outcomes of the election, and to evaluate its impact on the future of Indian politics.

III. METHODOLOGY

The paper draws on a range of secondary sources, including academic studies, media reports, and government documents. The sources were selected based on their relevance, reliability, and credibility, and were analyzed using a thematic approach.

Significance of Lok Sabha Election:

The Lok Sabha election is a critical event in India's socio-political landscape. It provides citizens with the opportunity to exercise their democratic right to vote and choose their representatives. The Lok Sabha election has a significant impact on the country's governance and policies. The elected representatives of the Lok Sabha are responsible for making laws and policies that affect the lives of millions of Indians.

Democracy and Elections:

Democracy is not just about voting, but it is a way of life. It provides citizens with the freedom to express their opinions, participate in the decision-making process, and hold the government accountable. Elections are an essential aspect of democracy, as they provide citizens with the opportunity to choose their representatives and hold them accountable for their actions.

Historical Context:

India gained independence from British colonial rule in 1947, and the first general election was held in 1951-52. Since then, India has had 17 general elections, with the 17th Lok Sabha election held in 2019. Over the years, the Indian democracy has matured and evolved, with greater participation of the people in the electoral process. The 17th Lok Sabha election was a testament to the strength of Indian democracy, with a record voter turnout of 67.11%.

Role of the Election Commission:

The Election Commission of India is an autonomous body that conducts elections in India. It is responsible for preparing electoral rolls, conducting elections, and enforcing the model code of conduct. The Commission also has the power to cancel elections if it finds evidence of malpractice. In the 17th Lok Sabha election, the Commission played a crucial role in ensuring that the electoral process was fair and transparent.

Electoral Process:

The 17th Lok Sabha election was held in seven phases, from April 11 to May 19, 2019, across 543 constituencies. The Election Commission of India, an autonomous body responsible for the conduct of elections in India, played a crucial role in ensuring free and fair elections. The Commission deployed more than 11 million election officials and security personnel to conduct the election. The election was also monitored by international observers, who praised the Indian democracy for its transparency and fairness.

Impact of Information and Communication Technology (ICT) or Social Media:

The 17th Lok Sabha election was also notable for the impact of social media on the electoral process. Social media platforms such as Facebook, Twitter, WhatsApp, Instagram and other ICT applications were widely used by political parties to reach out to voters and mobilize support. However, social media was also used to spread fake news and hate speech, leading to concerns about the impact of social media on the election. The Election Commission took several steps to counter the spread of fake news, including the creation of a dedicated social media monitoring cell.

Challenges Faced by the Election Commission:

The Election Commission faced several challenges in conducting the 17th Lok Sabha Election, including ensuring free and fair elections, managing the logistics of conducting elections across the country, and addressing complaints of electoral malpractices. The Election Commission also had to deal with the issue of fake news and misinformation, which was spread by the WhatsApp, Facebook, Twitter, Instagram and other ICT applications and websites which could potentially influence voter behavior.

Impact of Lok Sabha Election:

The Lok Sabha election has a far-reaching impact on India's socio-political landscape. It sets the tone for the country's governance and policies for the next five years. The election results determine the ruling party, and the party's policies have a significant impact on the country's economic growth, foreign policy, social welfare, and national security.

Impact on Indian Politics and Society:

The 17th Lok Sabha Election had a significant impact on Indian politics and society. The election witnessed the emergence of a new political narrative, with the ruling party emphasizing issues such as national security, while the opposition focused on issues such as unemployment and agrarian distress. The election also saw a shift in voter preferences, with the ruling party making significant gains in states where it had traditionally been weak.

Reasons behind the High Voter Turnout:

There were several reasons behind the high voter turnout in the 17th Lok Sabha Election. One of the major reasons was the awareness campaigns conducted by the Election Commission and civil society organizations, which aimed to educate the voters about the importance of their vote. The Election Commission also implemented several measures to ensure that the voting process was smooth, transparent, and fair, which boosted the confidence of the voters.

IV. CONCLUSION

The Election Commission of India overcame several challenges to ensure a free and fair electoral process. The Lok Sabha elections are a crucial event in the Indian political system, and they play a significant role in shaping the country's future. The 17th Lok Sabha Election was a celebration of democracy, reflecting the vibrancy and resilience of Indian democracy. The high voter turnout, the role of social media and technology, and the challenges faced by the Election Commission highlighted the complexities of conducting free and fair elections in a diverse and populous country like India. The election also had a significant impact on Indian politics and society, marking the emergence of a new political narrative and the changing voter preferences. The results of the election indicate a significant shift in Indian politics, with the BJP consolidating its position as the

dominant party. The election also highlights the need for continued efforts to strengthen Indian democracy, including the promotion of voter education, transparency, and accountability.

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Foundational View of Set Theory in Its Axiomatic Development

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ABSTRACT

Being a powerful part and having its influence into all mathematical subjects, the set theory is having great significance. This paper reviews its arise in the form of axiomatic theory and how these axioms are used to develop the set theory. Subsets, cardinality of sets, its properties, basic set theory are used to prove several important results in real numbers. Because of continuing development in the theory of sets, this branch of mathematics shaped many basic concepts. This paper will reconnoitre problems where axiomatic set theory has salient role in its solution.

Keywords: Zermelo–Fraenkel axioms, ZFC, Countable sets.

I. INTRODUCTION

Set theory is a branch of mathematics used to systematize the data. Cantor's Continuum Hypothesis (CH) in 1878 clears that every infinite subset of \mathbf{R} is either countable or have the same cardinality as that of \mathbf{R} [1] is the main approach towards the development of set theory. He later worked on transfinite cardinal, ordinal numbers and the properties of real numbers especially topological properties of \mathbf{R} . In the try of solution to many paradoxes like Russell's paradox, Burali-Forti paradox, Cantor's paradox, etc some axiomatic theories were proposed and studied. In the development of Set theory, Zermelo–Fraenkel axiomatic set theory in addition with axioms of choice ZFC and some additional natural axioms settled the continuum problem. It cannot be ignored that the meeting in Switzerland (1872) between Cantor and Dedekind is considered as the birth of this enormously successful subject called the set theory [2]. In this meeting the concept of belongingness to something having common properties radices the axioms. We must know belonging before going to axioms. If a belongs to A means a is an element contained in set A, it is denoted using mathematical symbol " \in " i.e. $a \in A$. Opposite to it, non-belonging is denoted by the symbol \notin . In the same period the study of function spaces started by Hilbert, Maurice Fréchet, and many others. Later Bernhard Riemann using sets and advanced study in set proposed ideas of topology, manifolds.

Ackermann [3] also proposed new and different axiomatic theory of sets and classes. Levy absorbed standard ZF axiomatization and expanded it. The concept subset Dedekind defined special subsets following certain properties of Rings as Ideals and Ideals is the new branch of mathematics with lot of applications.

II. THEORETICAL AXIOMS

Some Theoretical Axioms are discussed below

Axiom 1.

Axiom of Extension is $\forall x (x \in A \text{ iff } x \in B) \rightarrow A = B$.

Any two sets are same if and only if they contain exactly same elements. Axiom of extension is the key in marking out the belonging.

Axiom 2.

For every set A and $x \in A$ with condition $f(x)$, there exist a set B whose elements are same as that of set A satisfying the condition $f(x)$. $B = \{x \in A \mid f(x)\}$.

This axiom using mathematical symbols can be expressed as $\forall A, \exists B \forall x (x \in B \leftrightarrow x \in A \wedge f(x))$. It raises the logical way towards another important subject called theory of subsets.

Axiom 3.

There exists a set that contains no elements and this set by axiom 1 is unique. Notation for the empty set is \emptyset or $\{\}$.

$\exists A$ such that $A = \emptyset \wedge \forall x (x \notin A)$.

Empty set is a subset of every set, $\emptyset \subset A$.

Axiom 4.

Axiom of pairing states that for every x and every y there exists a set C such that x and y are members of C.

$\forall x \forall y \exists C \forall z (z \in C \leftrightarrow z = x \vee z = y)$.

Axiom 5.

For every set A there exist a set C such that for all x in B where B is in A then x is also in C.

$\forall A \exists B \forall x (x \in B \leftrightarrow \exists C (x \in C \wedge C \in A))$

Axiom 6.

For every set A there is a set B consisting of the subsets of A, called as power set and denoted by $P(A)$.

$\forall A \exists B \forall x [x \in B \leftrightarrow \exists C (C \subset A \wedge x = C)]$.

It can be interesting to see that the power set of empty set contains singleton element, the empty set itself.

For next axiom it is important to know the following definitions.

Definition 1.

(Injective) A function $f: A \rightarrow B$ is one-to-one if and only if for all $a, b \in A$, $f(a) = f(b)$ implies $a = b$.

Definition 2.

(Surjective) A function $f: A \rightarrow B$ is onto if for any $b \in B$ there exists an $a \in A$ for which $f(a) = b$.

Definition 3.

A function f is bijective if and only if it is both injective and surjective.

Definition 4.

The cardinality of a finite set A is the number of elements contained in a set, it is denoted as $|A|$.

Definition 5.

The symmetric difference of two sets A and B is the set of elements that are in one and only one of the sets. The symmetric difference is written as $A \Delta B$.

$$A \Delta B = (A - B) \cup (B - A).$$

Definition 6.

The ordered pair of a and b is defined as $(a, b) = \{\{a\}, \{a, b\}\}$, denoted by the set (a, b) .

Definition 7.

The Cartesian product of the family of sets $\{A_i\}$ ($i \in I$), is the set of all families $\{a_i\}$ with $a_i \in A_i$ for each $i \in I$.

The Cartesian Product $A \times B$ of two sets A and B is the set of all ordered pairs (a, b) where $a \in A$ and $b \in B$.

Example: If $A = \{a, b\}$ and $B = \{1, 2\}$, then $A \times B = \{(a, 1), (a, 2), (b, 1), (b, 2)\}$.

Axiom 7.

Axiom of Choice: The Cartesian Product of a nonempty family of nonempty sets is nonempty.

Consider a set of nonempty sets as A and its union is the set P , then there exists element x contained in X in A .

Zermelo–Fraenkel axioms together with axiom of choice is referred as ZFC.

In the basic set theory Venn diagrams are generally used as it is the easiest way to solve problems or to prove some simple properties and easy to visualize. But Venn diagrams have some restrictions if it is concerned with the members of set, union of all subsets of a set cannot be easily represented using these Venn diagrams. Even it is not possible to use these diagrams if the number of sets are more and with different properties. Set theory is not having just a single method to solve related problems. Schoenfeld in [4] also said, “The phenomena we wish to “see” should affect our choice of method, and the choice of method will, in turn, affect what we are capable of seeing. And, of course, the kinds of claims one will be able to make (convincingly) will depend very much on the methods that have been employed”

With addition to axioms, it is essential to know some theorems [5] in set theory required to study sets in detail like subset of countable set is countable, if a set contains uncountable subset, then that set is also uncountable, the intersection of finitely many countable sets is countable, The Cartesian product of finitely many countable sets is countable, there does not exist any surjection function from a set A to $P(A)$, etc. Descriptive set theory (DST) is the specific study of definable sets of real numbers. Advanced to it completeness axiom applied in Bolzano’s principle to observe the sequence of nested closed intervals in \mathbb{R} .

III. EXAMPLES

Some examples where the definitions and axioms are used to prove the results:

Example 1. Every finite set is countable

Example 2. The set of all integers \mathbb{Z} is countable

Example 3. The set of all rational numbers is countable

Example 4. The set of real numbers in $[0; 1]$ is uncountable.

Example 5. If A is countable and non empty set $B \subset A$, then B is also countable

Proof:

Case 1: If A is finite, being a subset B is also finite.

Case 2: If A is countably infinite, then there exist a bijective function $f : A \rightarrow \mathbb{N}$. $f(B) \subset \mathbb{N}$, since any subset of \mathbb{N} is countable so $f(B)$ is either finite or countably infinite. As B is equivalent to $f(B)$ or B and $f(B)$ are of same cardinality (since f is injective), hence B is countable.

Example 6. If $B \subset A$ and B is uncountable, then A is uncountable.

Proof:

This can be shown by contradiction.

Consider A is countable and then there will be two cases.

Case 1: If A is finite, then $B \subset A$, is a contradiction since B is uncountable.

Case 2: If A is infinitely countable, then there exist a bijective function $f : A \rightarrow \mathbb{N}$, as $B \subset A$ implies that $f : B \rightarrow f(B)$ is also a bijective function. But $f(B) \subset f(A) = \mathbb{N} \Rightarrow f(B) \subset \mathbb{N}$, therefore $f(B)$ is countable. Since there is a bijection from B to $f(B)$ then cardinality of B and $f(B)$ is same. This is also a contradiction since an uncountable set can never be equivalent to a countable set.

Example 7.

If B is countable and $f : A \rightarrow B$ is injective; then A is countable.

Proof:

If A is Finite, then it holds that A is countable. Now let A be infinite. Since f is injective, A is equivalent to $f(A)$. Therefore $f(A)$ is also infinite. As $f(A) \subseteq B$, hence B is infinite. But given that B is countable so B is countably infinite. Subset of a countable set is countable hence $f(A)$ is countable. A is equivalent to $f(A)$ so A is also countable.

Example 8.

If A is countable and the function $f : A \rightarrow B$ is surjective then B is countable

Proof:

Given that f is surjective. Therefore, f has right-inverse $g : B \rightarrow A$, i.e. $f \circ g(b) = b, \forall b \in B$. The function g is injective since it has a left - inverse f. and if B is countable and $f : A \rightarrow B$ is injective; then A is countable. Since A is countable, B is countable (f is surjective).

IV. CONCLUSION

Axiomatic set theory is a very basic tool to have an idea about set theory and its development. Many applications of the set theory can also be seen in decision making problems, in data mining, soft computing, in the study of large cardinal consistency.

In the case of inadequacy of parameters or where the data is not precise then one can use the advanced set theory concepts collaboratively even if the data is too large and is not fixed. Sets can be linearly ordered so limitations to axiom of choice can overcome by ordering principle.

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Online Cab Booking System

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ABSTRACT

The recent development of internet and technology has augmented the Self-drive car rental industry in a country like India. As Transportation is backbone of working man and is a medium amongst so many people. The emergence of online cab booking is a recent advancement for the taxi industry in India. Even though both ordinary cabs and online cabs provide the same utility to customers, the preference of online cabs among customers in urban is increasing. Online cabs are quite different from ordinary cabs. The firm must be registered and meet all of the transportation department's criteria and security standards. The Online Cab Booking System is a web-based application that enables your clients to book taxis and executive taxis from the convenience of their own home or workplace or even from their current location. So, there is a need to evaluate the customers' perception and preference for these services and to identify the factors influencing them.

I. INTRODUCTION

The recent development of internet and technology has augmented the Self-drive car rental industry in a country like India. As Transportation is backbone of working man and is a medium amongst so many people. The emergence of online cab booking is a recent advancement for the taxi industry in India. Even though both ordinary cabs and online cabs provide the same utility to customers, the preference of online cabs among customers in urban is increasing. Online cabs are quite different from ordinary cabs. The firm must be registered and meet all of the transportation department's criteria and security standards. The Online Cab Booking System is a web-based application that enables your clients to book taxis and executive taxis from the convenience of their own home or workplace or even from their current location. So, there is a need to evaluate the customers' perception and preference for these services and to identify the factors influencing them.

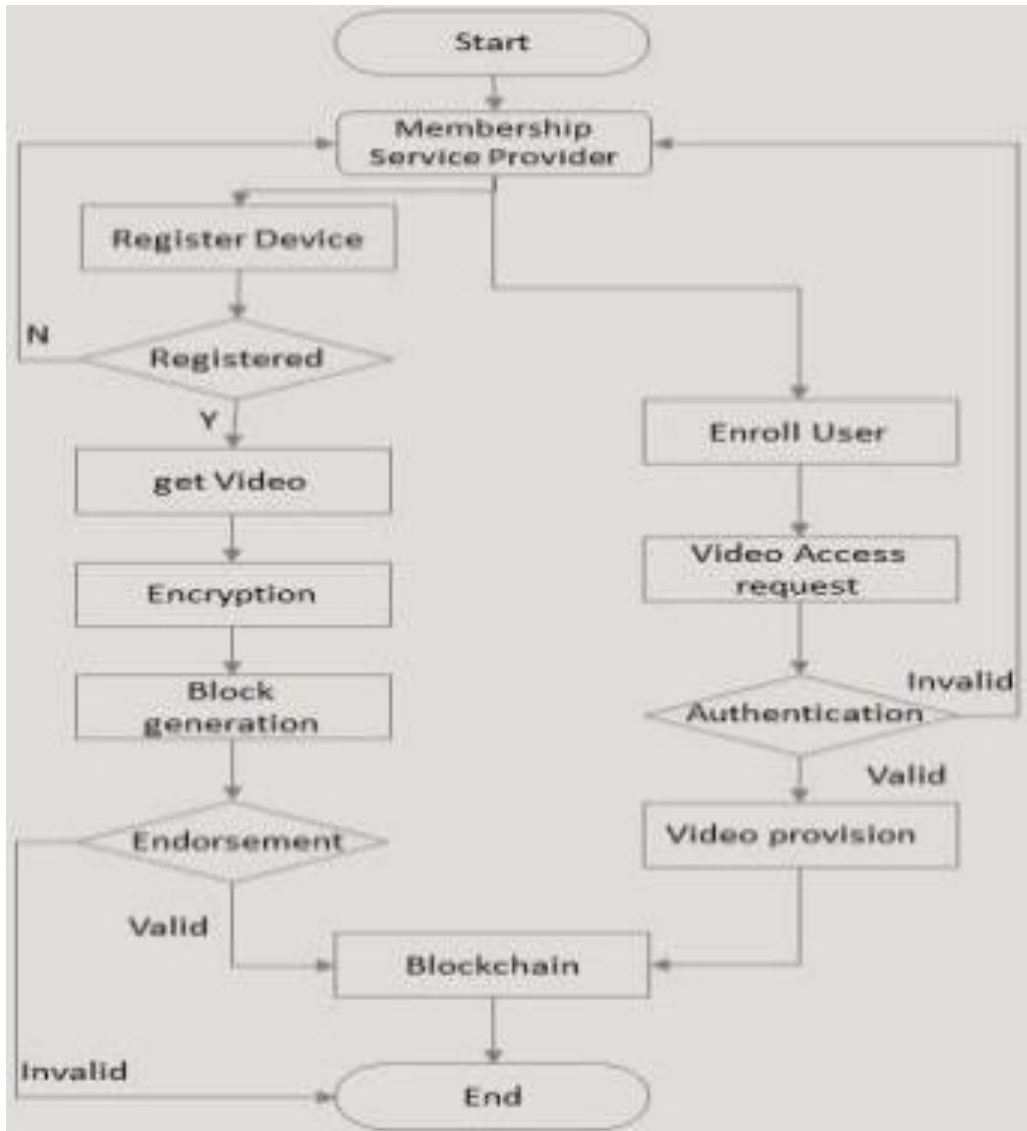
II. LITERATURE SURVEY

The present online cab Booking projects approach needs a large lot of physical and mental labour whenever cabs are ordered manually over the phone. Many human errors, such as inputting the trip date, time, and location inaccurately, are manually registered in a register by an employee, increasing the chances of miss

registration. There is no clear communication between drivers, passengers, and the office due to traffic and misunderstanding problems, leading in a denial of service. In the current system, there is no application that alters the state of taxi availability. Local consumers are also not notified when a vehicle comes to their neighbourhood to give service.

III. RESEARCH METHODOLOGY

Customers can order a cab based on their requirements by sampling logging in to the projected Online Cab Booking project website by give required information asked for further procedure.



Customers may book taxis online, make changes to their arrangements, and cancel them at any time. Users will be notified of the driver's location and phone number, which will allow them to contact him. On a frequent basis, the customer is updated on their bookings, driver details, and booking status. The user can also make suggestions or ask questions in the feedback box and can rate the service provided to them. For research design study must be in analytical as well as descriptive in nature. Behaviours of online cab users from different cities must be studied.

IV. OBJECTIVE

1. To study customers' preference towards online cab services.
2. To identify the factors influencing the customers for choosing the preferred cab service.
3. To identify the problems encountered by the customers while availing the services.

Theoretical Framework 5 best cab services in India

1. Ola Cabs

Available – Android | iOS

Ola Cabs is one of the top-rated taxi booking apps in India which provides services in all major cities including Mumbai, Chennai, Delhi, Bangalore, Kolkata, Hyderabad, and many others. Started in 2010 by BhavishAggarwal and AnkitBhati, the cab services of Ola operating in 100+ Indian cities with more than 600,000 registered vehicles which is highest by any taxi company in India. The app helps people to book a taxi by simply register using email and mobile number. By choosing the pickup and drop location, the app sends a request to the nearby cab and helps to confirm the ride. The cost of the ride differs based on the ride options selected from the app which includes Ola Mini, Seda, Prime, Share, and Auto. Ola is the top taxi apps in Bangalore, Mumbai, Chennai, Kolkata, Hyderabad, and all other major cities. Ola Cab booking app available in both Android and iOS platforms. Ola app for android currently has more than 50,000,000+ installs, which is the highest for an Indian cab booking app. The app provides easy payment methods for users including both online and offline payments.

2. Uber

Available – Android | iOS

Global leader for taxi booking app, Uber is one of the key player in Indian subcontinent and top taxi apps in India. The prominent taxi hailing company started its operation in 2013 in India and running successfully at all major cities including Delhi, Kolkata, Hyderabad, Chennai, Bangalore, Mumbai and more. Running multiple businesses across the globe, Uber cab booking is the key competitor for Ola vans in India. User can book cabs using mobile app and website, Uber app available in android and iOS stores for free. Uber is one of the top taxi apps in Delhi and other metro cities of India. The taxi fare of Uber ride is calculated based on various factors including type of vehicle choose for ride, distance, waiting charge, traffic and more. After completion of ride, user can pay the fare by multiple methods as per their convenient. The successful taxi services in India, the company also launches its food ordering app Uber Eats in all major cities.

3. Meru Cabs

Available – Android | iOS

Meru Cabs which is based out of Mumbai, India providing taxi services in Indian cities including Mumbai, Delhi and more. Founded in 2007, Meru Cabs provides taxi for its customers using call services and later due to technology development, the company launched its app in android and iOS platforms. Meru Cabs offers separate user taxi booking app for android and iOS. The app includes easy map navigation, live route tracking, view ride history and more. Meru Cabs is prominent taxi booking app in Mumbai before Ola and Uber services

came to Indian cities. The cab service provided by meru includes open categories of Hatchback, Sedan and SUV. The company also tie up with French taxi service app ‘Taxis G7’ for global taxi operation in various countries.

4. Carzonrent

Available – Android | iOS

Carzonrent is an prominent taxi booking services in India operating from New Delhi. The company started in 2000 and provides its services in all major cities including Mumbai, New Delhi and more. The cab services offering end to end long and short term rental. Started its services office by call and order method, later the company has launched its mobile application in android and iOS platforms. Carzonrent collaborated with Government of India’s “Indian Railway Catering and Tourism Corporation (IRCTC)” in 2015 and provides taxi services to all railway customers under the name of EasyCabs in major cities and rated as best taxi booking app in india. The mobile app of Carzonrent allows user to book cab by tapping starting and end dropping location. The company eyeing to expand its business to other cities in India to compete along with Uber and Ola cabs.

5. Savaari Car Rentals

Available – Android | iOS

Savaari Car Rentals is India’s prominent outstation and local car rental services. The company founded in 2006 to fulfill the gap of customers for booking quality taxi at affordable price in all major cities in India. Savaari majorly provides taxi services for outstation from city to city which is familiar among many India users. Currently, the company’s operating from 98 major Indian cities with more than 50,000 vehicles. Savaari is prominent cab booking app for outstation rides in all major Indian cities. The company has launched its taxi booking app services in India for both android and iOS platforms. With the help of mobile app, the customers can book the cab instantly by tapping location and confirm their ride. The company is to expand its business to other Indian cities to compete with other cab booking providers.

The Cab Aggregators Business Model in a Nutshell:

The Taxi Driver: Anyone with a driving license and a car can apply for a Cab Aggregators driver in any Cab Aggregators covered cities. After screening, the driver is enlisted in the Cab Aggregators system and given a Cab Aggregators iPhone. This provides a steady income to anyone with a car without additional hazard or investment. Drivers are restricted to keep their locations on due to safety perspective.

The Passenger: Registered Cab Aggregators users download the Cab Aggregators app to their phones and if they need a taxi, they call a taxi via the Cab Aggregators app. They can also track the taxi on their phone as it approaches. This service is convenient for the passengers, provides them relatively low cost comfortable service.

Fare and Payment: Cab Aggregators set the taxi fares as premium fare during peak hours and flat rate for off peak hours. Passengers pay through their credit cards and don’t have to pay any cash to the drivers. The fare is based on car type, distance and peak hour. Payment is secure because passengers pay only via credit card using Cab Aggregators app.

Dividing the Profits: Cab aggregators divides the fare, usually 80% to the driver and 20% to Cab aggregators. Even after a 20% pay cut, the taxi drivers earn more than the traditional taxi services. It is estimated that Cab Aggregators have to lower its profit in all the cities it operates in coming months.

V. RESULT

A feasibility assessment of the proposed system is to be carried out during system analysis. This is to guarantee that the planned system will not cause the organization any problems. A basic grasp of the system's primary needs is required for feasibility analysis. A visually appealing design and a user-friendly interface are required for the Online Cab Booking system. An application should be well-defined, with a significant emphasis on design and user interface, as well as being userfriendly, to appeal to the target market.

VI. CONCLUSION

Customers can use an online booking system to rent cabs. Customers may use this online system to browse available taxis, view profiles, and book cabs. Taxi booking is a typical kind of transportation that is offered by a number of different transportation firms in a particular city. The bulk of people rely on taxi services for their daily transportation needs. The company must be registered and fulfil all of the transportation department's requirements and security requirements. This paper demonstrates an effective taxi booking system. This project included a wide variety of topics, from corporate principles to computer science, and required the completion of a number of courses in order to reach the deadline

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Android Malware Analysis using Classification Techniques

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ABSTRACT

Malware is currently one of the biggest threats aimed at mobile devices is growing as more sophisticated mobile platforms have just become available, and more sensitive applications like banking are increasingly employing mobile platforms to the Internet's security. Any malicious software intended to carry out harmful operations on a targeted framework is considered malware. The introduction of Android terminals into people's lives allowed Android malware to start having a real impact on people's lives. Attackers may easily obtain client private information due to Android's security flaws, and the information can then be exploited in APT assaults. This article discusses Android malware techniques, AI, and the use of deep learning to a malware detection system.

Keywords: Malware, Android Malware Detection, Signature-based Malware Detection Systems.

I. INTRODUCTION

Data Mining [2] is the process of extracting previously unknown information from a large dataset. Data mining is also known as knowledge mining from data, knowledge extraction, data / pattern analysis, data archaeology, and data dredging. Remember that the mining of gold from rocks or sand is referred to as gold mining rather than rock or sand mining. [2] Thus, data mining should have been more appropriately named "knowledge mining from data," which is unfortunately somewhat long. Data mining is considered one of the most important frontiers in database systems and the KDD like Kaggle site for the gathering of data sets.

II. LITERATURE SURVEY

Sunil Kumar, et.al presents and compares the analysis of different Android malware detection frameworks dependent on various parameters, for example, detection system, examination technique and separated highlights [1]. We discover inquire about work in all the Android malware detection procedures that utilization AI, which additionally features the way that AI calculations are usually utilized around there for recognizing Android malware in nature.

Howard, M., et.al proposed a technique for expanding machine learning-based malware detection systems by anticipating characteristics of future varieties of malware and implanting them into the protected

structure as a vaccination[3]. Our method uses significant learning to know the ways by development of malware.

Souri, A, et. al, presents a detailed and systematic review using malware detection method data mining techniques[4]. It also classifies malware sensing techniques into two primary classes, namely methods for signature and behaviour. The paper offers a detailed and confidential view of current solutions to the machine learning mechanisms; talks about the structure of realistic techniques used in detection approaches of malware and summarizes the problems of malware methods in data mining; and addresses significant data mining malware classification approaches.

Tieming Chen, et. Al proposes a novel lightweight static detection model, TinyDroid, utilizing guidance rearrangements and AI strategy[5,6]. Initial, an image-based improvement strategy is proposed to extract the opcode succession decompiled from Android Dalvik Executable records. At that point, N-gram is utilized to separate highlights from the streamlined opcode succession, and a classifier is prepared for the malware detection and order assignments. The test results show that TinyDroid can get a higher precision rate and lower bogus alert rate with fulfilled proficiency.

III. WEKA

Weka was developed at the University of Waikato in New Zealand; the name stands for Waikato Environment for Knowledge Analysis The system is written in Java and distributed under the terms of the GNU General Public License. It runs on almost any platform and has been tested under Linux, Windows, and Macintosh operating systems and even on a personal digital assistant. It provides a uniform interface to many different learning algorithms, along with methods for pre and post processing and for evaluating the result of learning schemes on any given dataset. Weka provides implementations of learning algorithms that can be easily apply to dataset. It also includes a variety of tools for transforming datasets, such as the algorithms.

The Weka workbench is a collection of state-of-the-art machine learning algorithms and data preprocessing tools. It is designed so that we can quickly try out existing methods on new datasets in flexible ways. It provides extensive support for the whole process of experimental data mining, including preparing the input data, evaluating learning schemes statistically, and visualizing the input data and the result of learning. As well as a variety of learning algorithms, it includes a wide range of preprocessing tools. This diverse and comprehensive toolkit is accessed through a common interface so that its users can compare different methods and identify those that are most appropriate for the problem at hand. All algorithms take their input in the form of a single relational table in the ARFF format. The easiest way to use Weka is through a graphical user interface called Explorer. This gives access to all of its facilities using menu selection and form filling.

The Weka contains a collection of visualization tools and algorithms for data analysis and predictive modelling, together with graphical user interfaces for easy access to this functionality. Advantages of Weka include:

- Free availability under the GNU General Public License
- Portability, since it is fully implemented in the Java programming language and thus runs on almost any modern computing platform.

- A comprehensive collection of data pre-processing and modelling techniques.
- Ease of use due to its graphical user interfaces.

Weka supports several standard data mining tasks, more specifically, data pre-processing, clustering, classification, regression, visualization, and feature selection. All of Weka's techniques are predicated on the assumption that the data is available as a single flat file or relation, where each data point is described by a fixed number of attributes (normally, numeric or nominal attributes, but some other attribute types are also supported). Weka provides access to SQL databases using Java Database Connectivity and can process the result returned by a database query.

Weka's main user interface is the Explorer, but essentially the same functionality can be accessed through the component-based Knowledge Flow interface and from the command line. There is also the Experimenter, which allows the systematic comparison of the predictive performance of Weka's machine learning algorithms on a collection of data sets from Kaggle.

IV. CLASSIFICATION

Decision Table Classifier: Decision Table is an accurate method for numeric prediction from decision trees and it is an ordered set of If-Then rules that have the potential to be more compact and therefore more understandable than the decision trees[7,8]. Selection to explore decision tables because it is a simpler, less compute intensive algorithm than the decision-tree-based approach.

The algorithm, decision table, is found in the Weka classifiers under Rules. The simplest way of representing the output from machine learning is to put it in the same form as the input. It summarizes the dataset with a "decision table" which contains the same number of attributes as the original dataset. The use of the classifier rules decision table is described as building and using a simple decision table majority classifier. The output will show a decision on a number of attributes for each instance. The number and specific types of attributes can vary to suit the needs of the task[9,10,11,12]. Decision Table classifier algorithm is used to summarize the dataset by using a decision table containing the same number of attributes as that of the original dataset. A new data item is allocated a category by searching the line in the decision table that is equivalent to the values contained in the non-class of the data item.

The entire problem of learning decision tables consists of selecting the right attributes to be included. Usually this is done by measuring the tables cross validation performance for different subsets of attributes and choosing the best performing subset. Fortunately, leave-one-out cross-validation is very cheap for this kind of classifier. Obtaining the cross-validation error from a decision table derived from the training data is just a matter of manipulating the class counts associated with each of the tables entries, because the table's structure doesn't change when instances are added or deleted. The attribute space is generally searched by best-first search because this strategy is less likely to get stuck in a local maximum than others, such as forward selection. Decision Table are one of the simplest hypothesis spaces possible and usually they are easy to understand. Decision Table builds a decision table majority classifier[13]. It evaluates feature subsets using best-first search and can use cross-validation for evaluation. An option uses the nearest-neighbour method to determine the class for each instance that is not covered by a decision table entry, instead of the table's global majority, based on the same set of features.

ZreoR Classifier:

ZeroR is the simplest classification method which relies on the target and ignores all predictors. ZeroR classifier simply predicts the majority category (class). Although there is no predictability power in ZeroR, it is useful for determining a baseline performance as a benchmark for other classification methods.

M5Rule Classifier:

Generates a decision list for regression problems using separate-and-conquer. In each iteration it builds a model tree using M5 and makes the "best" leaf into a rule.

M5Rules generates a series of M5 trees, where only the "best" (highest coverage) leaf/rule is retained from each tree. At each stage, the instances covered by the best rule are removed from the training data before generating the next tree[14]. The algorithm is similar to the PART method for classification trees, except that always builds a full tree at each stage and does not employ the partial tree building speed-up of PART. M5P builds a single decision tree. It is certainly possible that an M5 rules classifier could outperform M5P on a given dataset.

Fig. 1: ZeroRClassifiers Wi-Fi state with Referred Application

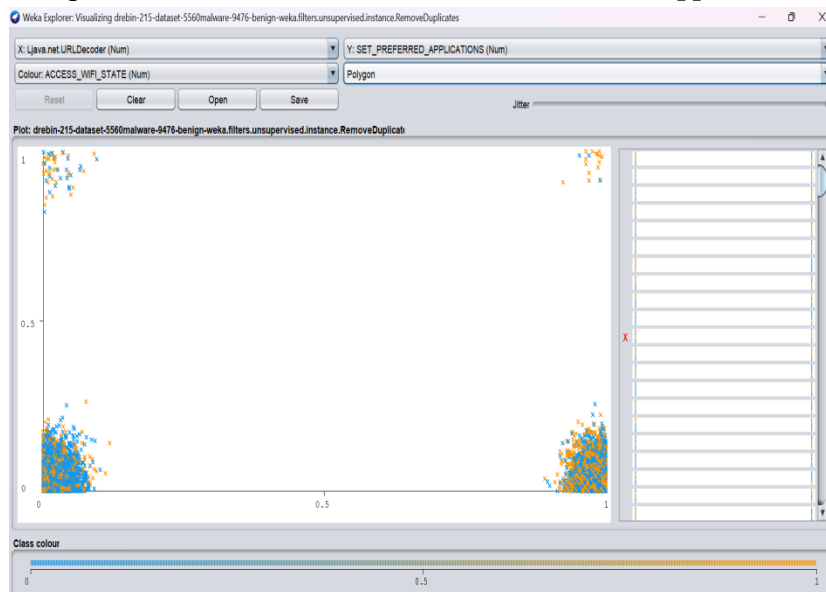


Fig. 2: M5Rules Classifiers Wi-Fi state with Referred Application

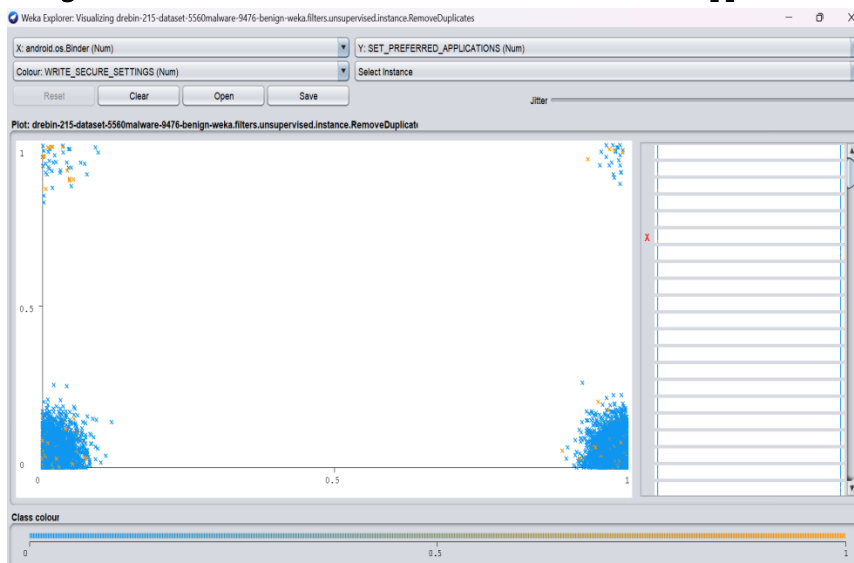


Fig. 3: Decision Tables Classifiers Wi-Fi state with Referred Application

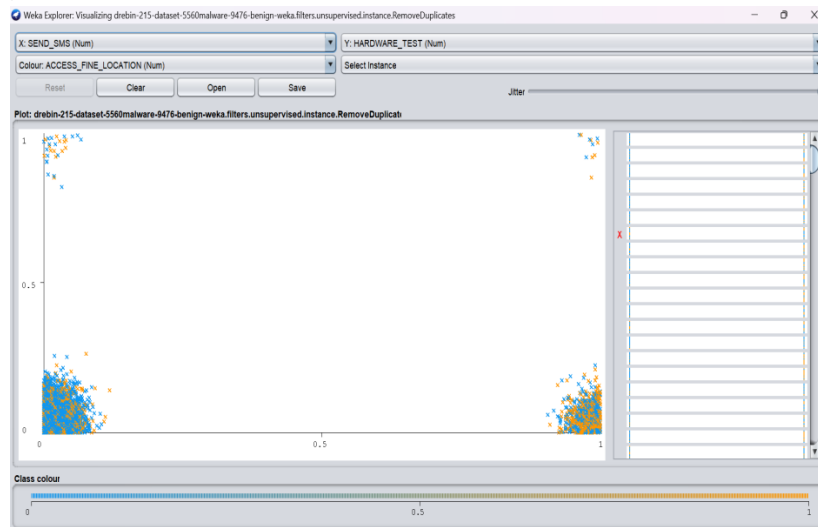


TABLE1: Comparative Study

Name of Classifiers	M5Rules	Decision Tables	ZeroR
Time taken to build model:	1.04 Sec	0.07 sec	0.08 sec
Correlation coefficient:	0.964	0.9394	0.5454
Mean absolute error	13508.405	971379.82	1087916.76
Root mean squared error	40923.16	2045139	2294065.24
Relative absolute error	21.88%	53.17%	59.55%
Root relative squared error	26.62%	75.48%	84.67%
Total No. of Instances	7261	7261	7261

Table-1 represents the three classifiers M5Rules, Decision Tables and ZeroR with the WEKA tool by using these classifiers with the following contents. In these Time taken to build model, Correlation coefficient, Mean absolute error, Root mean squared error, Relative absolute error, Root relative squared error, Total no. of Instances with Ignored Class Unknown Instances.

According to Table 1 M5Rule is not superior than Decision Tables and ZeroR classifiers.

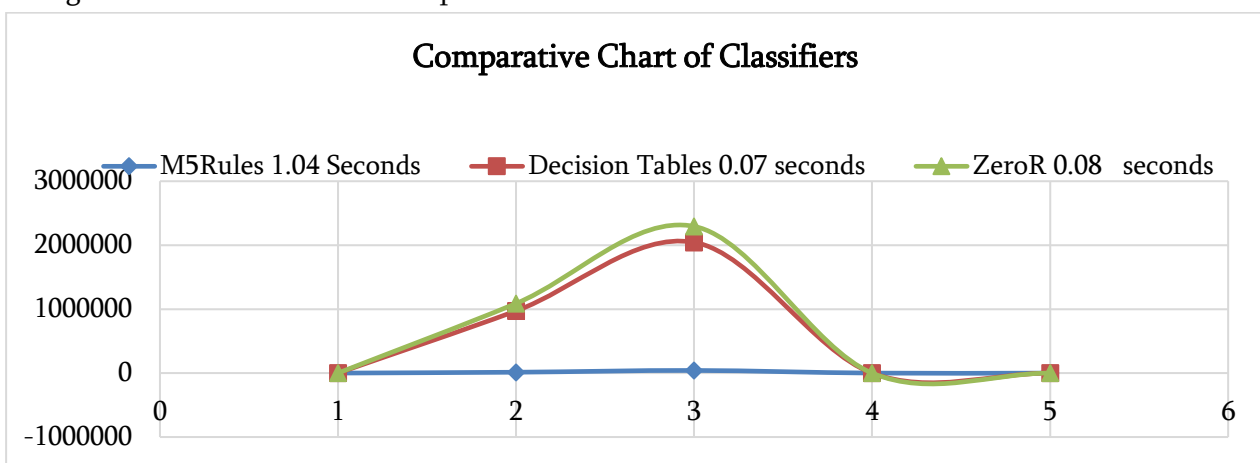


Fig. 5 - Comparative Analysis of Classifiers

V. CONCLUSION AND FUTURE SCOPE

This research proposes a malware detection module based on advanced data mining and machine learning. It can be implemented at enterprise gateway level to act as a central antivirus engine to supplement antiviruses present on end user computers. It can help protect invaluable enterprise data from security threat, and prevent immense financial damage. Data mining techniques and algorithms such as classification help to find the patterns to decide upon the future trends to expand the hospitality in this pandemic crisis. This paper focuses on the existing literature in the field of Classification Techniques (DTs, M5Rules, ZeroR) and research challenges in Data Mining. It found that there is no single technique that is consistent with all domains, and that Classification Techniques and algorithms perform better than the other existing methods. Each technique has its own strength and weakness, and can be selected based on the needed conditions. ZeroR classifier is one of the best classifiers.

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CO₂ Gas Sensing Properties of ZnO-Fe₂O₃ Composites

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ABSTRACT

ZnO-Fe₂O₃ composites of 0–100 mol% composition range were fabricated in the form of thin films by sintering powders at 800°C and their electrical conductivity and CO₂ gas sensitivity were measured between 30 and 80°C. SnO₂-rich composites showed higher sensitivity values than pure ZnO. Fe₂O₃-rich composites have more porous microstructure and thus are more sensitive to CO₂ gas at all temperatures than pure Fe₂O₃. The effects of microstructure and composition on the gas sensitivity were discussed. ZnO-Fe₂O₃ grain boundary was also proposed to be responsible for the gas sensitivity.

Keywords: ZnO nanoparticles; Fe₂O₃; Gas sensor; CO₂

I. INTRODUCTION

Semiconductor-type gas sensor for sensing CO₂ has been fabricated with base materials like SnO₂ and In₂O₃. To improve the sensing properties, transition metal oxides, such as La₂O₃, Nd₂O₃, were added as a catalyst on it. [1-4]. Among these sensors, La₂O₃-added SnO₂ sensor showed the most superior sensitivity to CO₂ gas. The La₂O₃-added SnO₂ sensor was investigated using various methods such as powder mixing, soaking, impregnating, coating, etc. [3,4].

Seiyama et al have proposed the gas sensors based on ZnO thin films [5]. ZnO is sensitive to many gases of interest, H₂ [6] oxygen [7-12], H₂O [10-11], ethanol [12] and NH₃ [13], etc. It also has a rapid response with a possibility of miniaturization. However, it has some drawbacks, such as high working temperature, normally between 400 and 500 °C, poor gas selectivity and relatively low gas sensitivity [14].

To overcome these disadvantages, considerable research and development are underway. There are various techniques to modify the sensing properties of the gas sensors. One critical approach is to modify the metal oxide surface by using noble metals (Au, Pt or Pd) [15, 16] or rare earth metals (La, Y and Ce) [17,18]. ZnO(n)/CuO(p) heterocontact configuration also showed some possibility of improving the selectivity [19]. Nanto et al have reported that a sensor based on a ZnO thin film doped with Al, In or Ga could detect the ammonia gas whose concentration was as low as 1 ppm [9]. But the working temperature was as high as 350 °C. Recently, Ivanovskaya et al suggested that a sensor based on Fe₂O₃/In₂O₃ nanocomposites exhibited high sensitivity to NO₂ [20].

The present work was undertaken to investigate the gas sensing behavior of ZnO nanoparticle thin films doped with Fe₂O₃ nanoparticles prepared by a screen printing method. Morphological, structural and sensing

properties at room temperature were studied. The ultimate objective of this study is to improve the gas selectivity and sensitivity of the nano-sized ZnO-based sensors at room temperature.

II. EXPERIMENTAL

Appropriate amount of tin oxide (Sd fine, 99.9%) and ferric oxide (Sd fine, 99.9%) powders were calcinated at 800°C for 4 h in the furnace. Initially the single chemicals were calcinated at 800°C for five hours. After calcinations the fine powder was formed in agate and mortar. The paste was prepared by mixing calcinated fine powder with Ethylcellulose and Butylcarbitol for screen printing. The paste was screen printed on glass substrate in the form of thin film. The films were subjected to heating at 150°C for 30 min. For surface conductance measurement the electrodes of silver paint were formed on adjacent sides. Again the films were subjected to heating at 150°C for 30 min for drying the silver paint. Phase and microstructure were characterized by the X-ray diffractometry (XRD) and scanning electron microscopy (SEM), respectively.

The electrical conductivity was measured after it was cooled to the measurement temperature.

All samples showed almost linear Sensitivity–Concentration of CO₂ gas. Resistance values in air and in 500 ppm CO₂ were measured. The specimen was kept in dry air for 30 min before changing the measurement temperature. The gas flow rate was 2ml min⁻¹. Gas sensitivity was defined as $R_g - R_a / R_a$, where R_a and R_g are the electrical resistance values in dry air and in sample gas, respectively

III. RESULTS AND DISCUSSION

3.1 Phase and microstructure observation

The X-ray powder diffraction patterns of ZnO, Fe₂O₃ and their compositions calcinated at 800°C for 4-5 h were recorded in terms of 2θ in the range 10-100° and are shown in figs.1 (a) to (c). It is observed that XRD pattern of ZnO and Fe₂O₃ contains 8-10 peaks. The prominent peaks observed in XRD spectra are due to ZnO and Fe₂O₃. The intensity of the peaks varies with ZnO and Fe₂O₃ concentration. The (h k l) values are calculated for various peaks from XRD spectra, ZnO as hexagonal and Fe₂O₃ hematite in structure [23-26].

The lattice parameter values obtained for ZnO are $a = b = 3.249 \text{ \AA}$ and $c = 5.201 \text{ \AA}$ with c/a ratio of 1.6, respectively [27]. These values are in good agreement with the values reported in references [28-30]. Intensity of ZnO decreases with increasing composition of Fe₂O₃. The crystallite size (D) calculated from Scherrer formula [21, 22] using the FWHM is listed in (table 1) for each material that used for sensors preparation. The SEM study indicates that the crystallite sizes are different and therefore small intergranular pores and voids are formed and these are responsible for gas sensing.

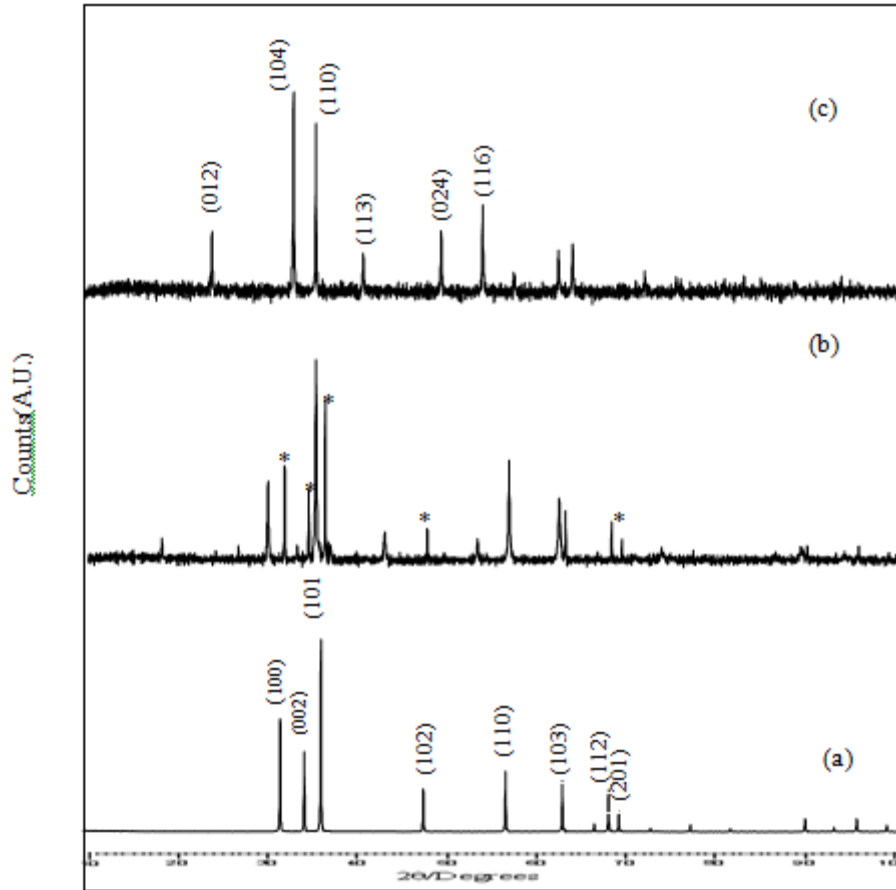


Fig.1: XRD of (a) ZnO (b) 40 Fe₂O₃.60 ZnO, (c) Fe₂O₃; * indicates peaks of ZnO (100,101,102,112) planes.

Table(1): Shows the (2θ) position and average crystallite size (D) of ZnO, Fe₂O₃, and their composites.

Chemical composition ZnO - Fe ₂ O ₃ (mol%)	FWHM (2θ) Degree	Average crystallite size (D) (nm)
100 - 0	0.1338	105.38
60 - 40	0.0816	162.80
0 - 100	0.0816	194.45

3.2 SEM of ZnO - Fe₂O₃:

Fig. 2, shows the SEM photographs of 60ZnO-40Fe₂O₃ sensors for X5000 magnifications. Fig.2, shows the randomly distributed ZnO-Fe₂O₃ grains of larger size and shape distribution. The large number of grains which are leading to high porosity and large effective surface area are available for adsorption of gas species. The non-uniform voids, bigger and flat patches also seen in the ZnO- Fe₂O₃ micrograph. The size of voids varies from ~20 nm to 400 μm and pore size varies from ~50 nm to 10 μm. The average grain size seen from micrograph varies from ~100 to 200 nm.

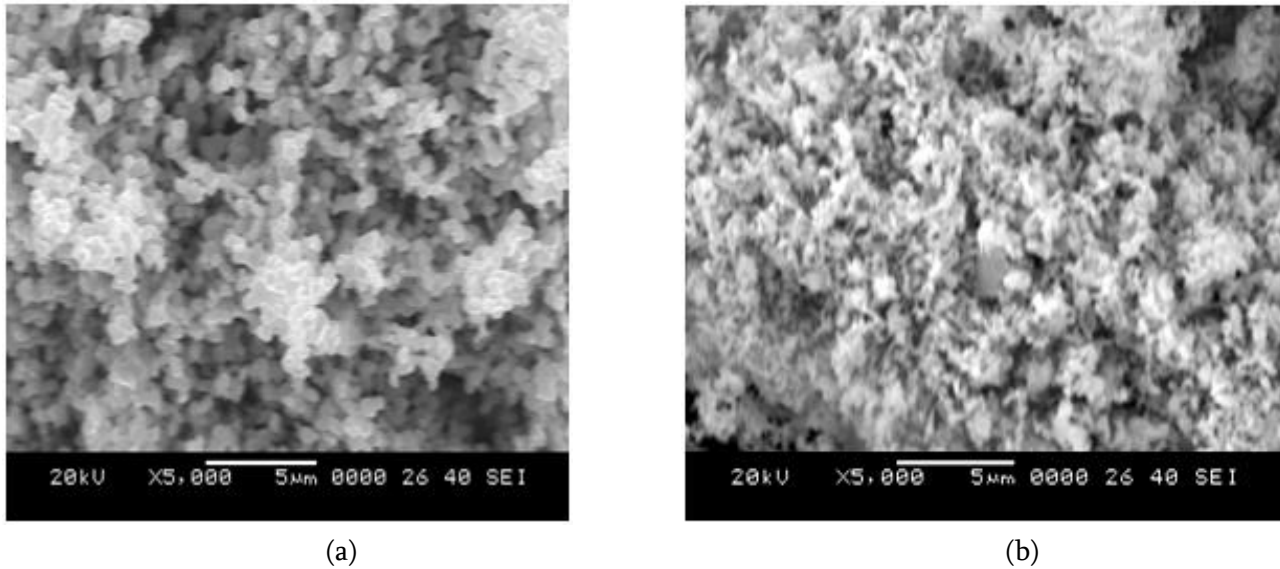


Fig.2: SEM picture of (a) Fe₂O₃ and (b) 60ZnO-40Fe₂O₃

3.3 Sensitivity of ZnO- Fe₂O₃ to CO₂ gas :

Fig.3 shows the sensitivity variation with concentration of CO₂ gas for SC₁, SC₂, SC₃, SC₄, SC₅ and SC₆ sensors at temperatures 303K. The sensitivity increases with increasing concentration of CO₂ gas.

The curves are linear in certain range of CO₂ gas concentration. At higher concentration the curves shows saturation effect. Very small change in resistance is observed at high ppm level. Similar type of behavior is observed at all temperatures. At temperature 303K sensor SC₂ shows higher sensitivity than other sensors. This may be due to small grain size formed in sample SC₂ than other samples. More number of grains formed larger surface exposed to gas.

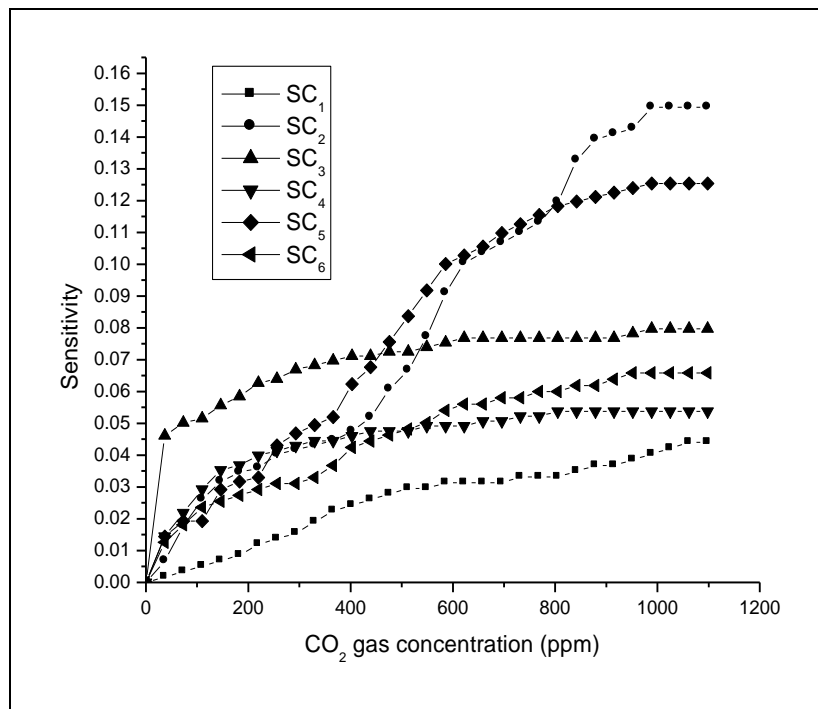


Fig.3: Variation of sensitivity with ppm of Fe₂O₃-ZnO composition at temperature 303K

IV. CONCLUSION

Gas sensors based on Fe₂O₃-ZnO nanocomposites have been prepared with different compositions of Fe:Zn. The sensor with 40Fe₂O₃-60ZnO (SC2) exhibited good sensitivity and selectivity to CO₂ at room temperature. The response and recovery time of the sensor were about 10 min. The reproducibility of the ZnO gas sensor with 40Fe₂O₃-60ZnO was good. The increased sensitivity and selectivity to CO₂ may largely be attributed to the addition of Fe₂O₃ nanoparticles, which can promote the adsorption of CO₂ molecules on the oxide surface and accelerate the oxidizing process.

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Critical Data Analysis of Various IoT-Based Technologies for Automated Smart Farming

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ABSTRACT

The IoT-based smart farming uses various technologies in agriculture as well as challenges, outcomes, pests and diseases of Crops Cultivations. In this research paper, we studied the various research papers on IoT-based smart farming and its technologies used for automation to smart farming. We especially criticize the Data Analysis of Various IoT-based technologies for Automation Smart Farming to develop farming techniques for increasing the human population and other parameters are developed for any country to boost its economy. We will save money for our country to pay another country to require fulfill food, and also to boost the country's economy by exporting to others countries for food. This research paper aims to improve farming techniques of farmers to use sustainable water and energy. Life without farming is impossible to imagine; it survives for humans easily with food. But problems with the cultivation of crops identify pests and diseases. Here we gather the various articles data to related diagnosis Pests and Diseases of crops as well as automation to farming.

Keywords: IoT, Smart Farming, Agriculture, LoRo, Big Data, Cloud, Deep Learning, Machine Learning, Artificial Intelligence, WSN.

I. INTRODUCTION

Farming is a very important thing for humans to eat food. This farming offers food for humans and it's the backbone of any country to fulfil and boost the economy. Today there are a lot of demands for food because of the increasing human population in every country in this world. So every country needs to develop its farming techniques. The IoT is an abstract idea for changing the future. This IoT interconnects all devices, tools, and gadgets over the Internet to enable these devices to communicate with other devices. IoT finds application in various areas, such as Healthcare, Agriculture, Smart Home, Education, Retails, and Industries. These things are changing the future of humans. The IoT-bases smart farming on achieving the desired outcome for human life. The Internet of Things (IoT) gives an automatic system that can operate without any human intervention. These systems are really necessary for farm fields and help the farmers to maintain more farm fields. The automatic system notifies the farmers to take the proper decision to deal with various problems the farmers face during farming[1]. A LoRa-based IoT system that aims for a low cost, low power, and wide range wireless

sensor network targeted at smart farms. The presented system integrates already existing Programmable Logic Controllers (PLC) typically used to control multiple processes and devices, such as water pumps, certain machinery, etc., along with a newly developed network of wireless LoRa sensors distributed over the farm. A Telegram bot is also included as a novelty for automated user communication via this mobile phone messaging application[2]. IoT-based agricultural monitoring is reducing human intervention in farming. The system also has an excellent set of decision-makers with reduced manual contributions. Furthermore, the outcomes help us to understand more about the significance of each variable in obtaining healthy plants. This achievement leads to smart water management in farming[3].

II. LITERATURE REVIEW

This Literature Review of IoT-based smart farming uses various technologies for different proposed. This is a literature review of automated farming and agriculture using IoT-based technologies, challenges, outcomes, pests, and diseases of Crops Cultivations. The Critical Data Analysis of Various IoT-based technologies for Automation Smart Farming to develop farming techniques for increasing the human population and other things are developed for any country to boost its economy. We have various paper surveys on smart farming and agriculture about farmers' techniques for sustainable water and energy, challenges, outcomes, pests, and diseases of Crops Cultivations.

The review of this research paper tries to fathom the use of modern technologies in smart farming. Different types of sensors are used to collect the data in a farm field and also cyber security that occurs in the agriculture sector[1]. This paper describes the development of a complete IoT system for a smart farm with three main aims: 1) Provide better storage conditions of the food products inside a warehouse by monitoring the humidity and temperature and set suitable values. 2) Remote monitoring and control of the different devices of the system via the web application. 3) Automate some tasks such as irrigation, or adjusting the temperature inside the warehouse[2]. Smart Agricultural is reducing human intervention in farming using IoT-based Technologies. This process is aimed at educating the farmer on the use of an integrated technology system to monitor and control operations in farming. The system has also reduced manual contributions and its outcomes are helping us to understand healthy plants. This achievement leads to smart water management in agriculture[3]. IoT modernization helps to get information on a situation such as the weather, climate, temperature, and soil fertility. There are many technological transformations in the last decades that have become technology-driven. Smart farming is a new technology in agriculture that makes agriculture more effective and more efficient[4].

III. CRITICAL ANALYSIS OF METHODOLOGY

A detailed review of related papers is conducted and analyzed from various key points of view. The methodology used, outcomes, and limitations are thoroughly studied and summarized in Table-1.

Table-1: Critical Data Analysis of Various IoT-based technologies for Automation Smart Farming

Sr. No.	Title of the paper	Authors	Journal /Year	Methodology/ Objective	Outcomes/ Advantages	Limitations/ Disadvantages
1	IoT Enabled Smart Farming: A Review	A. Y and A. S. Poornima	(ICICCS) 2022	1) Smart Irrigation using IoT. 2) Cyber Attack	1) Data Security 2)Reviews different research papers on IOT Base Farming	1) Only Irrigation and data Security 2) Doesn't Diseases Identification Of crops
2	Deployment of a LoRa-based Network and Web Monitoring Application for a Smart Farm	M. Saban, O. Aghzout and A. Rosado-Muñoz	IEEE, 2022.	1) LoRa-based IoT system 2) cloud-based monitoring application	1) a low cost, low power and wide range wireless sensor network.	1) warehouse control 2) Only Irrigation and No data Security.
3	Real Time Automation of Agriculture Environment for Indian Agricultural System using IoT	E. D, K. SB, G. N and D. S. Kumar	(ICSES) 2022	1) IoT-based real-time dynamic and manual irrigation 2) Sensor-based IoT technology.	1) Reduce water use by using a more efficient method. 2) Watering may be automated and monitored at the same time.	1) Only watering base on moisture level of soil. 2) It is a major challenge for uneducated farmers.
4	IoT Based Smart Agriculture	M. Jeyaselvi, M. Sathya and B. Prasad	(ICASI) 2022	1) IoT based applications in agriculture 2) Deep Learning and Machine Learning based farming.	1) IOT based agriculture are making farmer to smarter in farming. 2) Identify to Healthy and diseased of crops using images of plant leaf.	1) It's challenging for uneducated farmers. 2) Identify to Healthy and diseased of crops but not a solution.
5	Internet-of-Things (IoT)-Based Smart	M. Ayaz, M. Ammad-Uddin, Z.	IEEE Access, 2019	1) IoT based farm area network (FAN).	1)Sustainable IoT-based sensors and	1) New agricultural practices can be

	Agriculture: Toward Making the Fields Talk	Sharif, A. Mansour and E. -H. M. Aggoune		2)Hydroponics and vertical farming (vf) 3) Machine learning and analytics.	communicatio n technologies 2) Predict which genes are best suited for crop production. 3) Crop disease and pest management	very crucial to overcome the geographic and resource limitation challenge. 2) Respective locations and climate conditions crops cultivation.
6	Effective Utilization of IoT for Low-cost Crop Monitoring and Automation	P. Suriyachai and J. Pansit	2018 21st Internation al Symposiu m on (WPMC)	1) IoT-based crop monitoring and automation system. 2) IoT cloud-based platform	1) The system consists of low-cost sensor nodes. 2) web application for both real-time and historical data displays	2) The system uses an open weather API to obtain a weather forecast. 2) IoT- requires a constant internet connection. 3) IoT-related devices enable farmers to learn.
7	Agricultural Production System Based on IoT	M. Lee, J. Hwang and H. Yoe	2013 IEEE	1) IoT-based agricultural production system 2) IoT-based monitoring system to analyze crop environment	1) Developed the decision support system to forecast agricultural production using IoT sensors. 2) farmers observe whole cycle from seeding to selling using this IoT-based decision support system	1) Demand of agricultural products has not been controlled properly. 4) Uneducated farmers challenges' to observe whole cycle from seeding to selling.

8	Intelligent Farming System With Weather Forecast Support and Crop Prediction	U. Shandilya and V. Khanduja	2020 5th (ICCCS)	<p>1) state-of-the-art technology to provide the water to the agricultural field based on the soil moisture value, which is detected using IoT sensor.</p> <p>2) The system is activated using the mobile application; this can be accomplished with the help of ON/OFF buttons.</p>	<p>1) The proposed system suggests the farmers about crops that are suitable for a particular region.</p> <p>2) This automated irrigation system, weather prediction and notification regarding new government policies.</p>	<p>1) Crops harvesting based on the past year's data</p> <p>2) Doesn't Identify to Healthy and diseased of crops.</p>
9	A Novel Approach towards using Internet-of-Things in Smart Agriculture Monitoring System	S. C. Shah, A. Chakraborty, Y. S. Kumar, T. Samant and S. Swayamsiddha	2021 IEEE 15th International Conference on (AICT)	<p>1) The entire architecture is based upon Wireless Sensor Network (WSN).</p> <p>2) linear regression model</p> <p>3) binary logistic regression model</p>	<p>1) Remotely monitor natural conditions like soil moisture, humidity temperature, pressure, unwanted presence, detect the presence of light, rain.</p>	<p>1) It is a major challenge for future Large-scale implementations of smart farming.</p> <p>2) Security major challenge WSN.</p> <p>3) Plant disease detection and solution.</p>
10	Wireless Communication Technologies for Internet of Things and Precision Agriculture: A Review	D. K. Singh and R. Sobti	2021 6th (ISPPCC)	<p>1) IoT wireless communication technologies deployed in agriculture are ZigBee, Bluetooth, WiFi, RFID, GSM, 4G, SigFox, and LoRa. ZigBee</p>	<p>1) Suitable for short-distance communication and offers good power efficiency.</p> <p>2) Wireless communication technologies</p>	<p>1) If scalability is not suitable for long-distance communication range.</p> <p>2) Wireless communication technologies different devices</p>

					differ in their data communication range and power efficiency. 3) The collected information helps the farmers to plan agricultural activities efficiently.	in their different range and power capacity. 3) farmers to plan agricultural based on the past year's data
11	IOT Based Monitoring System in Smart Agriculture	S. R. Prathibha, A. Hongal and M. P. Jyothi	2017 (ICRAECT)	1) IOT Based Monitoring System	1) Wireless monitoring of field reduces the human power. 2) User to see accurate changes in crop yield.	1) In future this system can be improved by adding several modern techniques like irrigation method, solar power source usage.
12	Agricultural Water-Saving Precision Irrigation Control Strategy based on Internet of Things and Rainy Season Prediction	L. Qi	2022 6th (ICOEI), Tirunelveli, India.	1) The system completes Intelligent irrigation. 2) Agricultural Water-Saving Irrigation	1) utilization rate of agricultural Irrigation water and the water-saving efficiency reach 96.3%.	1) water-saving efficiency reaches 96.3%.
13	IoT, big data science & analytics, cloud computing and mobile app based hybrid system	S. Roy et al	2017 8th (IEMECO N), Bangkok, Thailand.	1) IoT, Big Data Analytics, Cloud Computing and Mobile Applications based Hybrid	1) Efficiency of agriculture 2) harvesting rainwater and groundwater,	1) High cost maintenance to hybrid system. 2) It's implementation are difficult for

	for smart agriculture			Solution for Smart Agriculture. 2) AgroTick.	and predicting effective utilization.	Farmers.
14	Agro-tech: A digital model for monitoring soil and crops using internet of things (IOT)	O. Pandithurai, S. Aishwarya, B. Aparna and K. Kavitha	2017 Third (ICONSTEM), Chennai, India.	1) AGRO-TECH is IOT application. 2) AGRO-TECH to update the activities of several sensors. 3) A. Farmer registration B. Installation of sensors C. Water level sensor in well and irrigation sprinkler D. AGRO-TECH Software E. Cloud storage	1) User friendly to be interactive with the farmers. 2) Updated to farmers through proposed system methodology. 3) Sprinkle the water in the field sufficiently. 4) Fast and effectively using cloud sensor. 5) Power management using solar radiation sensors. 6) Irrigation sprinkler to be effectively used water scarcity.	1) It's implementation are difficult for Farmers. And Long process. 2) It is a major challenge for future Security. 3) In future work, track a wide area to monitor critical aspects like abnormal weather conditions, pests and fungal infestations.
15	A LoRa based Wireless Smart Irrigation System	M. R, A. T, V. T and V. S	2022 6th (ICECA) Technology, Coimbatore, India.	1) LoRa-based Wireless system 2) automated irrigation systems on the basis of Internet of Things	1) a low cost, low power and wide range wireless sensor network. 2) Automated irrigation systems.	1) Only Irrigation system and No data Security. 2) Doesn't monitor, pests and fungal infestations. 3) Only based on

						the moisture data to pump is turned ON or OFF.
16	IoT based Smart Agriculture using Machine Learning	K. S. Pratyush Reddy, Y. M. Roopa, K. Rajeev L.N. and N. S. Nandan	2020 Second (ICIRCA), Coimbatore, India.	1) Supervised machine learning algorithms- decision tree Raspberry pi. 2) smart irrigation system which predicts the water requirement for a crop, using machine learning algorithm. 3) decision tree algorithm	1) Farmer can decide himself to water the crop only when required, avoiding the wastage of water use. 2) Crop yield making it more profitable and reduce irrigation wastages. 3) Decision tree algorithm is used to solve several regression and classification problems.	1)Limited to only water irrigation
17	Ensemble Classification and IoT-Based Pattern Recognition for Crop Disease Monitoring System.	G. Nagasubramanian, R. K. Sakthivel, R. Patan, M. Sankayya, M. Daneshmand and A. H. Gandomi	IEEE Internet of Things Journal, Aug.15, 2021.	1) Analytical statistics on plant growth and disease patterns, the proposed framework uses machine learning (ML) techniques, such as support vector machine (SVM) and convolution neural network (CNN).	1) System that observes the crops' growth and leaf diseases. 2) Efficient crop condition notifications to terminal IoT components which are assisting in irrigation, nutrition	1) Limited to Pattern Recognition of Crop growth and Disease. 2) Doesn't Irrigation and data Security. 3) In the future, this work is to be extended using a huge data set of multiple plants and its parts

				2) Ensemble classification and pattern recognition of crop.	planning, and environmental compliance related to the farming lands. 3) (ECPRC) to identify plant diseases at the early stages	using the deep learning approaches.
18	Affordable Smart Farming Using IoT and Machine Learning	R. Varghese and S. Sharma	2018 Second (ICICCS), Madurai, India.	1) Machine learning based real-time analytics is performed to predict the future condition of the crops base on its past data.	1) Affordable system which deployed will give an insight into the real time condition of the crop. 2) State-of-the-art methods in order to improve the accuracy. 3) Minimal human intervention	1) Reliability 2) cyber-attacks on field from anywhere in the world.
19	An Overview of Internet of Things (IoT) and Data Analytics in Agriculture: Benefits and Challenges	O. Elijah, T. A. Rahman, I. Orikumhi, C. Y. Leow and M. N. Hindia	IEEE Internet of Things Journal, Oct. 2018	1) Cloud platform, sensors and camera, communication technology	1) Increase productivity of crop yield	1) Range of communication distance, data rate, battery life, mobility, latency, security
20	Sensor Based Smart Agriculture with IoT Technologies: A Review	M. Pyingkodi et al.,	(ICCCI), Coimbatore, India, 2022.	1) Precision agriculture 2) Acoustic Sensor Field-Programmable Gate Array (FPGA)-Based Sensor 2) Optical Sensors	1) IoT sensor-based agriculture is now widely recognized as the new age of farming 2) It is already in use in large	1)IoT-Smart farming requires a constant internet connection. 2) IoT-related devices enable farmers to learn and realize how

				<p>3) Ultrasonic Ranging Sensor</p> <p>4) Humidity Sensors</p> <p>5) Airflow Sensor</p> <p>6) Temperature Sensor</p> <p>7) Moisture Sensors</p> <p>8) Soil Water Content Sensor</p> <p>9) PH Sensor</p> <p>10) Optoelectronic Sensor</p>	<p>farms and industrialized nations</p> <p>3) It may quickly Solve world hunger.</p> <p>4) Green revolution and pave the way for progress in a nation like India</p>	<p>to implement technology</p> <p>3) It is a major challenge for future Large-scale implementations of smart farming.</p> <p>4) Security measures, Different types of network attacks.</p> <p>5) IoT framework is extremely complex</p>
21	IoT Based Smart Agriculture Automation in Artificial Intelligence	K. Parasuraman , U. Anandan and A. Anbarasan	2021 Third (ICICV) on Technologi es and Virtual Mobile Networks Tirunelveli , India.	<p>1)Data Collection Module(Soil Parameters:Soil Type, Soil Ph value), (Climatic Parameters:Humi dity, Temperature, Wind, Rainfall)</p> <p>2) Recurrent Neural Network (RNN)</p> <p>3) Multi-Layer Perception (MLP).</p>	<p>1)Productive harvest proposal Framework utilizing classifier models.</p> <p>2) The crop detection algorithm Accuracy of 99.96%.</p>	<p>1) The crop detection algorithm Accuracy of 99.96%. Not a 100%.</p>
22	Predictive Analytics for Complex IoT Data Streams	A. Akbar, A. Khan, F. Carrez and K. Moessner	IEEE Internet of Things Journal, Oct. 2017.	<p>1)Adaptive Moving Window Regression</p> <p>2) Complex event processing (CEP), data streams, Internet of Things (IoT), machine learning (ML),</p>	<p>1) AMWR as described below. I) Selection of regression algorithm. II) Finding optimum training</p>	<p>1) Real-time and historical data processing using CEP and ML.</p> <p>2) Prediction algorithm called AMWR for realtime data.</p> <p>3) Prediction</p>

				predictive analytics (PAs)	<p>window size.</p> <p>III) Size of the prediction horizon.</p> <p>2) Prediction algorithm was validated on traffic data with accuracy up to 96%.</p>	algorithm was validated on traffic data with accuracy up to 96%.
23	IoT, Big Data, and Artificial Intelligence in Agriculture and Food Industry	N. N. Misra, Y. Dixit, A. Al-Mallahi, M. S. Bhullar, R. Upadhyay and A. Martynenko	IEEE Internet of Things Journal, MAY 1, 2022	<p>1) IoT, big data, and artificial intelligence (AI)</p> <p>2) ML algorithms.</p> <p>I) Supervised Learning,</p> <p>II) Unsupervised Learning,</p> <p>III) Reinforcement Learning</p> <p>IV) Representation Learning:</p> <p>3) block chain-based digital traceability</p>	<p>1) IoT and big data technologies will be potentially impacting are economical (e.g., increased productivity, lower production cost, and higher quality), environmental (e.g., less resource consumption, lower emission, and carbon footprint).</p>	<p>1) It is a major challenge for future Large-scale implementations of ML algorithms.</p> <p>1) Supervised Learning: 2) Unsupervised Learning: 3) Reinforcement Learning: 4) Representation Learning:</p>
24	Internet of Things in Greenhouse Agriculture: A Survey on Enabling Technologies, Applications, and Protocols	M. S. Farooq, S. Riaz, M. A. Helou, F. S. Khan, A. Abid and A. Alvi	IEEE Access 2022	<p>1) Internet of Things in Greenhouse Agriculture.</p> <p>2) IoT-enabled greenhouse network structure based on cloud and big data</p>	<p>1) IoT backbone and help farmers to increase crop productivity.</p> <p>2) Remotely monitor the greenhouse</p>	<p>1) IOT based Greenhouse Agriculture is a major challenge for future Large-scale implementations .</p>

				analysis. 3) Technology based cultivation techniques of greenhouse.	parameters such as CO ₂ , PH, moisture content, humidity, temperature, and irrigation by using IoT sensors and devices.	
25	Machine learning and data analytics for the IoT	Adi, E., Anwar, A., Baig, Z. et al.	Springer Nature 2020	1) Machine learning and data analytics 2)classification of various analytics techniques for IoT(Descriptive, Predictive , Prescriptive ,Adap tive analytics for IoT, 3) Classification of IoT data analytics based on Technological (Cloud, Edge , Fog computing)	1) Machine learning and data analysis and highlight the current challenges.	1) Intelligent applications for the IoT 2) cyber security
26	IoT-based Plant Health Analysis using Optical Sensors in Precision Agriculture	H. Bagha, A. Yavari and D. Georgakopoulos	(DICTA), Gold Coast, Australia, 2021.	1) Devising plant models from RGB and multi-spectral data. 2) UAVs and IoT can be used to automatically capture and analyse the images and multi-spectral data for advancing PA.	1) RGB image analysis provides a relatively cheap method to analyse visible light colours and determine plant health status at different stages. 2) Multi	1) plant variety profiles to determine the performance and health of the plants across entire crops

					spectral data analysis enables analysis of invisible lights in particular NIR.	
27	IoT based Soil Nutrients Analysis and Monitoring System for Smart Agriculture	M. Pyingkodi, K. Thenmozhi, M. Karthikeyan, T. Kalpana, S. Palarimath and G. B. A. Kumar	(ICESC), Coimbatore, India, 2022	1) Soil sensor and Arduino can be used to quickly determine the nutrient content of the soil. 2) Soil fertility can be detected by using NPK sensors 3) analyses and compares different nutrient levels in soil by using kernel density estimation algorithm and machine learning.	1) Soil nutrient content in Nitrogen, phosphorus, and potassium increase the crop fertility.	1) Spectral analysis method is inconvenient, where the records are only 60-70% accurate. 2) Lack of nutrients cannot be identified in the soil.
28	Smart Farming – IoT in Agriculture	R. Dagar, S. Som and S. K. Khatri	2018 (ICIRCA) Coimbatore, India, 2018.	1) Poly House 2) Water Volume Sensor 3) Soil Moisture Sensor Air Temperature Sensor 4) Motion Detector Sensor	1) Farming can be made more efficient & accurate with the implementation of IoT device. 2) We can control water wastage then we are automatically controlling electricity wastage	1) Poly House

29	Modeling and Simulink of Smart Agriculture Using IoT Framework	T. Krongthong and B. Muangmeesri,	(ICORIS) Denpasar, Indonesia, 2019	1) Fuzzy Logic Controller 2) Temperature control 3) Soil moisture control 4) Humidity control 5) Smart Agriculture Enhanced by Cloud-Based and Networking Technology.	1) IoT to smart agriculture and sustainable agriculture 2) cooling system control and to adjust the environmental higher conditions such as the speed of the fan motor, the air volume, the flow rate, the vibration and various energy of smart agriculture.	1) agri-food such as fruit, vegetable only. 2) IoT to better support the smart agriculture and sustainable agriculture.
30	IoT Based Smart Greenhouse Framework and Control Strategies for Sustainable Agriculture	M. S. Farooq, R. Javid, S. Riaz and Z. Atal,	IEEE Access, 2022	1) IOT Smart Greenhouse Framework. 2) IoT-based network framework for a sustainable greenhouse environment and implement control strategies for efficient resources management 3) cloud computing, big data analytics, security attacks	1) IOT based Greenhouse framework help farmers to increase crop productivity. 2) efficient resources management 3) IoT deployment challenges, and security issues are stated as outcomes	1) IOT based Greenhouse framework is a major challenge for Large-scale implementations . 2) Smart greenhouse farming challenges and security issues. 3) IoT-based greenhouse farm security attacks.

31	Automation in Agriculture and IoT	V. Puranik, Sharmila, A. Ranjan and A. Kumari	2019 4th International Conference on (IoT-SIU), Ghaziabad, India, 2019.	1) IoT based Automation in Agriculture 2) Soil moisture sensor, pH Sensor, Temperature and Humidity Sensor.	1) Automate the Maintenance, Control of Insecticides and pesticides, Water Management and Crop Monitoring. 2) Minimizing human labour	1) Require human intervention not done completely automation.
32	A model for smart agriculture using IoT	K. A. Patil and N. R. Kale	(ICGTSPIC C), Jalgaon, India, 2016	1) smart agriculture using IoT to combined with internet and wireless communications, Remote Monitoring System (RMS) 2) smart agriculture to develop real time monitoring system 3) Proposed system has methods as follows.	1) Real time data of agriculture production environment t provides easy access for agricultural facilities through SMS and advices on weather pattern, crops. 2) Improve the quality and quantity of productivity of agriculture. 3) Efficient management and utilization of resources.	1) Real-time and historical environment information is expected to help to achieve efficient management and utilization of resources. 2) IOT based smart agriculture is a major challenge for Large-scale implementations . 2) Smart agriculture using IoT in challenges of security issues.
33	Internet of Things (IoT) for Precision Agriculture Application	M. Dholu and K. A. Ghodinde	(ICOEI), Tirunelveli , India, 2018	1) application of cloud based IoT in the agriculture 2) Agriculture parameters are Soil Moisture,	1) Precision agriculture is to provide right amount of resources at and for exact	1) Limited resources are water, light, pesticides etc. 2) Network attacks.

				Temperature & Relative Humidity around plant, Light intensity.	duration of time. 2) implement precision agriculture the benefits of IOT has been utilized water, light, pesticides etc 3) Irrigation valve is actuated based on soil moisture readings.	
34	IoT Applications in Smart Agriculture: Issues and Challenges	M. R. M. Kassim	2020 IEEE	1) IoT Applications in Smart Agriculture of Issues and Challenges	1) Increasing of world population to agriculture products will have be a very high demand In future Agriculture. 2) IoT and related technologies will be the potential solution to solve the agricultural and food demand issues.	2) Limited agriculture products for increasing population of world. 3) It's challenging for uneducated farmers.
35	A Study on IoT based Low-Cost Smart Kit for Coconut Farm Management	S. Jaisankar, P. Nalini and K. K. Rubigha, "	International Conference on I-SMAC, Palladam,	1) Low cost smart kit of coconut farm.	1) Manage their farmland efficiently without any manpower resources.	1) farms major reasons; The frequent intrusion of elephants in the fields, Scarcity of

			India, 2020			water to supply to grow coconut trees, Common pests attacking coconut trees.
36	A Survey on the Role of IoT in Agriculture for the Implementation of Smart Farming.	M. S. Farooq, S. Riaz, A. Abid, K. Abid and M. A. Naeem	IEEE Access 2019	1) IOT base .automaticall y maintains and monitors agricultural farms. 2) IoT based smart farming. 3) cloud computing, big data storage and analytics	1) Minimal human involvement. 2) Efficient and reliable.	1) Major challenge Implementation of Smart Farming. 2) Security issues.
37	AgriTalk: IoT for Precision Soil Farming of Turmeric Cultivation	W. -L. Chen et al	IEEE Internet of Things Journal, June 2019	1) AgriTalk 2) biopesticides	1) turmeric quality has been significantly enhanced 2) user-friendly GUI called AgriGUI. 3)Maintenance of IoT precision farming is effective by using the IoTtalk	1) To apply these biopesticides precisely before diseases occurring and pest damage
38	Internet of Things for the Future of Smart Agriculture: A Comprehensive Survey of Emerging Technologies.	O. Friha, M. A. Ferrag, L. Shu, L. Maglaras and X. Wang	IEEE/CAA Journal of Automatic a Sinica, April 2021	1) IoT platforms, (SDN), (NFV) technologies, cloud/fog computing. 2) IoT applications for smart agriculture.	1) water management, , disease management, harvesting, supply chain management.	1) Sustainable resources and Energy.

39	Internet of Things (IoT) for Next-Generation Smart Systems: A Review of Current Challenges, Future Trends and Prospects for Emerging 5G-IoT Scenarios	K. Shafique, B. A. Khawaja, F. Sabir, S. Qazi and M. Mustaqim	IEEE Access, 2020	1) cloud-based platforms and IoT devices based edge computing. 2) advances in artificial intelligence, machine and deep learning 3) Fifth Generation (5G) (MIMO, massive-MIMO, coordinated multipoint processing (CoMP), (D2D) communications, (CRAN), (SD-WSN), (NFV) and cognitive radios (CRs)	1) higher data-rates, large bandwidth, increased capacity, low latency and high throughput	1) High Cost implementation of 5G-IoT.
40	Sustainable Water Resource Management Using IOT Solution for Agriculture	H. H. Kadar, S. S. Sameon and P. A. Rafee	2019 9th IEEE (ICCSCE), Penang, Malaysia, 2019	1) IoT for smart farming 2) smart water management 3) smart water management system AGRIZL.	1)Sustainable Water Resource Management. 2) optimum use of water resources	1) Limited to water irrigations. 2) around 70% of water resource for irrigation
41	IoT Based Smart Agriculture Management System	G. S. Nagaraja, A. B. Soppimath, T. Soumya and A. Abhinith	2019 4th International Conference on (CSITSS) Bengaluru, India.	1) Smart Agriculture Management System(SAMS). 2)ThingSpeak IoT Cloud platform.	1) Farmers to increase the crop production. 2) Reduce resource wastage. 3) Crop prediction and crop efficiently	1) Limited to production.

42	Smart Cropping based on Predicted Solar Radiation using IoT and Machine Learning	S. Ghosh, A. Sarkar, A. Mitra and A. Das	2020 IEEE (ICATMRI), Buldhana, India.	1) predicting solar radiation data 2) machine learning algorithm 3) renewable power	1) optimizing crop production 2) boost up cropping	1) Limited to solar radiation data.
43	Adaptive Power System for IoT-Based Smart Agriculture Applications	S. S. A. Emira, K. Y. Youssef and M. Abouelatta	(ICENCO), Cairo, Egypt, 2019	1) Power source represented as either solar panel or battery. 2) Architecture for monitoring Agro systems. 3) simulation results for energy efficient algorithm	1) energy optimization, sustainable, energy efficient	1) No Security and Prediction.
44	Precision Agriculture: Renewable Energy Based Smart Crop Field Monitoring and Management System Using WSN via IoT	M. S. Islam and G. K. Dey	2019 International Conference on (STI), Dhaka, Bangladesh, 2019	1) Precision agriculture (PA), wireless sensory network (WSN). 2) sustainable technology such as solar panel 3) Monitor the crop field conditions by using smartphone.	1) sustainable technology 2) avoid interrupted power supply due to the load shedding	1) limited to sustainable technology
45	Security and Privacy for Green IoT-Based Agriculture: Review, Blockchain Solutions, and Challenges.	M. A. Ferrag, L. Shu, X. Yang, A. Derhab and L. Maglaras,	IEEE Access, 2020	1) Security and privacy of green IoT-based agriculture. 2) blockchain-based 3) Precision agriculture 4) Four-tier green.	1) state-of-the-art of existing security and privacy solutions	1) Limited to existing security and privacy.
46	Machine Learning based soil moisture prediction for Internet of	G. Singh, D. Sharma, A. Goap, S. Sehgal, A. K. Shukla and	2019 5th (ISPCC), Solan, India.	1) Soil moisture prediction. 2) Smart Irrigation System	1) Optimize the irrigation water. 2) Soil moisture of a	1) Limited to water irrigation.

	Things based Smart Irrigation System	S. Kumar			field.	
47	Machine Learning-based Smart Irrigation Monitoring System for Agriculture Applications Using Free and Low-Cost IoT Platform	H. Youness, G. Ahmed and B. E. Haddadi	(ICM), Casablanca, Morocco, 2022	1) Machine Learning 2) Smart Irrigation Monitoring System for Agriculture 3) Artificial intelligence	1) Free and Low-Cost IoT Platform 2) agriculture in waste of water and the quality of products.	1) Limitation to irrigation system.
48	An IoT Based Smart Farming System Using Machine Learning	A. Dahane, R. Benameur, B. Kechar and A. Benyamina	2020 (ISNCC), Montreal, QC, Canada, 2020.	1) Smart Farming System. 2) Machine Learning 3) artificial intelligence 4) Precision agriculture. 5) EDGE-Fog-IoT-Cloud	1) Optimize plant growth. 2) feasible and cost effective for optimizing water resources	1) Limited to Optimize plant growth and Prediction.
49	Raspberry Pi as Visual Sensor Nodes in Precision Agriculture: A Study	R. Kamath, M. Balachandra and S. Prabhu	IEEE Access, 2019	1) Precision agriculture, Raspberry Pi 3, Computer vision, wireless visual sensor network. 2) To monitor paddy for weeds using Raspberry Pi	1) Enhance the crop production.	1) Limited to crop producers.
50	Crop Yield Prediction using Machine Learning Algorithm	D. J. Reddy and M. R. Kumar	2021 5th (ICICCS), Madurai, India.	1) Crop Yield Prediction 2) Artificial Neural Network, Convolution Neural Network, Crop yield prediction,	1) Crop Yield Prediction.	1) Limited to Crop Yield Prediction. 2) Security issues.

				Machine learning.		
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IV. APPLICATIONS

Recently, various algorithms are frequently used that are used according to application and their performance is given below in Table 2. Such as Big Data, Cloud, Artificial Intelligence, Machine Learning, and Deep Learning have been widely used in farming and agriculture, such as classification, crop health monitoring, prediction of crop disease, etc.

Table 2: Big Data, Cloud, Artificial Intelligence, Machine Learning and Deep Learning for automation smart farming and agriculture

Application	Models / Algorithms used
IoT Based Smart Agriculture[4]	Deep Learning and Machine Learning
Crop disease and pest management[5] in Smart Agriculture Monitoring System[9]	Machine learning and analytics. Cloud, linear regression model, binary logistic regression model
AgroTick ;Smart Agriculture[13]	Big Data Analytics, Cloud Computing and Mobile Applications
Smart Irrigation System[15]	LoRa, Machine Learning
IoT based Smart Agriculture[16]	Machine Learning, Supervised machine learning algorithms-decision tree, Raspberry pi.
IoT-Based Pattern Recognition for Crop Disease Monitoring System[17]	Machine learning (ML) techniques, such as support vector machine (SVM) and convolution neural network (CNN).
Affordable Smart Farming[18]	Machine Learning
Data Analytics in Agriculture: Benefits and Challenges[19]	Cloud platform
IoT Based Smart Agriculture Automation[21]	Artificial Intelligence, Recurrent Neural Network (RNN), Multi-Layer Perception (MLP).
Classification of IoT data analytics[25]	Machine learning , Cloud, Edge , Fog computing)
IoT-based Plant Health Analysis[26]	Precision Agriculture , multi-spectral data
IoT based Soil Nutrients Analysis and Monitoring System for Smart Agriculture[27]	Machine learning.
Smart Greenhouse Framework and Control Strategies for Sustainable Agriculture[30]	Cloud computing, big data analytics, security attacks
Low-Cost Smart Kit for Coconut Farm Management[35].	Big Data, Artificial Intelligence and Machine Learning

Agriculture for the Implementation of Smart Farming[36].	Cloud and edge computing, Big data analytics and machine learning
AgriTalk: IoT for Precision Soil Farming of Turmeric Cultivation[37]	Artificial intelligence
smart agriculture sensors enable, analyzed supply chain management of IoT Base agricultural[38]	Cloud/fog computing, block-chain
Internet of Things (IoT) for Next-Generation Smart Systems[39]	Cloud-based, edge computing, artificial intelligence, machine and deep learning
smart agriculture management system (SAMS), NodeMCU and Raspberry Pi3 [41]	Machine Learning, Precision Agriculture, Message Queuing Telemetry Transport (MQTT)
Smart Cropping based on Predicted Solar Radiation[42]	Machine Learning
Smart Irrigation System based on Soil moisture prediction[46]	Machine Learning
Smart Irrigation Monitoring System for Agriculture [47]	Machine Learning, Raspberry Pi, artificial intelligence
Smart Farming System ,optimize plant growth [48]	Machine Learning, Raspberry Pi, Artificial intelligence, Precision agriculture.
To monitor paddy for weeds using Raspberry Pi[49]	wireless visual sensor network for precision agriculture, Random forest and support vector machine
To analyze crop yield prediction [50]	Artificial Neural Network, Convolution Neural Network, Machine learning

V. CONCLUSION & FUTURE SCOPE

In this research paper, we surveyed different IoT applications to control the environment of crop fields. For these reasons, we have a system based on an IoT-based application to predict pests, diseases, and moisture in crops. So that increasing food for human demands of the growing population can be fulfilled.

Automated Smart Farming using IoT was applied in farming to improve crop yields, improve quality and reduce costs.

Extensive literature, we found that precision agriculture and farming use an IoT basis. Furthermore, the applications of these technologies in precision agriculture are highlighted. Moreover, the paper tried to address one of the problems faced by crop cultivation in a country like India. Since crop growers are still using the classical approaches of disease prediction without any technological intervention like IoT/ WSN, one of the major advantages of the proposed approach will be real-time measures against any possible disease of crops.

We have many challenges ahead before the survey of IoT-based farming framework on various technologies. The IoT is an abstract idea for changing the future. Here, Critical Data Analysis of Various IoT-based technologies for Automation Smart Farming to develop farming techniques for increasing the human population and other things are developed for any country to boost its economy. The research paper aims to

automate farming using IoT-based technologies, challenges, outcomes, pests, and diseases of crop cultivation. IoT-based Automation Smart Farming enables the future of agriculture.

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Blockchain With Internet of Things : Benefits, Challenges, And Applications

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ABSTRACT

Real-world applications of blockchains, such as faster cross-border payment transactions, identity authentication, smart contracts, cryptos, and supply chain-blockchain technology, are here to stay and, like the Internet, have become the next innovation. The Internet of Things (IoT) is a network of network elements that can exchange information and be controlled and monitored through the use of unique identifiers. Mechanization, wireless sensor networks, embedded systems, and control mechanisms are just a few examples of well-known IoT technologies. Converging advances in real-time analytics, machine learning, resource sensors, and embedded devices demonstrate the IoT paradigm's rapid expansion. So, to begin, a brief overview of the fundamental concepts of IoT and Blockchain is provided.

Keywords : blockchain; smart contract; Internet of Things; security, networking, Sensors, Embedded Systems, Cryptocurrency.

Introduction:

IoT refers to the concept of connecting everything to the Internet. Automobiles, household appliances, and other positioned beneath a vintage with computers, as well as software, detectors, effectors, and interconnection that allow these things to connect, collect, and exchange information, are all included. Kevin Ashton is widely regarded as the father of the Internet of Things [1], which extends Internet connectivity beyond standard devices such as desktops, laptops, smartphones, and tablets to a wide range of historically dumb or noninternet-enabled devices and everyday items. Sensors, the cloud, wireless devices, and security are the entirely new way used in the Internet of Things.

The basic life cycle of IoT includes four parts: (1) gathering data through devices using sensors; (2) storing the gathered data in the cloud for analysis; (3) sending the analysed data back to the device; and (4) acting accordingly [2]. IoT is relevant in many domains, making our lives easier. Smart Homes, Smart Cities, Agriculture, Smart Retail, Driverless Cars, and Healthcare are the primary applications of IoT. Security is still an important aspect of any technology and is critical to the smooth operation of IoT networks. Methodologies for supplying information security and verification, access control within the IoT network, privacy and trust among users and things, and the enforcement of security and privacy policies are some ongoing projects for

improving IoT security. The security issue in IoT arises from careless programme design, which leads to vulnerabilities, which is a major cause of network security issues.

Proper IoT initialization is done at the physiological level in IoT architecture so that any unauthorised receiver could indeed access the system. The Sensing device, Network layer, Middleware layer, Application layer, and Business layer are the five layers of IoT architecture [3]. Each layer has its own set of goals and issues. Consent, Truthfulness, and Accessibility are the three most important security goals in IoT. (CIA). There are four types of attacks in IoT based on security breaches: "Physical attack," "Software attack," "Network attack," and "Cryptographic attack."

Blockchain is a new technology that is being used in a variety of networks to ensure network security and reliability. Blockchain technology is also being prioritised in different demand management solutions, and it is gradually supplanting the present system.

The following are the issues associated with the present banking system:

- i. Expensive transaction fees
- ii. Increase spending by twofold
- iii. Banks have become associated with cries for help.

Blockchain is the technical differences behind bitcoin and has solved the problem associated with centralised banks. Blockchain is a publicly distributed database that contains an encrypted ledger [4].In a centralised architecture, there is a centralized communication system to which every node is linked. This central coordination system will share, pass, and approve all data between the nodes. If the centralized communication platform fails, all of these independent dependent nodes will be disconnected. As a result, shifting from a centralised to a decentralised system is an urgent necessity. There will be more than one coordinator in the decentralised system. A decentralised system has no centralised authority because each node is treated as a coordinator. Each node is linked to the others, and the system is not dependent on just one coordinator.

Blockchain is made up of a chain of blocks, with each block containing a collection of all recently verified transactions. Figure 1 depicts the detailed and general structure of the Blockchain, which shows the sequence of blocks and how each block is cryptographically connected. All of these transaction information are stashed on each block, and a centralised hash code is calculated and stored into the block block by block. Once the transaction has been verified, this block is added to the Blockchain and the chain continues to grow.

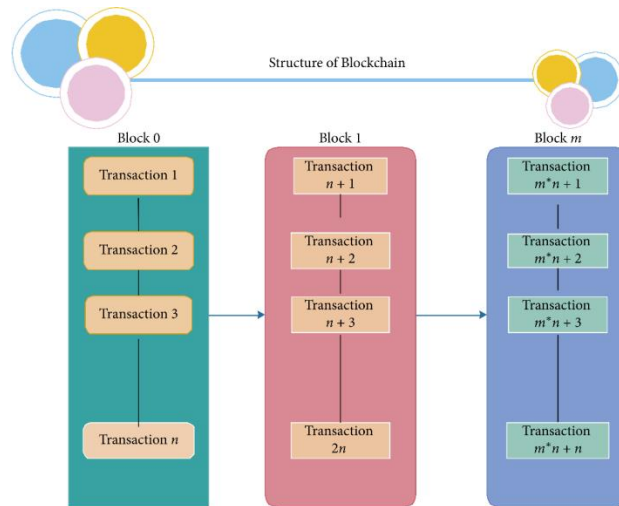


Figure 1: Blockchain structure

Blockchain is a dominant technology, second only to the well-known bitcoin. The operation of bitcoins on the Blockchain can aid in the comprehension of Blockchain technology. Santoshi Nakamoto introduced Bitcoin, the first decentralised digital currency, in 2009 [5].

IoT Architecture:

The Internet of Things (IoT) is the correlation and interaction of various devices via the Internet. These devices are made up of networking nodes, which can be servers or computers, that are linked together to share data. All devices have sensors that collect data that can be transferred, stored, analysed, and displayed in a useful manner [6].

There are numerous IoT architectures that are widely accepted. Various researchers and organisations proposed various architectures. The ITU defines the Internet of Things architecture as four layers, as shown in Fig. [7]

- Application layer
- Service support and application layer
- Network Layer
- Device layer

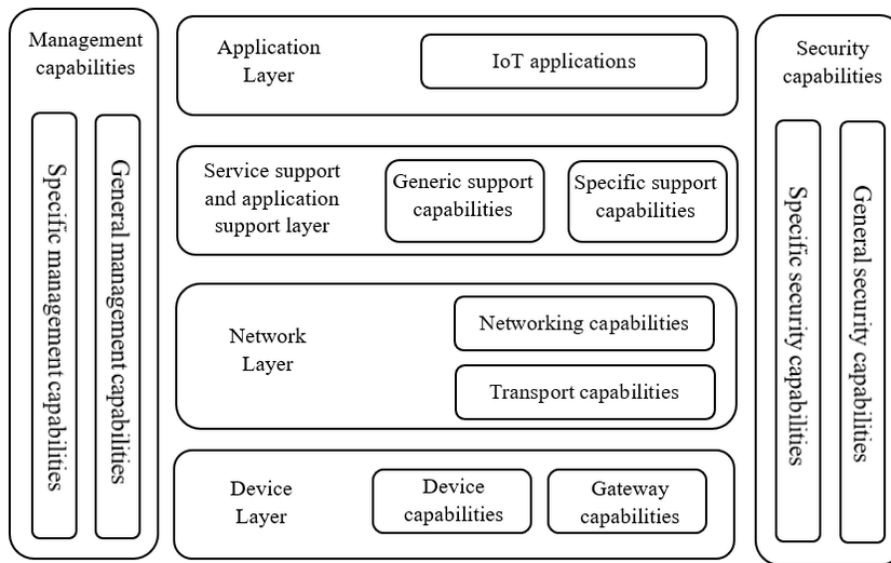


Figure 2: Internet of Things reference model and architecture [7].

IoT applications are included in the application layer. Many IoT applications are available, including healthcare, intelligent buildings, connected cars, smart energy, smart agriculture, and so on. The implied contract and implementation layer include common capabilities that can be used by various IoT applications [8].

The current Internet of Things architecture is based on a centralised model known as the server/client model. In this model, all gadgets are unable to interact with one another and must instead communicate with a centralised gateway. The centralised model has been used for many years to communicate a broad range of desktop computers and will keep supporting small-scale IoT networks; however, it will not be able to meet the needs to stretch the IoT network in the years to come [9].

Characteristics Of Blockchain

The blockchain has several characteristics which render it appealing for the IoT to use to solve many of its problems. As illustrated in Fig. 3, blockchain features include:

1. Immutability: One of the primary benefits of blockchain is the ability to create unchanging ledgers. All centralised datasets can be manipulated, necessitating trust in a third party to maintain data integrity. Once an agreement has been agreed upon and recorded, it cannot be changed.
2. Decentralization: The lack of centralised control helps to ensure flexibility and resilience by utilising the resources of all network participants and eradicating numerous traffic flows, which reduces latency and eliminates the single point of failure that's present in the centralised model.
3. Anonymity: Anonymity allows users to conceal their personalities and keep their personality private.
4. Increased Security: Blockchain increases security because there is no one point of failure.

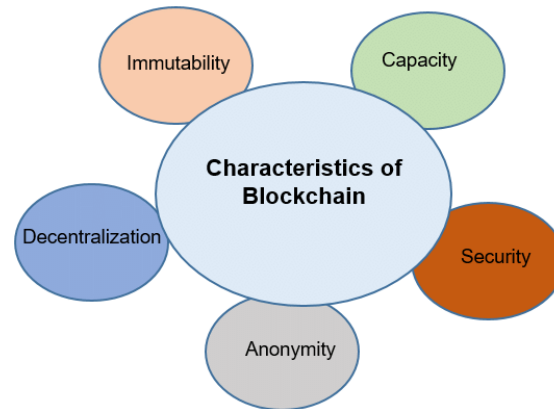


Figure 3: Characteristics of Blockchain

Blockchain:

Blockchain is the innovation that powers cryptocurrencies such as Bitcoin. It can help the Internet of Things by creating a decentralised ledger of all exchanges. This blockchain technology is stored in each network node.

To verify consumers and add new data to the blockchain, cryptography is used. The ledger cannot be changed or altered until all nodes have accepted the adding. Blockchain is less reliant on local storage options due to its decentralisation.

One application of blockchain in the Internet of Things is supply chain tracking. Engrained gadgets may perform payments according to supply chain tracking in some cases.

Blockchain might be employed to track the crispness of leafy greens, for example. This would help to prevent foodborne diseases outbreaks.

The blockchain and IoT

Gateway nodes can be used to create blockchain-based IoT solutions. These connections act as an intermediary between legacy applications and IoT devices. These gateways can exchange data with one another and also verify frames prior to actually adding them to the public blockchain.

Among the numerous advantages of combining blockchain and the Internet of Things, security and privacy are two of the most compelling reasons to integrate hybrid blockchain and IoT application forms. Adoption of blockchain in IoT can advantage us in all aspects of our lives. Blockchain, for example, can be used in the food business, and blockchain-based IoT systems can be used to track food safety.

This technology would also benefit smart farms and factory operations. IoT systems based on blockchain could also be used in public schools and universities. A smart app would allow parents to track their child's progress. Teachers could provide feedback and report inappropriate behaviour to parents, and vice versa.

The Benefits of Blockchain and IoT

The distributed ledger of a blockchain is tamper-proof, eliminating the need for the parties involved to trust one another, according to Andres Ricaurte, a senior vice president and global head of payments at an IT services company. As a result, no single party has control over the massive amount of data generated by IoT devices. Because of blockchain encryption, it is nearly impossible for anyone to overwrite existing data records. Furthermore, storing IoT data on blockchain adds another layer of security to block malicious attackers from gaining access to the network.

According to Vipul Parekh, senior director at management consulting firm Alvarez & Marsal, a primary challenge for IoT players is protecting information throughout the IoT ecosystem. IoT devices' security flaws make them an easy target for distributed-denial-of-service attacks, malicious attackers, and data breaches.

According to Parekh, the combination of Internet of Things and blockchain allows for novel possibilities that reduce inefficiencies, improve security, and increase transparency for all parties present while enabling secure machine-to-machine transfers. The combination of these technologies enables a physical asset to be tracked from the time natural resources are mined, for example, and throughout the supply chain until it reaches the end consumer. [10,11]

The following table compares blockchain and IoT. Both technologies have numerous advantages that can be combined to produce a better result. The Internet of Things has limitless benefits, and using a decentralised approach to IoT would solve many problems, particularly security. Adopting a standardised peer-to-peer communication model to process hundreds of billions of transactions between devices will significantly reduce the costs affiliated with installing and maintaining large centralised data centres, as well as distribute computation and storage needs across billions of devices that comprise IoT networks. This prevents a single node in a network from bringing the whole network to a halting halt. [12]

Table 2. Comparison between blockchain and IoT

Blockchain	IoT
Decentralized	Centralized
Resource consuming	Resource restricted
Block mining is time-consuming	Demands low latency
Scale poorly with large network	IoT considered to contains large number of devices
High bandwidth consumption	IoT devices have limited bandwidth and resources
Has better security	Security is one of the big challenges of IoT

The blockchain's decentralised, independent, and trustless capabilities make it an ideal component for becoming a foundational component of IoT solutions. It's no surprise that entrepreneurship IoT technologies were among the first to embrace blockchain technology. Establishing peer-to-peer communications, on the other hand, will present its own set of challenges, particularly in terms of security. IoT security is about much more than just safeguarding sensitive data. To prevent spoofing and theft, blockchain solutions will need to maintain privacy and security in IoT networks, as well as use verification and consent of people involved for transactions. [13]

Challenges Of Blockchain With IOT

However, the complexity of blockchain, which include high computing costs and delays, poses a challenge in the combination of blockchain with IoT, which has limited power and storage capacities. The difficulties encountered when dealing with IoT data on the blockchain are illustrated in Figure 4 and summarised below.

1. Scalability: Scalability in the blockchain may lead to centralized power, raising concerns over the cryptocurrency's future. As the percentage of nodes that make up the network grows, the blockchain scales poorly. This is a serious problem because IoT networks are anticipated to have a large number of nodes [14].

2. Processing Power and Time: The amount of having to process power and time required to encrypt all of the objects in a blockchain system. IoT systems use a variety of devices with varying computing capabilities, and not all of them can run the same cryptographic techniques at the required speed [15].

3. Storage: While blockchain eradicates the need for a database controller to store transfers and device IDs, the ledger must be stored on the nodes themselves [16]. The distributed database will grow in size as time passes and the number of nodes in the network grows. As previously stated, IoT devices have limited computation power and storage capacity.

4. Lack of expertise: Blockchain technology is still in its early stages. As a result, only a few people have extensive knowledge and skills in blockchain, particularly in banking. There is a widespread absence of comprehension of how the blockchain works in other applications [17]. Because IoT devices are everywhere, adopting blockchain with IoT will be extremely difficult without raising attention of the blockchain.

5. Legal and Compliance: Because blockchain is a new technology, it will be able to connect people from different countries without any legal or conformance code to follow, which is a serious problem for both businesses and individuals. This challenge will be a major impediment to the widespread adoption of blockchain in many business owners and implementations [18].

6. Naming and Discovery: Because blockchain technology was not designed for IoT, nodes in the network were not supposed to find each other. The Bitcoin application, for example, embeds the IP addresses of some "senders" within the Bitcoin client and is used by nodes to build the network topology. This approach will not work for IoT because IoT devices are constantly moving, causing the topology to change [19].

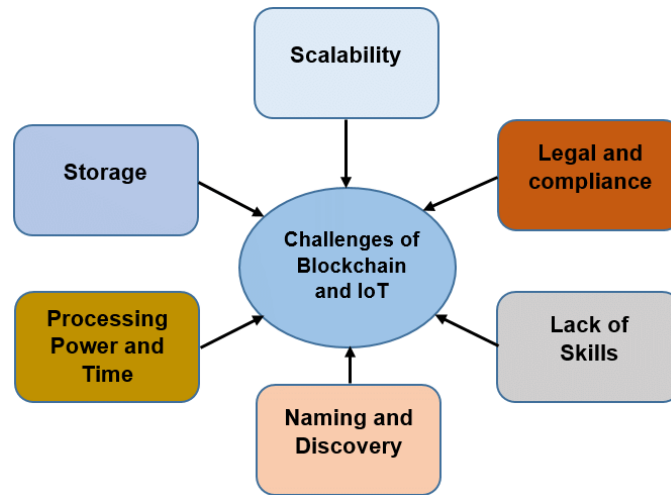


Figure 4: Challenges Of Blockchain With IOT

Applications

The availability and protection of integrated resources are central concerns of the modern internet. These resources could be encrypted on a network-to-network chain referred to as a blockchain or ledger, where each user is aware of who they are transacting with. It may protect commercial interconnection and avoid fraud by simplifying the business, speeding up the process, eliminating failures, and saving it. People's lives will be transformed by distributed blockchain technology, which will allow them to execute trades as well as control money via phones, vote, rent a car, or even demonstrate their identity.

1. Smart Devices

A smart connects directly wirelessly and provides users with superior knowledge and control over previous generations. For example, if your washing machine breaks down, a code affiliated with your machine can connect to the internet and notify you. Such notifications keep the equipment in good working order, saving money on fuel efficiency and enabling you to monitor the devices while driving to work. Accessing such devices through the blockchain would protect the assets while enabling for information flow. [20-21]

2. Sensors for the Supply Chain

A sensor is a gadget that detects and reacts to input that comes from tangible facilities. Light, wind, movement, humidity, strain, and other environmental changes can all provide important information. Sensors in the supply chain help locate vehicle temperature changes, pressures, and other parameters. Such inputs are used when supply chain executives need to monitor product or vehicle circumstances and decide precisely where they are and where they are going. The ability of sensors in the supply chain and can provide real-time activity information determines their value.

3. The Smart Contract

A consensus mechanism evolved into a digital device designed to digital format inspire, test, or execute an agreement's arrangement and execution. Smart contracts enable the execution of reliable transactions without the need for third-party providers.

4. Keeping Track of Prescription Medications

According to the release, blockchains could enhance a patient's experience by enabling them to scan a barcode and instantly determine whether a prescribing is counterfeit. Its technology could also ascertain when pharmaceuticals were collected and transmitted throughout the manufacturing process at the necessary changes in temperature.

5. Voting through Electronic Means

The security of a vote is an issue related to national safety in any country. Cybersecurity is investigating the potential of using an online voting system to reduce the cost of hosting a national election while meeting and improving security standards. The voting mechanism has been based on paper and pen since the founding of democratic leaders. To reduce fraud and make voting verifiable and trackable, it is crucial to replace the present pen-and-paper methodology with contemporary election innovation. Blockchains enable a wide range of uses that benefit from the exchange.

6. Healthcare on the Blockchain

The blockchain has the potential to revolutionise healthcare data by putting the patient at the centre of health infrastructure and improve health security, privacy, openness, and interconnection. By trying to make electronic records more powerful, without an intermediary, and secure, such breakthroughs have the potential to create a new structure for health information sharing. This contemporary, ever-changing climate is ideal for advancement, research, and concept testing.

7. Blockchain Music

Blockchain technology may be beneficial in some cases in music. Through special edition digital releases, it could possible in order to maximize or create incentives and share profits with viewers. Employing it for a music service, on the other hand, is unjust, and trying to claim it is an alternative to any of the most important concerns musicians face is false.

8. Blockchain Identification

Identity management is now an essential part of our daily lives. Visiting another country, buying a new car, and enrolling in university all necessitate identification checks. Creating a new social media account requires mobile authorization as well. Bringing personal items is not always practical or even possible. This is where the blockchain's strong nondisclosure control comes into play.

9. Passports

Citizens can regulate electrical transport identifier using demonstrable data, such as biometric data, travel history, or any other connected data gleaned at control points by trustable government authorities or other contact points, according to the concept behind a blockchain-based passport. Rather than keeping the specifics to themselves, each jurisdiction or agency makes the decision to rely on the data of the others.

10. Certificates of Birth, Marriage, and Death

Some things are more important than showing paperwork, such as birth certificates, marriage certificates, and expiry certificates that allow you to access various benefits (such as elections, employment, and residency), but ineptitude is becoming more common. More than one-third of children under the age of five do not have a birth certificate, according to UNICEF. By acquiring birth and death accreditations and letting people access to this vital information, the Blockchain can help to secure records.

11. Processing of Insurance Claims

Insurance claims could be handled using decentralized applications on the blockchain network. In this case, all policyholders may have access to the shared health coverage ledger to view actual policies. When a claim is filed, the claimant can submit evidence to the distributed ledger such as insurance documents, claim papers, and continuing to support claims proof. Policyholders must deal directly with distributors for statements. This activity is documented on a private blockchain, with contracts allowing for a workflow claim.

12. Data Exchange

The primary goal of blockchain is to improve the efficiency of data exchange across the supply chain, which includes manufacturers, shipment suppliers, distribution companies, governments, providers, order fulfillment, and consumers. Blockchains will enable the corporate entity to track the source of deterioration much faster, reducing the impact of contaminated products.

13. Copyright and Royalties Are Protected

Blockchains could be difference makers for copyright owners looking to digital format defend their rights. Without a doubt, it began to make itself known to copyright owners. It continues to remain to be seen whether the suggested compliance procedures for such channels will be executed. The outlook, however, remains positive. It's difficult to see blockchain being used to protect authorship in the following months. Before it can be widespread used to protect copyright, this method must first be widely adopted.

14. Property Registration, Real Estate, and Land Registration

Blockchains have the potential to significantly alter the marketplace for real estate, from capital investment to title management. It has the potential to change the relationship between taxpayers and tax authorities, as well as how tax returns are required to submit, taxes are paid, and data is handled. Blockchain technology has the

potential to disrupt and restructure finance, as well as to simplify transfer of funds, exchange, and real estate registration.

15. In a Catastrophic Situation (COVID-19)

The COVID-19 pandemic highlights the world's interconnectedness. This also highlights a complex reality: when we need quick, collective action or cooperation, vast amounts of critical information remain trapped in fortified information storage facilities and reputation mechanisms. The blockchain-IoT integrated solutions help us solve the most difficult problems we face between 2019 and 22.

Conclusion:

In today's world, IoT technology is used in almost every industry, including agriculture, healthcare, and smart cities. In the field of healthcare, IoT is used for applications such as regular patient health monitoring, drug traceability, and so on. However, there are a number of security issues in IoT that can be addressed by integrating IoT with Blockchain.) eBlockchain is a decentralised technology that can be used to improve system security. Blockchain technology, in conjunction with healthcare, ensures that patients' sensitive health-related records are protected from tampering and leakage.

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Role of Computer Technology in an Evaluative Survey of Midday Meal Programme - A Government Scheme

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ABSTRACT

Research is the part of various information collected on the base of result that found out. Computer play an important role in data analysis and conclusion and result finds out of any study. That's why computer technology is important for research.

Keywords : Social Media, Ethics, Social Responsibility, Cyber Crime

INTRODUCTION:-

Computer technology correlates with information technology and is used for the study of computers, networks, computer networks, etc. It encompasses a developing list of different software programs and devices. It includes programming, networking, database design and development to ensure that computers work correctly.

The school programmes were started in our country keeping in mind the social and economic advancement of the country. Urbanisation, Industrialisation and an increase in the number of working mothers frequently brought about longer school days. This mean, that children often did not receive proper meals at home and therefore needed to have a meal at school. Thus, a free compulsory primary education became more common and pressures were brought to bear on governmental authorities to provide school lunch.

Mid-day meal programme for school children is comes under Ministry of education. On the recommendation of National school health committee, the government of India started a scheme for providing midday meal to school children is extended to all states with effect from is 15th August 1995. The government of India pays 40% of expenditure and 60% is borne by the states. The meal is usually prepared from special foods such as Balahar, Soya fortified Bread, Indian Multipurpose food, Skim milk Powder and Wheat. The children studying in corporation schools are given midday meals. The meals given are based on a combination of cereals, pulses and leafy vegetables. Eggs are given once a week. Such a diet would increase the amount of vitamins and minerals result in weight gain and clearance of deficiency symptoms.

Objectives of Study :-

1. To study the policy perspectives of midday meal scheme of Government of India and its implementation mechanism in the primary and secondary schools of Amravati and Nagpur.
2. To compare the working of midday meal scheme in rural and urban primary schools and secondary in Amravati and Nagpur district of Vidarbha.

3. To evaluate how the scheme has been effective in raising the overall current enrolment rate in the primary and secondary schools of Amravati and Nagpur district.
4. To evaluate the scheme effectiveness in checking the dropout rate of children in the primary schools of Amravati and Nagpur district.
5. To explain the views and perspectives of Stakeholders, Head teachers and cooks about the problems faced in running the midday meal Scheme in Amravati and Nagpur district
6. To study the scheme at rural and urban level and compare the data and analyse it
7. To suggest measures for further improvement in the planning and implementation of midday meal programme
8. To assess the malnutrition by Physical Examination and deficiency symptoms of beneficiaries
9. To study the problems in implementation of programme in condition of COVID pandemic period.

The study is limited to 400 sample size only and only for rural and urban area of Amravati and Nagpur district.

1. Study of Midday meal scheme and its implementation in selected area.
2. Study of Policy perspectives of scheme in the primary schools of Amravati and Nagpur district.
3. To compare the working of Midday meal scheme in Rural and urban primary schools in Amravati and Nagpur district.
- 4 Questionnaire and Interview schedule develop to use to collect data. Observation method also apply.
5. Z test and standard deviations and logistic regression analysis will use for statistical values.
6. 24 Hour dietary Recall Method for dietary assessment of beneficiaries.

Methodology :

Sample size and sample design

5-10 schools will select and 300-400 samples, Students (Both Boys and Girls) will be select from rural and urban primary and secondary schools of Amravati and Nagpur District for the above study.

Sample design

5-10 schools will select from rural and urban area of Nagpur city.

Rural area Amravati and Nagpur Urban area Amravati and Nagpur

Camp Area Amravati, Yashoda Nagar, Mozari, Tiwasa

Sitaburdi , Sakkardara, Nandanwan, Hivri Nagar, Hudkeshwar, Besa, Butibori , Ramtek

After data collection

Tools and measuring Scales:

Questionnaire method, Interview method were applying for data collection test Z test will apply to collect data and assessment of nutritional status by anthropometry scales and other measurement.

Material and Methods:

The study will apply following steps

1. Study of Policy Perspectives of Midday Meal Programme of government of India and its implementation in the primary and secondary schools of Amravati and Nagpur.

2. Observation Method and develop interview schedule, Questionnaire use in the study.
3. Compare the collected data of working of MDM Scheme at rural and urban level. Comparison between subjects of Rural and Urban beneficiaries will be studied
4. Study of school dropout rate and problems faced in covid situation.
5. Dietary assessment by 24 Hour Dietary Recall Method. Midday meal and total dietary intake of subjects will be observe and impact on health and effectiveness of subjects were examine.
6. Subjects were examine by symptoms of nutritional deficiencies

Text Editing : The ability to change text by adding ,deleting and rearranging letters words sentences and Paragraphs.It will perform in word Processors which typicallyalso handle graphics and other Multimedia files.

Formatting In MS word :

Formatted text is Text that is displayed in a specified style.Text data may be qualitative or Qunatitative eg. Font size colour etc.

Statistical Analysis:Different Parameters Observation, Interview, Questionnaire method will use to collect information and collection of data. Data on mid day meal programme in schools will be collected. The information of school management and beneficiaries of Mid day meal programme will be collected. For statistical analysis T test ,Z test and Standard Deviation method will use. Logistic Regression Analysis method also use to study.

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Review of Fascial Synthesis Route of Graphene Oxide by Using Equivalent Hummer Method

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ABSTRACT

Graphene oxide is now a valuable substance in research and technology. We are concentrating on graphene oxide, GO has unique mechanical, optical, and electrical properties, making it a promising material for a wide range of applications, including energy storage, catalysis, sensing, and biomedical devices. We have studied here highly oxidised, less hazardous, temperature-controlled graphene oxide compounds. These significant materials are synthesized by using a variety of methods, such as the Hummers Method, the Modified Hummers Method and the Improved Hummers Method. We have implemented here equivalent Hummer's methods for graphene oxide, this material has maximum utility in advanced nanomaterial science. It is also highly tuneable, with its properties depending on the degree of oxidation and the type and number of functional groups present on its surface. Due to its ease of production and modification, GO has become a popular research topic in recent years, and its potential for various applications is being explored extensively.

Introduction:

Carbon structure study is much sizeable due to its unequalled properties and numerous applications. Along different category of carbon, graphene is mostly noted due to its remarkable excellent properties [1,2] Graphene is a stimulating material. Graphite having single atomic layer is known as graphene. Thickness of graphene is of single carbon atom arranged in honeycomb lattice. They are much solid and can be designed into zero dimension, 1-d,2-d,3-d forms[3]. Graphene has the two dimensional honeycomb lattice accelerate sp^2 hybridization which, leads to remarkable mobility near $100,000 \text{ cm}^2/\text{Vs}$ at room temperature [4]. Graphene has the young modulus of 1TPa and tensile strength 130GPa [5] It also have unusual thermal conductivity 5300 W/mK [6], due to which it has great potential in electronic sector such as transistor and integrated circuit [7], energy storage [8] gas sensor [9] bio electronic sensor [10]. Graphene is transferable two dimensional single layer nanosheet was first obtained by mechanical exfoliation (Scotch-tape method) of bulk graphite [11] and it was also done by epitaxial chemical vapour deposition [12]. Although those routes might be propose for specific device assembly, they can be less fruitful for large scale manufacturing. Chemical means are a practical approach to synthesis bulk scale graphene material [13]. In synthesis of graphene scalability is an important factor and one of

the most popular process for graphite exfoliation is use of strong oxidizing agent to obtain Graphene oxide (GO), to obtain nonconductive hydrophilic carbon material. [14 15]. Although it is difficult to determine the exact nature of graphene oxide (GO), it is clear that GO the previously contiguous aromatic lattice of graphene interrupted by epoxies, alcohols, ketones, and carboxylic groups. [16-18]. The disorder of lattice give back an increase in interlayer spacing from 0.335nm for graphite to more than 0.625nm for GO [19] the powder of natural flake graphite (NFG) can easily be oxidized to produced GO. Due to its inexpensive cos, vast availability, and ease to convert to graphene, GO is of great interest.

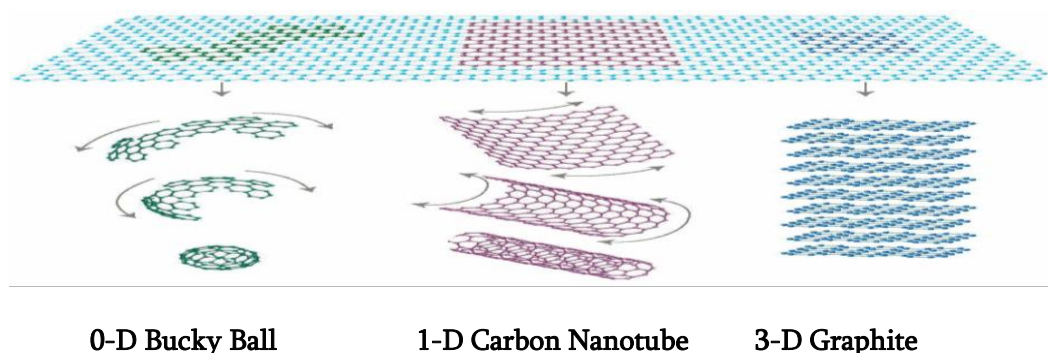


Fig.1 Various structure of graphene (0-D Bucky Ball, 1-D Carbon Nanotubes, 3-D Graphite) Reproduced with permission from ref 20 (Copyright 2016 springer publications)

Experimental Details

Hummers' Method

Involved adding concentrated H_2SO_4 (69 mL) to a mixture of graphite flakes (3.0 g, 1 wt equiv) and NaNO_3 (1.5 g, 0.5 wt equiv) and cooling the mixture to 0 °C. To keep the reaction temperature below 20 °C, KMnO_4 (9.0 g, 3 wt equiv) was added slowly in parts. The reaction was warmed to 35 °C and agitated for 30 minutes before progressively adding water (138 mL), resulting in a large exothermic to 98 °C. External heating was used to keep the reaction temperature at 98 °C for 15 minutes before it was removed and cooled in a water bath for 10 minutes. Another exothermic was produced after adding more water (420 mL) and 30% H_2O_2 (3 mL). After air cooling, the mixture was refined as described above for the IGO (sifting, filtration, numerous washings, centrifugation and decanting, vacuum drying) to yield 1.2 g of solid.

Improved Hummers' Methods

A 9:1 mixture of concentrated $\text{H}_2\text{SO}_4/\text{H}_3\text{PO}_4$ (360:40 mL) and a mixture of graphite flakes (3.0 g, 1 wt. equiv.) and KMnO_4 (18.0 g, 6 wt. equiv) were added for the improved procedure, which resulted in a minor exothermic to 35-40 °C. After that, the reaction was heated to 50 °C and stirred for 12 hours. The reaction was brought to room temperature and poured onto 400 mL of ice with 30% H_2O_2 (3 mL). For workup, the mixture was filtered through polyester fibre after being sifted through a metal U.S. Standard testing sieve (W.S. Tyler, 300 m) (Carpenter Co.) After centrifuging the filtrate at 4000 rpm for 4 hours, the supernatant was decanted out and discarded. The remaining solid matter was next washed sequentially with 200 mL of water, 200 mL of 30% HCl, and 200 mL of ethanol (2) for each wash, the mixture was then sifted through a U.S. Standard testing sieve and filtered through polyester fibre, with the filtrate being centrifuged (4000 rpm for 4 h) and the supernatant decanted away. After this prolonged, multiple-wash operation, the material that was left over was coagulated with 200 mL of ether, and the resulting suspension was filtered onto a PTFE membrane with a 0.45

m pore size. 5.8 g of product were produced after the solid on the filter was vacuum-dried for a whole night at room temperature.

Modified Hummers Method:

This process is referred to as Modified Hummers' method, and the end result as HGO. Graphite flakes (3.0 g, 1 wt. equiv.), NaNO_3 (1.5 g, 0.5 wt. equiv.), and concentrated H_2SO_4 (69 mL) were combined, and the mixture was chilled in an ice bath to 0 °C. To keep the reaction temperature below 20 °C, KMnO_4 (9.0 g, 3 wt. equiv.) was added gradually. For 7 hours, the reaction was stirred and warmed to 35 °C. The reaction was agitated for 12 hours at 35 °C with the addition of further KMnO_4 (9.0 g, 3 wt. equiv.). Using 400 mL of ice and 30% (3 mL) H_2O_2 , the reaction liquid was emptied after being cooled to room temperature Following the preceding procedure of sifting, filtration, centrifugation, decanting with numerous washes, and final vacuum drying to produce 4.2 g of solid product, the mixture was next refined.

Equivalent Hummers Method:

Graphite powder and sodium nitrate were used in a ratio of 1.2 to synthesise graphene oxide. Using a conical flask and 75ml H_2SO_4 , the setup was cooled using an ice bath. Slowly adding KMnO_4 6 gm while keeping the temperature below 20 °C 3 hours were spent stirring the reaction at less than 20 °C. In it, the viscus slurry developed. The ice bath was removed, 70 ml of D.W. was added, and the temperature was kept below 10 °C. In order to eliminate the metallic ions from the process, 3 ml of H_2O_2 was supplied after adding 150 ml of D.W steadily over the course of 15 minutes at 60 °C. As graphene oxide developed, it turned from dark brown to golden yellow in colour. Moreover, the stirring was continued for an additional 2 hours and 20 degrees Celsius. After being centrifuged at 5000 rpm for 20 minutes, the solid was cleaned with 10% HCL, centrifuged once more at 10,000 rpm for 15 minutes, washed with DW water, and dried in an oven at 60 °C for 12 hours. It creates the powdered graphene oxide.

• Flow chart for Hummers Method for synthesis of GO.

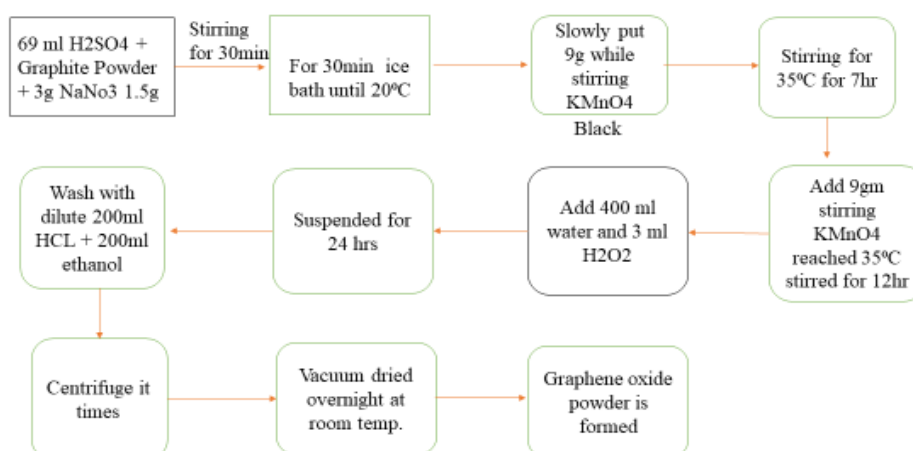


Fig 2. Flow chart for Hummers Method for synthesis of GO.

• Flow chart for Improved Hummers Method for synthesis of GO.

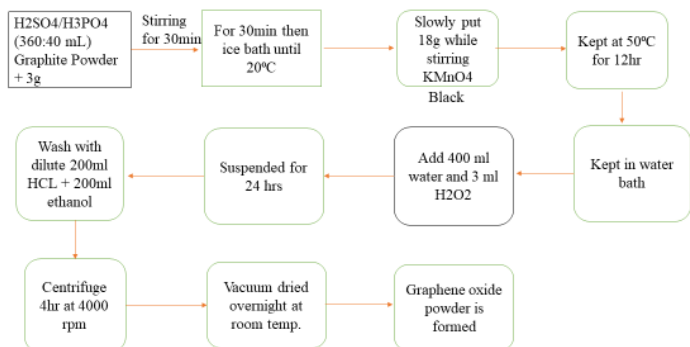


Fig 3. Flow chart for Improved Hummers Method for synthesis of GO.

• Flow chart for Modified Hummers Method for synthesis of GO.

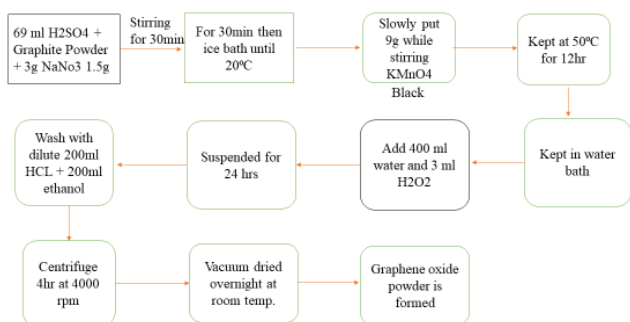


Fig 4. Flow chart for Modified Hummers Method for synthesis of GO.

• Flow chart for Equivalent Hummers Method for synthesis of GO.

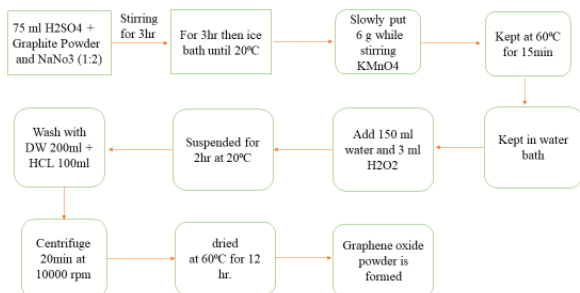


Fig 5. Flow chart for Equivalent Hummers Method for synthesis of GO.



Fig.6: GO appears in Green Colour through Equivalent Hummer Methods

Structure of Graphene Oxide:

Graphene oxide was fabricated much after than graphene, a material that has generated such great scientific interest. Graphene oxide is a monolayer of carbon atoms having both (significantly) sp^2 hybridized carbon atoms and (partially) sp^3 hybridized carbon atom bearing oxygen containing functional groups located both on the basal (hydroxyl and epoxy) and edge plane carboxyl, carbonyl). Carbon atoms covalently bonded to oxygen containing functional groups are sp^3 hybridized carbon cluster are located slightly above and below the plane of sp^2 hybridized carbon atom which is conformed from HRTEM. [21 22]. We are going to confirm this atomic layer at angstrom AFM atomic force microscopy and this AFM atomic micro graph confirms the formation of graphene oxide structure. Small amount of oxygen mass reduced is very dilute chemicals reaction at room temperature.

This LK model has become one of the most widely accepted and used for moderately oxidised GO.

Fig.7: Lerf- Klinowski model of graphene oxide

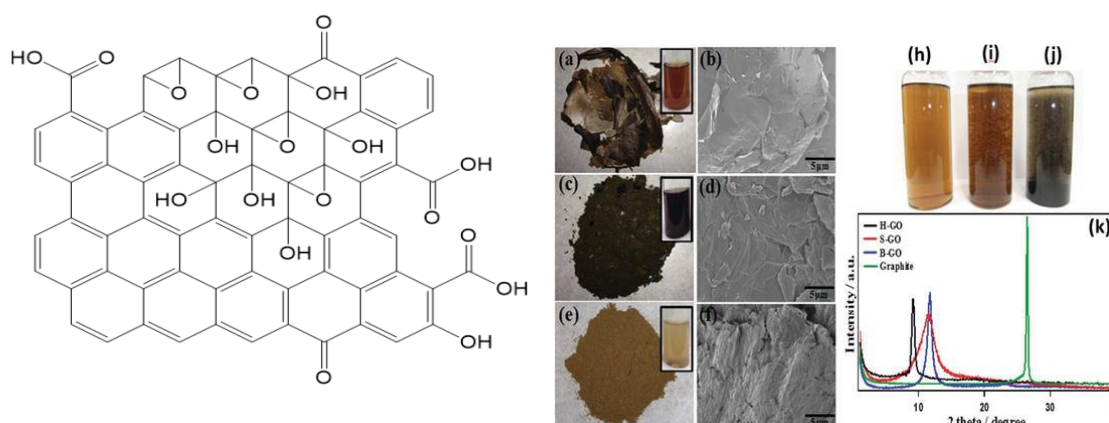


Fig.8: GO powder and nano dispersed in chemical form with surface morphology of SEM micrograph with verified XDR results adapted from this reference, <https://www.intechopen.com/chapters/54591>.

Conclusion:

Graphene oxide (GO) was successfully prepared by equivalent hummer method. Fascial synthesis route of GO can be the most suitable and prominent material than hummer modified, improved hummers and modified hummers method. Due to its ease of production and modification of equivalent hummers method, GO has become appear in green colour powder and nano dispersed in chemical form that compare with consonant fairly reported results GO powder and nano dispersed in chemical form with surface morphology of SEM micrograph with verified XDR results adapted from this reference, <https://www.intechopen.com/chapters/54591>.

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Local Buddy

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ABSTRACT

Everyone knows about the local specialty which is trending. Some people know that places names but not this location or anything about it in specific. When we want to travel, we take the help of websites for it, it's not easy to find local specialties the existing sites only show the well-known places due to that some fascinating places are unknown to user, even though there are much more places to explore which are known to the local people. People who are interested in traveling mostly has their mind set to some specific types of traveling places that's why categorization is an important part for user experience and their comfort while using the system. Categorization of places doesn't have that much attention. To makes the visit more meaningful proper guidance is important. That's why our system has guide suggestions so that user can have the trip they imagined. Our project helps peoples/tourist to know more about the trending local speciality. That's why we have named it as "Local Buddy". In this project we are overcoming the drawbacks and providing interesting features to reduces user's problems while traveling and makes their trip easier. This paper proposes a tourism website with a guide option that allows users to access various information about tourist destinations and also hire a tour guide for a more personalized travel experience. The website is developed using modern web development technologies and provides a user-friendly interface for tourists to easily navigate and find information about different tourist attractions, local cultures, and traditions. The guide option connects users with professional tour guides who can provide customized tours based on the user's preferences and interests. The website also offers various other features to help tourists plan their trips effectively.

Keywords : Tourist, local specialty, Categorization of places, Travel guide, Blogs

I. Introduction

Tourism is a major industry that generates revenue for many countries around the world. With the increasing popularity of online travel planning, tourists now have easy access to a vast amount of information about tourist destinations. However, it can be overwhelming and confusing for tourists to plan their travel itineraries without proper guidance and knowledge regarding particular destination.

India is the only country which has cultural, religious, adventures and so many places to visit .The problem is that we although have many websites but they offer only hotel booking and well-known places location and also doesn't have guide suggestion on the same site. Because of this tourist face many problems in new cities, due to that they unable to visit cultural, religious traditional, natural and local speciality of particular city. Local Buddy helps peoples/tourist to know more about the trending local speciality. In this project we are

overcoming the drawbacks and providing interesting features to reduces user's problems while traveling and makes their trip easier. The website is convenient for each user.

This platform is also giving the best guide suggestions to the user to make their journey most interesting & excellent. To help tourists plan their trips effectively and also reduce the troubles which visitors face sometimes while using the web portal because there is a lack of relationship between websites and visitors requirements because of dissociated GUI(Graphical User Interface).

This paper proposes a tourism website that not only provides information about different tourist destinations but also offers a guide option to provide personalized tours for tourists, provide proper categorization and give the platform to local people to explore the local specialties. The aim is to enhance the tourism industry by providing a personalized touch to travel planning

II. METHODS AND MATERIAL

In order to know the problem faced by traveller, guide a questionnaire has been generated as a methodology in gaining information for this project. The answers from the respondents are used to know their problems and benefits that they think they can get from the system. Survey-based methodology is used here.

Step 1: Conducted a literature review to gather information of tourist websites and what problems are raising in front of traveller during their journey

Step 2: Developed a survey questionnaire that includes questions on the awareness of tourist websites, the use of guide suggestions, the effectiveness of place categorization, and the user experience of interactive GUI, Problems of traveller. The survey questionnaire designed in a way that captures both quantitative and qualitative data.

Step 3: Distributed the survey questionnaire to a diverse group of participants, including tourists, travel enthusiasts, and people with interests in traveling, using social media platforms, and email.

Step 4:The survey administrated online using a survey tool such as SurveyMonkey or Google Forms. The survey shared with participants through social media and other online platforms.

Step 5: Collected data from the survey questionnaire within a specific time duration.

Step 6: Sorted the collected responses and exclude those from participants who do not have prior knowledge or experience with tourist websites, guide suggestions, proper place categorization, and interactive GUI.

Step 6: Analyzed the sorted data and identified the drawbacks in the current system , trends, and what necessary changes are required in tourism websites in order to enhance the user experience.

Step 7: Interpreted the findings and drew conclusions based on the analysis.

Step 8: Then created a proper report to for the development and improvement of tourist websites with guide suggestions, proper place categorization, and interactive GUI ,to reduce the difficulties faced by traveler's during their journey.

Data collection and data analysis:

Through the research we observe that top challenges confronting tourism are undiscovered and unverified locations that create many problems in front of user, dissociated GUI(Graphical User Interface), many websites offer only hotel booking and well-known places location and also doesn't have guide suggestion on the same

site, show only the well-known places due to that some fascinating places are unknown to user, even though there are much more places to explore which are known to the local people.

Too many tourism destinations are not prepared for visitors, local user can't add locations. Current websites have lack of proper categorization. Lack of relationship between websites and visitors' requirements because of un interactive GUI(Graphical User Interface).

III. USECASE DIAGRAM



IV. RESULTS AND DISCUSSION

The research objective was to know what are the actual troubles and obstacles are faced by the travelers during their journey , what features and functionalities are required in the website for better user experience in order to develop a quality website which fulfil all the expectations of traveller to enhance their travel experience . For that survey is conducted on different aspect of tourism website , according to that various parameters are formed and developed the website. The results of our study showed that the Local Buddy website was well-received by users. We collected data from online survey and the majority of them reported that they found the website easy to use and navigate. Most of the users reported that the website provided them with useful information about tourist places in their area.

In terms of categorization, we found that users preferred to search for tourist places based on their interests, such as adventure, historical, or natural sites. The website's interactive GUI also received positive feedback, with users appreciating the ease with which they could explore different tourist places.

Furthermore, the "Suggest a Place" feature of the website was used by a significant number of users, indicating that they appreciated the opportunity to contribute to the platform's content. We also found that users preferred to read reviews and ratings from other visitors before deciding to visit a place.

The results of this study suggest that the Local Buddy tourism website is a promising tool for providing guide suggestions, proper place categorization, and an interactive GUI to enhance the user experience. The website's ability to attract a diverse range of users is a positive sign, and the positive feedback received regarding the website's features indicates that users find them useful. However, the relatively low usage of the suggestion feature suggests that it may require further promotion to encourage more users to make use of it. Additionally, while the blog section was found to be popular, further research could be conducted to determine the topics that users are most interested in reading about.

Overall, the Local Buddy tourism website has the potential to be a valuable resource for traveler's seeking information and suggestions for their next trip. With continued development and promotion, it could become a go-to destination for anyone planning a trip in the future.

V. CONCLUSION

This system will help to the visitors to make their trip easy and worthy. It also helps local guides and places which are underrated and unknown to most of the people to grow their business and popularity. Providing proper categories in order to enhance user experience . Sharing their thoughts via blogs users can build their community of similar interests in tourism.

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Energy Efficient Algorithms for Wireless Sensor Network

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ABSTRACT

These days, technologies like the Internet of Things and big data are gaining an increasingly significant role in society. The fact that they present researchers with a multitude of challenging obstacles, such as unstable network structures, constantly changing network topologies, irregular connection between nodes, and restricted resources, is one of the primary reasons they are interested in studying them. Because of all of these challenges, the vast majority of academics and businesses are interested in working in this sector. Clustering algorithms are of considerable assistance to the process of energy conservation in networks with limited space. The cluster head should be selected in such a way that the burden on the networks is balanced appropriately. The consumption of energy is decreased while at the same time an increase in life is brought about.

Keywords- "Cluster Head, Internet of Things (IoT), Network Lifespan, Genetic Algorithm" (GA)

I. INTRODUCTION

Connecting a large number of devices to an already-existing network and providing a more comfortable environment for humans are the primary goals of the Internet of Things (IoT) technology. Things encompass anything that can be found on the internet, as well as a variety of mobile devices, data analytics, home appliances, human wearables such as watches and shoes, and cars for both private use and public transportation. The Internet of Things is built on top of these up-and-coming technologies and has as its primary objective the enhancement of communication and flexibility in day-to-day living.

The Internet of Things is the result of multiple technologies being combined. The term "Internet of Things" has been attempted to be defined in a variety of different ways by researchers up to this time. Near Field Communications (NFCs), also known as "Radio Frequencies Identification" (RFIDs), and "Wireless Sensors Network" are some of the essential components that are utilized in the Internet of Things (WSNs).

However, there are a number of limitations to using the LEACH algorithm, despite the fact that it lengthens the time that networks can support live or multi-hop transmissions. Since the appointment of cluster heads is done in a haphazard manner, suitable dispersion and optimum arrangement cannot be guaranteed. To become the leader of the cluster, the node that has lower energy requirements must meet requirements equal to those of nodes with greater power levels (S & Dr. Dattatray G. Takale, May 2019). As a consequence of this, when the low lingering power node is chosen to step in as a cluster leader, it simply leaves, which results in a more restricted range of networks.

II. LITERATURE REVIEW

Xiong Luo et al., have spoken about a strategy that relied on distant sensor systems that could detect and combine secure information in digital physical frameworks. By using a forecast-based information detection and combination plan to restrict the information transmission, this technique anticipated giving out this justification. Moreover, it maintained the WSN's basic sensor inclusion level while maintaining data security. The Gray Model (GM), Kernel Recursive Least Squares (KRLS), and Blowfish computation were used to create the GM-KRLS plan (BA). With its ability for information detection and combination, GM was in charge of predicting the information of the next period from the start. It occurs when just a little amount of information is available, but KRLS was used to increase the accuracy with which the underlying expected value was appraised in relation to its real reward. The KRLS, which is an updated form of AI computation, has the ability to adaptively balance the coefficients with each piece of information while gradually converting predicted value to actual value. Due of the blasting applications throughout a broad range of locations, BA was used for information encoding and disentangling during the transmission method. The safe information detection and combination conspire GM-KRLS produced results with low correspondence, high adaptability, high expectation exactness, and high classification accuracy.

Omolemo Godwill Matlou et al., 2017 have provided clarification on AI using artificial intelligence in remote sensing systems. Artificial intelligence (AI) imbues systems with ideas and delivers stable and secure systems in order to shorten response times when it recognizes and highlights system attacks and additionally restricts system floods. The Software Defined Wireless Sensor Networks (SDWSN) in AI were designed to provide academic systems the ability to self-adjust, adapt to new conditions, filter streams inside the system, and make ends meet without external impedance. SDWSN was given certain AI

systems that give it a respectable state. Given that several applications were provided every day and multiple issues were recognized, it was simple. This helps to develop techniques that provide the system productive directing, security, or vitality effective monitoring for the necessary QoS and QoE.

Brutal Darji et al., 2016, have shown a computation for energy gathering in WSNs. The main goal was to enhance a steering convention based on AI. This convention used condition to collect energy in place of batteries. Several analyses of LEACH and modified LEACH calculations were done in WSN to determine the energy effectiveness. This approach often focused on grouping sensor hubs or, maybe, altering the guiding convention. Lastly, LEACH and this AI computation were compared in order to highlight the energy-efficient system's improved plan lifespan. This calculation's presentation was deemed to be the most notable. Fluffy reasoning was used as the primary step in the subsequent stage, followed by hereditary calculation for the grouping of hubs calculating multidimensional nature. The system lifespan was increasing since this hereditary computation has a very small starting population in comparison to the present approach.

Feeza Khan et al., 2016, have put into practice a bunching convention based on assistance vectors that effectively distributed the sensor hubs to the nearby group while modifying the energy distribution among the bunch heads. The SVM-based directing convention in WSN was the best solution for the problem of vitality preservation. This grouping computation was done in accordance with rules. As compared to the LEACH, it provided a useful grouping strategy that encourages the employment of the dominant force. The connection with the LEACH also showed that it provides improved asset utilization in the context of WSNs. The Networks Simulator 2 (NS-2) has been used to test and examine this framework. Performance measures were broken down, and analysis was also carried out, for the three scenarios involving small, medium, and large scope WSNs. The small-scale organization consists of five bunches and five regular hubs, one in each group. Seven groups and seven typical hubs make form a medium-sized organization. There are 10 fundamental hubs in each group and 10 bunch in the enormous scope arrangement. As compared to LEACH, the directed bunching computation provided a useful grouping method that assisted in improved force usage in WSNs.

Guorui L et al., 2018, a proposal in WSN using Denoising Auto Encoder has been explained (DAE). An efficient approach based on DAE was presented to address the aforementioned problem. Using the recorded detected information, DAE was able to process the information estimate grid and the information remaking framework in the information preparation step. The discovered information from the whole

system was collected next to an information assortment tree during the information assortment step. The information estimate lattice was utilized to compile the information that was detected in each sensor hub. The information reproduction grid was used to change the initial information in the sink. Lastly, using real discovered information, the information correspondence execution and the information remaking execution were evaluated and compared to current plans. The results of the exploratory analysis showed that it has faster information recreation speed, greater information pressure rate, reduced energy usage, and progressively exact information reproduction.

Wen Li et al., 2017, have developed a method to assess the assembling state of WSNs. A chance was offered for constant application of condition checking in order to increase the asset and vitality effectiveness. Both WSN and IoT were anticipated to be combined using a planned manner. Despite the fact that there aren't many processes in place, a system was nonetheless required in order to build different pieces of equipment and programming stages and successfully integrate them. In this case, a two-advance structure was used to first establish an expected framework design and then to deconstruct the selection criteria for each section. For a proof-of-concept, a contextual inquiry for temperature checking was presented. By carefully scrutinizing their workplaces, manufacturers had a significantly increased possibility of upgrading. The use of WSN and IoT might get beyond restrictions like huge financial investment, physical accessibility, and legality that are now in place. The advantages of such procedures will not only help the producers financially, but also easily and with assured quality. Also, it results in decreased energy use and the associated environmental impact.

III. DESIGN TECHNIQUES

This work focuses on an efficient cluster election technique that switches the cluster head position between levels of higher energy nodes compared to levels of higher force nodes coupled with others. Algorithms may take into account the beginning energy, residual energy, and optimal cluster head value when choosing the next cluster runs for a network suited for IoT applications, such as environment protection and smart city networks.

The most significant problem with LEACH is that it collects CH in a haphazard manner and then applies this method to all of the sensor nodes without taking any parameters into consideration. Adjusting the threshold used to pick CH is absolutely necessary if we want to enhance the energy efficiency of the network and extend its lifespan. To put it another way, in order to compute the threshold, we need to take into account three important variables: the distance between the node and the BS, the amount of residual energy, and the number of neighboring nodes that fall within the cluster range. By taking use of the

distance that exists between the node and the BS, the amount of data that must be transmitted in excess can be significantly cut down. The choice that the CH makes can be optimized if, in addition to taking into account the live neighbor, the unused node energy from each round is also considered. Nodes that have a high residual energy, are located relatively close to the sink, and have a large number of neighbors are selected as CHs all at once. Using a cost function using the following expression, we may employ the aforementioned criteria:

$$cost(i) = \alpha \frac{E_{rem}(i)}{E_{init}} + \beta \frac{N_{nb}(i)}{N_{alive}} + \gamma \frac{D_{toBS}(i) - D_{toBSmin}}{D_{toBSmax} - D_{toBSmin}} \quad (1)$$

The Analytical Hierarchy Process (AHP) “approach determines the weight parameter and between 0 and 1. Where Erem(i) is the energy left in node I, Einit is the initial energy, Nnb(i) is the number of nodes I neighbor, Naive is the number of nodes alive, DtoBS(i) is the distance between node I and BS, D to BS min is the distance between BS and the nearest node to BS, and DtoBSma is the maximum distance to BS”.

In WSNs, the creation of a ground-breaking cluster-head protocol takes place over the course of two phases. as an illustration, a setup and a steady state are both examples. The implantation of the sensor nodes for the WSN is a procedure that is part of the setup stage method. They will also be organized into clusters, and each cluster will have a cluster head that is able to collect data from all of the sensor nodes in the cluster. In addition to this, it eliminated the redundant parts by fusing them together. The routing procedure will then be carried out after the steady-state phase has begun, and this will take place while the cluster heads are passing the data that they have acquired to the base station.

A: Arrangement stage

Clusters and CHs for the first round are generated with the help of a typical LEACH algorithm, and CHs are selected with the aid of an equation (2). In addition to the transmission of data, each node in a network uses a certain quantity of energy, the exact amount of which varies from node to node within the same network. The amount of space, given by "d," that is between data transmission and reception nodes may have an effect on the amount of electricity that is used. As a result, going forward, CH will be selected using an enhanced methodology similar to the one described above.

$$T(n) = \begin{cases} \frac{P}{1 - P(r \bmod \frac{1}{P})} \times \frac{E_{residual}}{E_{initial}} k_{opt} ; \text{for all } n \text{ o } G \\ 0; \text{Otherwise} \end{cases} \quad \text{Eq. (2)}$$

Where $E_{residual}$ is “remained energies level of node and $E_{initial}$ is early assigne energies level. A optimal no. of clusters k_{opt} may be write as”

$$k_{opt} = \sqrt{\frac{n}{2\pi}} \sqrt{\frac{E_{fs}}{E_{amp}d^4(2m-1)E_0 - mE_{DA}}} M \quad \text{Eq. (3)}$$

'M' defines the diameters of the network, and E0 represents the primary energy that is supplied to each and every node.

B.Steady-state stage

The transmission of data to CHs takes place within the time slots that have been allotted to each node. In order to save power, the transmission node is the only one in the cluster that continues to breathe and function normally; the other nodes in the cluster switch off their radio. When all of the cluster nodes have completed their data transmissions, the CH will go on with the processing of the data nevertheless. CH gathers and then aggregates the information in order to reduce any instances of duplication, make the information as concise as is practically feasible, and maintain an equivalent amount of bandwidth utilization. Data is sent from the Cluster head to the sinks or BS through communications that may use a single hop or several hops.

IV.RESULTS AND DISCUSSION

In this part, the suggested approach that is based on failure node detection and energy efficient in WSN is conducted in the MATLAB tool R2016a, and the result that was produced may be shown. The selection of the sink node and the identification of the problem node are both accomplished based on the grade value. The node that has the grade value that is the highest overall is known as the sink node. Following that, K-means clustering may be used to group the sensor nodes for the purpose of minimizing the complexity of the highest network model and easing the stress of selecting the ideal route. After it has been determined that a cluster has been successfully formed, LEACH, CBDAS, protocols is used to determine the most effective way to proceed. This demonstrates the network parameter that was taken into consideration while modelling the system.

Table 4.1: Parameters Considered In the Network Model

S.No	Parameters	Value
1	Number of nodes	500
2	Network area	1000*1000m
3	Initial energy of nodes	1J
4	Data packet size	10kb
5	Sink node	1
6	Number of clusters	5

A. Accuracy of Proposed System:

Dataset Size: 100	
Algorithm	Accuracy

LEACH	70%
CBDAS	72%
KNN	85%
Proposed	90%

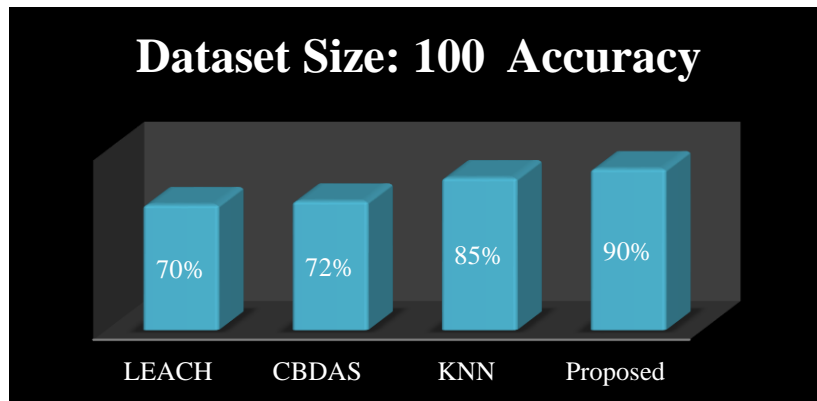


Fig 4.1: Accuracy of Proposed System

1. The newly suggested protocol has the potential to lengthen the lifespan of the network.
2. Using modified threshold values for cluster head selection has the potential to boost the throughput by about more than fifty percent, which is an improvement over the LEACH procedure.
3. Third, a novel protocol has been presented to increase network reliability by factoring in the residual energy of individual nodes and the optimal number of clusters for this purpose.
4. With the ability to cover more iterations than LEACH and CBDAS protocols for all energy values and to select a stable node to act as the cluster-head, the proposed protocol has the potential to extend the network's lifetime.

V. CONCLUSION

In order to accomplish this goal, a substantial quantity of research has been carried out. This is as a result of the fact that energy and life are two key limits that must be taken into account when developing any WSN routing protocol. It is probable that the process of selecting a load-distribution algorithm that is both economical with energy and consumes the fewest amount of network resources feasible may be difficult. When used as a protocol, the improved routing approach has the potential to provide improved performance in a variety of contexts, including environmental control via the Internet of Things. An illustration of such a circumstance is provided in the following paragraphs. The newly recommended protocol was able to improve the performance of the network in terms of metrics such as the quantity of residual energy, the number of packets sent to BS, throughput, and lifespan. These improvements were made.

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Artificial Intelligence using Neural Network D.S.S. For Iris Detection

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ABSTRACT

Our main aim is to develop a secure biometric recognition system to identify individual person both Irises other than physical or behavioural characteristics. One such method is iris recognition which is one of the most secure and unique features of any person. God has created every individual with an exclusive iris pattern on this earth. The iris recognition technique consists of iris localization, normalization, feature extraction and matching. Their unique feature was extracted and given to the neural network using MATLAB Simulation for detecting the Iris. The match results shows that the individual is identified accurately both the iris of a same Person.

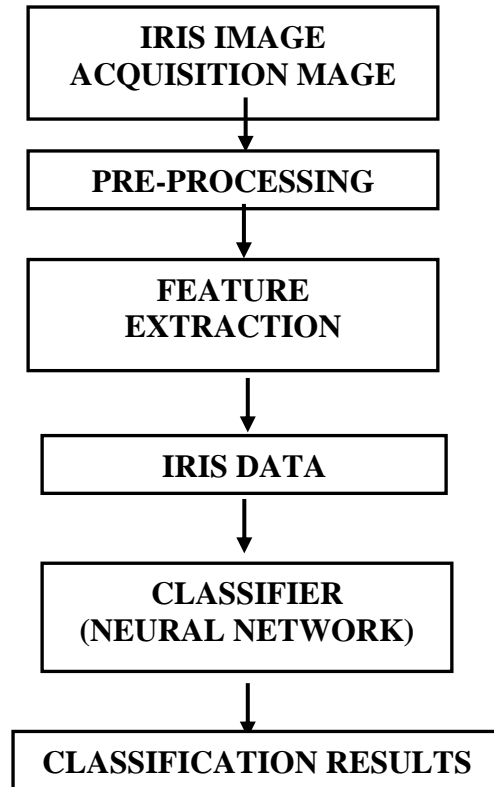
Keywords - Iris recognition, localization, normalization, neural network, person identification, MATLAB.

Introduction –

Identity verification and identification is becoming increasingly popular. Biometric measures [1] such as recognizing one's fingerprints, face, iris and voice greatly help in person identification authentication, and authorization. Pair of iris recognition has the high potential and non-invasive personal verification. Advances in the field have expanded the options to include biometrics such as iris and retina. Among the large set of options, it has been shown that the iris is the most accurate biometric. The iris is the elastic, pigmented, connective tissue that controls the pupil. Dougman [2] proposed an iris recognition system representing an iris as a mathematical function. Mayank Vatsa proposed a support-vector-machine-based learning algorithm selects locally enhanced regions from each globally enhanced image and combines these good-quality regions to create a single high-quality iris image.[3] proposes algorithms for iris segmentation, quality enhancement, match score fusion, and indexing to improve both the accuracy and the speed of iris recognition Further, Tests on another set of 801 images resulted in false accept and false reject rates of 0.0005% and 0.187% respectively, providing the reliability and accuracy of the biometric technology[5]. Leila Fallah Araghi used Iris Recognition based on covariance of discrete wavelet using Competitive Neural Network (LVQ). A set of Edge of Iris profiles are used to build a covariance matrix by discrete wavelet transform using Neural Network.[4]. Today with the development of Artificial Intelligence algorithm, Iris recognition system may gain speed, hardware simplicity, accuracy and learning ability. The experimental results have shown the effectiveness of the proposed system in comparison with other previous Iris recognition system.

Our Proposed Work Flow Chart

The complete iris recognition system consists of 4 stages, they are image acquisition, Pre-processing, Feature extraction and Matching. Figure 3.1 shows the flow diagram of Iris recognition system.



Flow Diagram of Iris Recognition Systems

Image Acquisition

This is very first step of the entire process. When a person wishes to be identified by iris recognition system, his/her eye is first photographed. The camera can be positioned between three and a half inches and one meter to capture the image. Today's commercial iris camera typically used infrared light to illuminate iris without causing harm or discomfort to the subject. In the manual procedure, the user needs to adjust the camera to get the iris in focus and needs to be within six to twelve inches of the camera. This process is much more manually intensive and requires proper user training to be successful. We must consider that the occlusion, lighting, number of pixels on the iris are factors that affect the image quality. Figure 1.2 shows the sample iris images.

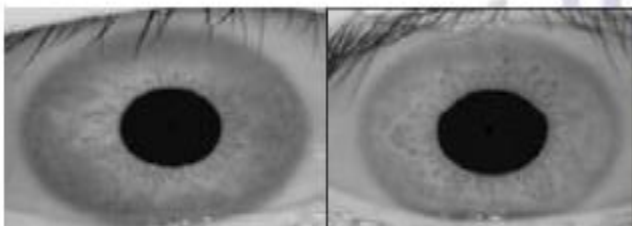


Fig. .1.2 Sample Iris Image

Pre-Processing:

The acquired iris image has to be pre-processed to detect the iris, which is an annular portion between the pupil (inner boundary) and the sclera (out boundary). The first step in iris localization is to detect pupil which is the black circular part surrounded by iris tissues. The centre of pupil can be used to detect the outer radius of iris patterns. The important steps involved are :

1. Pupil detection
2. Outer iris localization

The Hough Transform is used for a quick guess of the pupil center and then the Integro-Differential Operator is used to accurately locate pupil and limbus using a smaller search space.

Canny Edge Detection can be used for detecting edges in the entire eye image and Circular Hough Transform for detecting outer boundary of iris by using pupil center and inner boundary of iris. Figure 3.1.2 shows the localized iris image.

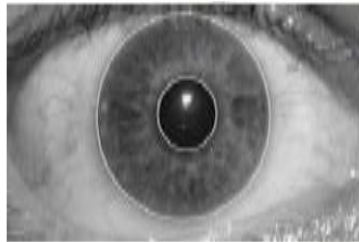


Fig. .1.3 Localized Iris Image.

Normalization:

For the purpose of accurate texture analysis, it is necessary to compensate this deformation, since both the inner and outer boundaries of the iris have been detected so it is easy to map the iris ring to a rectangular block of texture of a fixed size. The Cartesian to polar reference transform suggested by Daugman authorizes equivalent rectangular representation of the zone of interest as shown in figure 1.3.

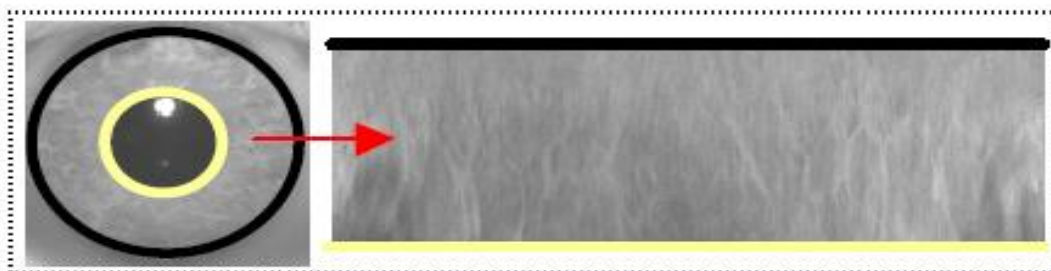


Fig. .1.3 : Iris Rectangular Representation

Pre-processing is a step, which is performed to obtain iris from the eye image. But here we have used standard iris database (i.e. UBIRIS database) so we have extracted features directly using the images.

In order to provide an accurate recognition of an individuals, the most discriminating information present in an iris pattern has been extracted. Only the significant features of the iris have been encoded so that comparison between templates is done. Below figure 1.4 shows the feature extraction stages.

Iris

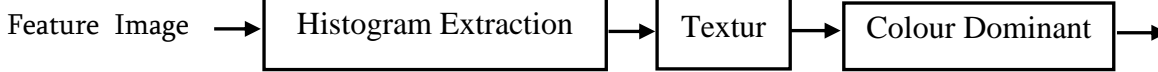


Fig. 1.4 : Feature Extraction Stage

Feedforward Network:

Feedforward networks consist of a series of layers. The first layer has a connection from the network input. Each subsequent layer has a connection from the previous layer. The final layer produces the network’s output.

Feedforward networks can be used for any kind of input to output mapping. A feedforward network with one hidden layer and enough neurons in the hidden layers, can fit any finite input – output mapping problem.

trainlm is a network training function that updates weight and bias values according to Levenberg – Marquardt optimization as shown in figure 1.5 trainlm is often the fastest backpropagation algorithm in the toolbox, and is highly recommended as a first – choice supervised algorithm, although it does require extra memory than other algorithms.

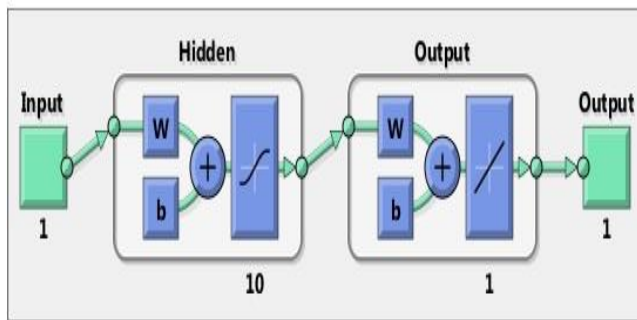


Fig. 1.5 Feedforward Network

Training of Neural Network For Right Iris :

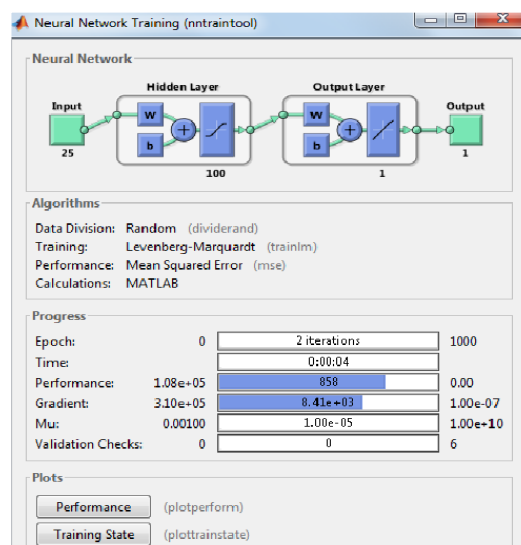


Fig. 1.6 Results of training Network for Right Iris

If the train button is pressed on the menu the neural network training (ntraintool) would be activated from the neural network toolbox. The result of train network is show in fig. 1.6.

In this figure the neural network algorithm would be displayed with 25 input two layers with weight and bias. Hidden layer is 100 and one output layer. According to the present result of training system the epoch is 2 iterations for 100 epochs. Running time is 0.004 hours. The performance is 858 for $1.08e + 05$ target. The gradient is $8.41e + 03$ for $1.00 e - 07$ and validation check is 0 for 6 must be displayed on the command window. According to the fig. 1.6 the neural network training system has been accomplished and known by the user neural network toolbox is very useful to simulation of this right iris recognition.

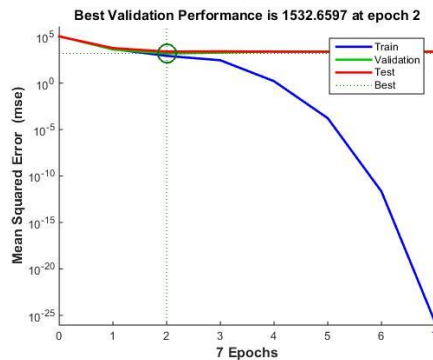


Fig. 1.7 Mean square error of Feedforward Neural Network

The results are found by the algorithm and we can get the number of epochs used and which epoch gives the best result as shown in figure 1.7. As shown in fig. a plot of epoch MSE has been plotted. The epochs get the best validation performance at epoch no. 2. The MSEW is the lowest at this point and hereafter no significant changes take place and no further decrease takes place. Hence this is the best validation performance is 1532.6597 at epoch 2. As shown in fig. 1.8. The training data are shown in the blue colour, validation is shown in blue colour, test data is shown in red colour and zero error is shown from the histogram.

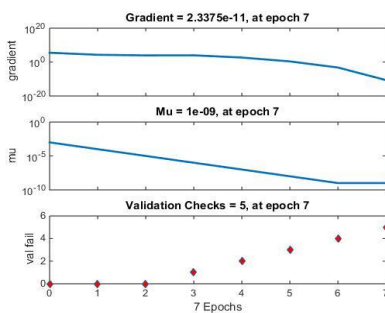


Fig. 1.8 Feedforward Neural Network Gradient versus Epoch

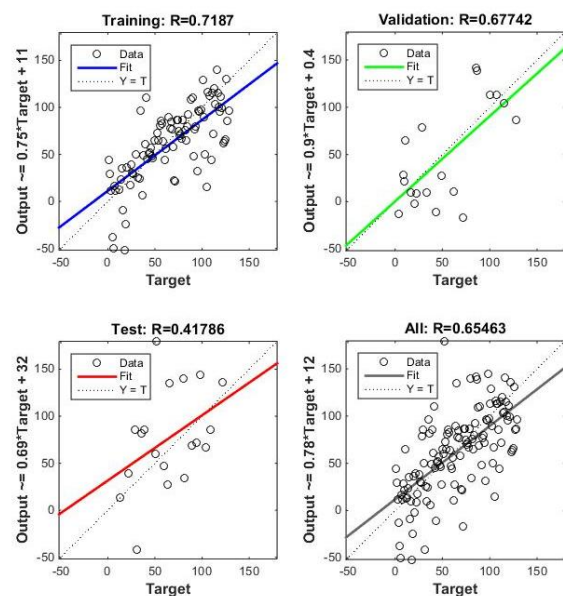


Fig.1.9 Regression plots for training, testing and validation of ANN

The four plots represent the training, validation, and testing data. The dashed line in each plot represents the perfect result – outputs = targets. The solid line represents the best fit linear regression line between outputs and targets. The R value is an indication of the relationship between the outputs and targets. If $R = 1$, this indicates that there is an exact linear relationship between outputs and targets. If R is close to zero, then there is no linear relationship between outputs and targets. For this example, the training data indicates a good fit. The validation and test results also show R values that greater than 0.9. The scatter plot is helpful in showing that certain data points have poor fits. As shown in figure.1.9.

CONCLUSION

The proposed methodology uses Levenberg – Marquardt feedforward network. Trainlm is often the fastest backpropagation algorithm in the toolbox. According to the fig. 1.6 the neural network training system has been accomplished and known by the user neural network toolbox is very useful to simulation of this right iris recognition The results are found by the algorithm and we can get the number of epochs used and which epoch gives the best result as shown in figure 1.7. In this paper gives the training of neural network for detection of right iris from the used database.

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Review on Distinct Techniques of Several Crystal Growth Methods

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ABSTRACT

Precise review of crystal growth and various techniques are mentioned in order to grow a single crystal from the state of saturation to nucleation.

The basic principle is to accomplish the state of nucleation from saturated solution followed by the combinations of atoms in definite manner with specific reactions results in the formation of single crystals and the method employed to grow a material depends on the characteristics of material

Keywords: Crystal Growth, crystal growth techniques

I. INTRODUCTION

In this modern era, Crystals has become the spine support of modern technology which has magnetized human beings since pre historic age with their beauty and rareness. But the real study has been seen on the large scale based upon applications for devices and in nonlinear optics.[1]

Crystal growth is highly bounded subject with the binded hands of crystallographers, process engineers, material scientist, physicist, chemist and biologist. Prior, the study of crystal growth was dependable on natural bases but day to day improvement in research has popped up the physiochemical environment of crystals with its vast or wide range of applicability in the field of photonics, optoelectronics, optical fiber communication system, nonlinear optical devices.[2]

Crystal growth is the process of arranging atoms, ions, molecules or molecular assemblies in a periodic arrangement and it is one of the most important branches of material science which leads technological materials of different sizes which covers up the crystals from bulk to nano size crystals.[3]

Its main aim is to grow a desired single crystal with perfection in shape and size for nonlinear optical applications by analyzing their pure quality throughout characterizations.[4]. Advance research in crystal growth techniques and characterization has handed us large number of technologically important single crystals in different varieties.[5]

II. THEORY OF CRYSTAL GROWTH

Crossing the several phases of solid, liquid and gaseous state, a solid-state transformation of crystal is seen with exception for certain metals and metal alloys at the other hand liquid to solid and gaseous to solid plays a keen role in the formation of crystal growth which is step froth with three stages [6]

- To be at the achieving state of supersaturation

- Nucleation
- Growing nuclei to single crystal of different phases.

During crystal growth the steady temperature is to be maintained at the supersaturation to form the best quality of crystal. whereas nucleation is the powerhouse for the crystal growth which leads to cell formation of crystal to the high quality of its crystal nature. which is studied till now by the various scientist. Thus, nucleation is very important for crystallization process [7].

III. CRYSTAL GROWTH TECHNIQUES:

crystal growth is known as interdisciplinary subjects which binds different branches and thus its difficult to review such a vast subject in this paper still some of the important techniques are reviewed below:

1. Solution growth
2. crystal growth from melt
3. crystal growth from vapor
4. Solid Growth

the technique uses to grow a crystal material depends on the characteristics of material like melting point, Volatile nature, solubility in water or other organic solvents.

1. SOLUTION GROWTH

The process of growth material has moderate to high solubility in temperature range ambient to 100°C temperatures. Further it is divided into

- A. Low temperature solution growth method.
- B. High temperature solution growth method.
- C. Hydro Thermal growth method.
- D. Gel Growth method.

A) LOW TEMPERATURE SOLUTION GROWTH:

low temperature solution growth further has trios of methods which consist of Slow cooling method, Solvent Evaporation method and Temperature Gradient method.

- **SLOW COOLING METHOD:** at the room temperature, a saturated solution is poured and sealed up thermally. After suspension of seed crystal in solution, crystallizer is kept in water thermostat. The temperature is reduced according to pre assigned plan which shows the large single crystals [8].
- **SOLVENT EVAPORATION METHOD:** here the difference between the rate of evaporation of solvent and solute established the excess of given solute. As compared to cooling method where total mass of the system remains constant in this method, the loose particles are seen in the solution which further weekly bound to other components due to which the volume of solution decreases. This is one of the oldest method of crystal growth which is technically very simple but consume much more time [9].
- **TEMPERATURE GRADIENT METHOD:** here maintenance of temperature plays a crucial role in the formation of crystal where a transport of material forms a hot region containing the source of material to be grown to a cooler region in supersaturated solution which results in the growth of crystals. Minute variation in the temperature between the source and crystal show larger effect on crystal growth [10].

B) HIGH TEMPERATURE SOLUTION GROWTH METHOD:

The most widely used high temperature solution growth is the flux growth. In this method, the constituent of the material which is to be crystalized are dissolved in suitable solvent and crystallization occurs as soon as the solution becomes supersaturated [11].

C) HYDRO THERMAL GROWTH METHOD:

In this method, growth is carried out in steel autoclave with gold and silver lining. The concentration gradient required for the growth is provided by the temperature difference 10°C to 100°C between the nutrients and growth areas. Materials like antimony, alumina, barium titanates, diamond can be grown with this method [12].

D) GEL GROWTH METHOD

The importance of gel growth and its application is seen broadly due to its simple and effective techniques for crystal growth as compared to others. Here, it is also seen in the study of medical science. the gel method has helped them for the study of crystal formed in urinary calculi and rheumatic disease, cholesterol stores.[13].

Gel obtained from physical process such as cooling is called physical gel such as clay and gelatin. Whereas gel formed by chemical reaction such as polymerization or hydrolysis are called chemical gels e.g., silica and polyacrylamide

In this method, the absence of convection is seen.

2. CRYSTAL GROWTH FROM THE MELT

Melt growth is the most important method of crystal growth which is commercial. Here, the pure material derived from recrystallization of fusion and re solidification

This method is popularly used for the crystal growth. The study seems that most of the technological crystals are recently obtained through this technique only. The selection of material must exhibit less chemical activity with no polymorphic transition and should melt without decomposition. The notable point is chemical reaction can disturb the stoichiometry of the crystal in the melt which has shown its physical and chemical defects. The main thermodynamic and kinetic principles are considered as driving forces for the generation of defects and incorporation, respectively. Further, it can be classified into the techniques given below

A) VERNUIL METHOD: The finely powdered starting material is placed in a container within a Verneuil furnace with its opening at the bottom.

When the container is vibrated, the powder can escape through it where oxygen is supplied into the furnace and travels down the powder in narrow tube which is located within large tube through which hydrogen is supplied and here the combustion occurs with a flame of suitable temperature at its core. When the powder passes through the flame, small droplets forms due to melting which when fall on onto an earthen support rod. It forms a sinter cone on the rod. the tip of which is close enough to the core to remain liquid and here at this peak point, the seed crystal eventually forms. As more droplets falls on to the tip, a single crystal, called a boule starts to form and support to move downward slowly allowing it to crystallize [14].

B) CZOCHRALSKI METHOD: In this method, the charge is melted at constant temperature slightly above the melting point which is used to grow large single crystal which are seen in semiconductor industry [15]. Here is no direct contact between the crucible wall and crystal which is most beneficial for the production of single unstressed crystals. It is not suitable for incongruent melting compound. The need for such a seed

crystal of similar composition limits is used as a tool for exploratory synthetic research [16].

C) KYROPOULOS TECHNIQUE: Here the crystal growth is seen in larger diameter. In this process, continuously heat removing is done by controlling the furnace temperature for proper growth of crystal [17]. It is very much useful for lenses, prism and other different optical components [18]

D) SKULL MELTING: This process is used for high melting point materials which are most widely accepted such as diamond imitation

Skull melting process is a technique suitable for the growth of high-temperature crystals by radio frequency (RF) heating the raw materials and forming a thin skull around the outside of the melt as a crucible. The process is crucible less. a thin skull separates the molten mass from the water-cooled container [19]. Thus, contamination problems or exsolution processes associated with contact between melts and hot crucibles are avoided [20].

E) ZONE MELTING: This is a technique of purification by melt crystallization. It is a crucial way for the evolution of transistors. It also known as Zone refining and it can be applied to the purification of those material which can be melted and solidified such as elements, organic and inorganic compounds [21]. In order to attain high purity, it is usually combined with other techniques due to non-agreeable impurities of solid liquid phases [22].

F) BRIDGMANN METHOD: There are two similar methods used to grow single crystals on a controlled temperature gradient surroundings are Bridgman and Stock Barger methods. The gradient can be accommodated by varying the temperature of the system. Single crystals developed from these techniques is adapted in many electronic devices [23].

In both methods, a polycrystalline material is heated above its melting point in the hot zone of an oven. The crystals can be grown in both vertical and horizontal orientation. slightly different cooling systems is only the deviation between them. Stockbarger method is in fact a modification of the Bridgman method [24].

3. CRYSTAL GROWTH FROM VAPOUR

Vapour growth technique is well known for the formation of bulky crystals. Crystals of diamonds, silicon, gas, semiconductor compounds can be grown by this method [25]. This vapour growth method has further divided into physical transport method and Chemical transport method [26].

A) PHYSICAL TRANSPORT METHOD: In this method with a moving gas stream or either in vacuum (Zns and Cds) are widely grown. It involves direct transport of materials from hot source zone to a cool region with sublimation or evaporation

B) CHEMICAL TRANSPORT METHOD: Here, the transportation of chemical compound is seen which decompose in the growth area. The temperature either hotter or cooler is based upon the nature of reaction involved.

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FUTURE POTENTIAL OF BEEKEEPING INDUSTRY IN INDIA

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Abstract :

Beekeeping with *Apis cerana* has been practicing in India and South Asia by using traditional methods from time immemorial. Beekeeping as a non-land based income generating tiny industrial sector is fast emerging as an important component of present day strategies for integrated rural development and off-farm employment for sustainable livelihoods. Though the beekeeping in India and South Asian countries has a long history with traditional management practices, the scientific methods of management is poorly understood by the beekeepers.

The present paper provides information on present status of beekeeping, honeybee species, potentialities / prospect for honey production for sustainable livelihoods of the stakeholders. The paper suggests that India has tremendous scope for commercial beekeeping and use of bees for pollination of diverse agri-horticultural crops and wild flora. Also, the paper emphasizes on the constraints for beekeeping development and strategies for organic honey production in Akola district.

Key words: Beekeeping, apiculture, pollination, honeybees



Sustainable Educational practices using ICT in subject Microbiology

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Abstract:-

ICT has expanded its horizons in all possible aspects of life. Communication, transportation research and education are most influenced domains of life with ICT & its tools. Covid-19 pandemic changed whole structure on an education system, recently online or blended mode of teaching is appreciated by students over traditional in person teaching methods. In Microbiology protein structure, Virus infection rate, immune response and many other topics can be best explained to students using stimulation and computer modeling. In present study Protein structure and modeling was demonstrated to group students using traditional black board method and computational modeling & stimulation using software NetLogo (6.3.0). Total 80 students in groups were demonstrated topic using both methods, out of which 92.5% of students found online teaching through NetLogo software more interesting and understood concept completely.

Keywords; Virus infection rate, Netlogo, ICT



Computational chemistry : A Newer approach in drug discovery : A Review

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ABSTRACT:

Computational chemistry is a modern technique for understanding reaction mechanism, which is more useful in Green chemistry. Now a days, molecular docking is a computational approach to study complex biological system, prediction of binding affinity of drug molecule to a specific targeted site and its biological response. It is the technique in which we can develop and identify new lead compound with higher success rate.

Keywords: Computational chemistry, molecular docking, lead compound.



Biostatistical methods to correlate oral hygiene with oral health

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Abstract

A questionnaire based survey was carried out among healthy as well as dental patients visiting to dental care clinic in Akola region. Data was entered into Microsoft excel and analyzed using SPSS. Descriptive Statistics (Number and percentage of responses for the questions related to the oral hygiene practice including the demographic information) were calculated for response item. Questionnaire included questions regarding oral hygiene practices and perception about relationship of oral health with detrimental habits. In present study of total participants n=288, participation of female participants was 61.55% (n=177) and remaining 38.5 % (n=111) was of male participants. In this study the opinion survey was made regarding the probable reasons for tooth decay. Improper brushing as the major cause of tooth decay was reported by 25.7% (n=74) while 23.6% (n=68) attributed it to the consumption of high sugar content, 14.9 % (n=43) opined improper diet as the reason for tooth decay, likewise 12.2% (n=35) reported dental treatment apathy or anxiety responsible for it, likewise 6.9% (n=20) held addiction of tobacco as the reason for tooth decay , whereas 16.7% (n=48) reported other factors like age were responsible for tooth decay.

Key Words: Biostatistics, Oral hygiene, tooth decay.



MOLECULAR DOCKING, A VITAL COMPUTER AIDED TOOL IN THE PATHWAY OF DRUG DESIGNING OF ANTICANCER AGENTS : A REVIEW

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The modern discovery in the field of anticancer medicine shows that verities of cancer proteins are responsible for the spread of cancer in the body of host. Structural complexity of protein makes it difficult to elucidate the structure of the ligand which binds to the protein in appropriate orientation. Using modern sophisticated technique i.e. molecular docking, the behavior of small molecules in protein binding site of target protein can be identified and molecular docking shows the possibility of proper orientation of ligand protein binding complex. Molecular docking is extensively used in the research are of producing novel potential anticancer agents. The present study incorporates the review of use of molecular docking in the pathway of drug designing of anticancer agents.



Information Technology for Habitat Monitoring and Wildlife Conservation

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Abstract

Human innovation often contributes to the destruction of nature. But new Information technologies has tremendous potential in the field of biodiversity conservation. The comprehensive database like wildlife database, conservation database, forest cover database etc. is available on a click. Here, some conservation technologies used by conservation community for monitoring wildlife and their habitats are discussed. Global Positioning System (GPS) allows field ecologists to record the location of their sampling sites, follow the movement of animals and analyse biogeographical trends. Camera traps can capture still pictures or videos after being triggered by an animal. It is a very good tool for monitoring many terrestrial species. Passive Acoustics Monitoring (PAM) is used to monitor wildlife on the basis of the sounds they produce. Sonar (sound navigation and ranging) is a technique that uses sound propagation usually for studying and monitoring underwater marine fauna. Ground-based stationary radars have been used to detect and track flying animals. Geophone is the promising tool to study the behaviour of small fossorial animals. Now a days, cell phones and apps has increased the potential for wildlife data collection and education. For example, citizen-science collected data on the eBird app to understand bird distributions. Thus, in the field of wildlife conservation, various tools of Information technology help ecologists to ensure species and ecosystem prosperity.

Keywords: Information technology, wildlife monitoring



CHEMINFORMATICS APPLICATION IN DRUG DISCOVERY- A REVIWE

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Abstract :- Discovering drugs to any diseases is a very challenging task in the field of chemistry due to the complex structure of biomolecules like AIDS, Cancer, COVID, Alzimer. Design and development of new efficient drugs for the diseases without any side effects are becoming very important point for the human beings , because change in various factors like food habits, environmental and migration in human life style. Cheminformatics deals with discovering drugs based in modern drug discovery technique which overcomes many issues which faces by traditional drug discovery system. Cheminformatics tools helps chemist for better understanding of complex structure of chemical compounds. And it is a new emerging interdisciplinary field which primarily aims to discover novel chemical entities which ultimately results in design of new molecules and it also play an important role for collecting, storing and analyzing the chemical data. this paper focus on cheminformatics and its application in drug discovery.

Keywords: Cheminformatics, drug discovery lead compounds,



VUV Spectroscopic Properties of Novel Gd³⁺-Eu³⁺ Doped LiBaF₃ Phosphor

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Abstract

The novel gadolinium, europium doped, and co-doped Lithium Barium Fluoride were successfully synthesized by a low-cost and time-saving wet chemical method followed by a Reactive Atmosphere Process (RAP). The phase purity was checked by the X-ray powder diffraction (XRD) technique. The luminescent properties in the UV-VUV region were first time investigated in the synthesized LiBaF₃: Gd³⁺, Eu³⁺ Phosphor. The excitation spectra in the VUV region (From 125 to 300 nm) were recorded at a 618 nm emission wavelength. Strong photoluminescence emission spectra were obtained at 593, 618, and 627 nm at excitation wavelength 252 nm. The emission spectra are associated with the transitions from the excited ⁵D₀ level to the ⁷F_J (J = 1, 2, 3, 4) levels of Eu³⁺ activators. The visible quantum cutting via down-conversion has been observed in LiBaF₃: Gd³⁺, Eu³⁺ Phosphor. The process of cross-relaxation and energy transfer very minutely was observed in Gd³⁺-Eu³⁺ ions pair doped with host LiBaF₃. According to the calculation from the emission spectra under 252 nm excitation wavelength, we can obtain the two-step energy transfer process with a visible quantum efficiency of up just greater than unity (100.7%)



ETHICS AND SOCIAL RESPONSIBILITY OF SOCIAL MEDIA IN INDIA

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ABSTRACT

The media is a fundamental Institution of the society. It plays a very vital role in democracy. It is the voice of democracy against illegal activities. Freedom of media in India is one of the important aspect for the nourishment of Fundamental Rights enshrined in the constitution of India. The media's role in society includes acting as a Watchdog and enhancing the free flow of information to public, therefore media is called the fourth pillar of the state. Although, the role of media in a democratic system has been widely debated. Being a largest democracy in the world and media has a powerful presence in the country. In recent times, Indian media has been subject to a lot of criticism for the manner in which they have disregarded their obligation to ethics and social responsibility. The Social Media has also become the integral part of human being at present. In today's society, the use of social media has become a necessary daily activity. Social media is typically used for social interaction and access to news and information, and decision-making. It is a valuable communication tool with others locally and worldwide, as well as to share, create and spread information. More than 86% of all business have a dedicated social media platform as part of their marketing strategy. Social Media is a big platform not only for promotion or marketing but one can also reach out millions of people and share their views, through social media, every person is aware of what is happening around them. But like any other theory social media platform have certain disadvantages. On the social site you will get easy to read false and baseless news. The government is still not regulating the ethical aspect of the social media and there is no control over the flow of information in social media. Some people create religious hysteria and hatred, through their thoughts and expression, on social site. Prank videography has become a fashion among teenagers, they have been totally forgotten decency and morality and serving vulgar and obnoxious scene before the viewers, consequently sexual sensuality are taking birth in young children and pushing them into criminal activities. Facebook, YouTube and many other sites are openly disseminating the horrible and offensive scenes on their screen, besides this you can find the advertisement regarding, treatment of incurable diseases, occultism, Magic remedies and many misleading things. Many people get cheated by coming under pretense. Due to prevalence of social media, online fraud and Cyber crimes are increasing day by day in society. Hence a strong legislation is required, by which a reasonable restriction could be imposed on social media. This paper with discuss about the role of social media in context of ethics and social responsibility

Key Words: Social Media, Ethics, social responsibility, cyber crime



Spectral interpretation of newly synthesized lactose containing -1, 2, 4-dithiazolidines (Hydrochlorides)

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Abstract:

The IR spectroscopy theory utilizes the concept that molecules tend to absorb specific frequencies of light that are characteristic of the corresponding structure of the molecules. It is an essential tool for the structural analysis of newly synthesized compound. Infrared spectroscopy is the measurement of the interaction of infrared radiation with matter by absorption, emission, or reflection. It is used to study and identify chemical substances or functional groups. It is the spectroscopy that deals with the infrared region of the electromagnetic spectrum that is light with a longer wavelength and lower frequency than visible light. It covers a range of techniques, mostly based on absorption spectroscopy. Many nuclei have spin, and all nuclei are electrically charged, according to the NMR principle. An energy transfer from the base energy to a higher energy level is achievable when an external magnetic field is supplied. Nuclear Magnetic Resonance (NMR) spectroscopy is an analytical chemistry technique used in quality control and research for determining the content and purity of a sample as well as its molecular structure.

Novel 4-aryl-5-p-tolylimino-3-hepta-O-benzoyl- β -D-lactosylimino-1, 2, 4-dithiazolidines (hydrochlorides) have been synthesized by the interaction of several 1-hepta-O-benzoyl- β -D-lactosyl-3-aryl thiocarbamides with N-p-tolyl-S-chloro isothiocarbamoyl chloride. The newly synthesized compounds have been characterized by analytical and IR, ¹H NMR. The polarimetric studies of the title compounds have been carried out.

Keywords: - IR, ¹H NMR spectroscopy, 1, 2, 4-dithiazolidines etc.



Sensitive Microdetermination of Lead with Pyrocatechol Violet in presence of Cetylpyridinium bromide

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Abstract:

Complexation reaction of Lead with Pyrocatechol Violet(PCV), a member of triphenylmethane dye in absence and presence of Cetylpyridinium bromide(CPB), a cationic surfactant have been studied. The intense coloured complexes of Lead in presence of Cetylpyridinium bromide show shift in the wavelength. The change in the properties of Pyrocatechol Violet utilized for the Microdetermination of Lead in the given sample.

Key Words: *Pyrocatechol violet(PCV), Cetylpyridinium bromide(CPB), Complexation, Microdetermination.*



MOLECULAR DOCKING : A Newer Approach Towards Drug Designing of Hepatoprotective Agents : A Review

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ABSTRACT:

Molecular docking is a part of computational chemistry for the confirmation of Ligand -binding to receptor in biological system. This technique is mainly used for the prediction of rational design of drug ,binding affinity, binding mode to a receptor. Docking technique ensure the accuracy and reliability of future prediction in design and selection of molecules with biological activity like Antioxidant activity , hepatoprotective activity, anti-inflammatory activity. This field has complex continued to develop and expand to more complex system.

Keywords : Molecular docking, Anti-oxidant, hepatoprotective activity.



Analysis of Fiber Quality Properties of Different Cotton Varieties

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ABSTRACT

Cotton (*Gossypium hirsutum* L.) is the most extensively cultivated commercial crop of the world. It is also known as white gold and full-fills the cloth needs of the human being, which is next to food. The quality of cotton fiber depends upon its various physical characteristics such as length, uniformity ration, maturity coefficient, and micronaire value and bundle strength. Sixteen cotton varieties namely NHH-44, Ankur-651, AKH-081, DHY-186, PA-348, Renuka-143, H-10, PKV-hy-2, H-8, NHH-52, BT-162, LRA-5166, Kaveri-Kurnel, Ankur-216, Banni- 145 and Ajeet-11 were selected for investigations. The analysis of different parameters of cotton fibers like SL length, uniformity ratio, fineness micronaire, bundle strength, tenacity, S.F.I. and E.L. was carried out at Ginning Training Centre. Span length of cotton fibers of different cotton varieties was found to be in the range of 24.6 to 34.1 mm.

Keywords: Cotton, harvest periods, fiber quality, yarn quality



Many-body interaction energy between cyanamide oligomers using density functional theory method

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Abstract

Many-body interaction energy between different molecule and their contribution to the binding energy of a respective hydrogen bonded oligomers. Cyclic and ladder type hydrogen bonded cyanamide oligomers are studied using density functional theory method. Cyanamide monomer shows the lowest energy at B3LYP/aug-cc-pvdz level among different method used here with the same basis set. Cyclic structures are more stable than the ladder. The nature of interactions between different molecules is studied using the many-body analysis approach. In cyclic oligomers not only total two-body energies, but higher body energies also contribute significantly to the binding energy of a respective oligomers.

Keywords: Many-body energy, Cyanamide oligomers, DFT.

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Water Vapour Sensing Mechanism Based on BaTiO₃ Doped SnO₂-ZnO Nanocomposite Thick Films Sensor

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Abstract

The BaTiO₃ doped SnO₂-ZnO nanocomposites were synthesized by a co precipitation method. The structural and compositional characterization has been studied by using X-ray powder diffraction method. The sensors are made in the form of thick film. The Surface morphologies of the prepared samples were analysed using Field Emission Scanning electron microscopy (FE-SEM) for thick film. Further, Humidity sensing investigations of prepared nanocomposites sensing materials were studied. Our result indicates that nanocomposite thick film sensor with different molecular weight ratio was most sensitive for humidity in comparison to pristine material under same conditions. The hysteresis plot between increasing and decreasing RH range from 30–90% and vice versa has been studied. The samples resistance is decreases $10^{10} \Omega$ to $10^6 \Omega$ in comparison with the pristine materials. The conductivity this material was also found to be stabilized through the resistance near in the range 4 to 6 M Ω . The similar change was also observed in sensitivity.

Keywords: SnO₂, ZnO, BaTiO₃ nanocomposite, Humidity chamber, XRD.



Brief Study of Cyber Crime and Cyber Security

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Abstract

In the present age of Information technology, internet has become an integral part of everyone's life. It is the global system of interconnected computer networks that links the devices worldwide. It carries an extensive range of information resources and services. However some of the peoples use the internet to harm the individuals who becomes victims and affects the national security. Such cyber Crimes and online criminal activities has been increased in multiples after COVID-19 pandemic. So this is a serious challenge to the society to increase the Cyber security and aware the people from the techniques of the criminals. In the present study, various types of cyber crimes such as Phishing, Scams, Online harassment, Identity Theft, Financial Theft, Malware, Ransomware, Spyware, Virus, Worm, Trojan programs in the cyber word have been described. Various domains of cyber security and Preventive measures against the cyber crime have been presented for national security.

Keywords: Internet, Cyber crime, Cyber security, Preventive measures, National security



Synthesis and Characterization of PPy-AA film for Sensor Development

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ABSTRACT

Recently, Conducting polymers have been used extensively for sensor development. In the present study, PPy-AA thin films were synthesized at room temperature using chemical polymerization technique. PPy-AA thin film was deposited on glass substrate by oxidation of pyrrole (doped with Acrylic Acid) at room temperature by optimized process parameters. Synthesized film was characterized by FTIR, UV-Vis. Spectroscopy. Scanning electron microscopy shows suitable morphology for sensor application. Gas sensing chamber developed indigenously in the laboratory and sensing behavior of the film for ammonia gas was studied. The PPy-AA film shows good response to 100-300 ppm of ammonia gas at room temperature.

Keywords: Conducting polymer, Polypyrrole, Acrylic Acid, Ammonia, Sensor



A Review : The enormous use of Annatto dye from Achiote plant (*Bixa orellana*)

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Abstract: Annatto is a natural carotenoid obtained from shrub, *Bixa orellana* commonly called as Achiote. The seeds are having great economic importance due to its highly desirable colourant. The ripe fruits on drying yield seeds, which are used for the production of annatto colour. It can be used for various purposes like coating medicines, cosmetics, drugs, Hair oils, Polishs, Natural food, Dietary suppliments.

Keywords:- Caretonoids, colourants, dietary suppliments, cosmetics.



Area of use Ad-hoc Network in Computer and Smart phone

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Abstract-

A wireless computer ad hoc network (WANET) a type of local area network (LAN) and other (WAN) that is built spontaneously to more are enable two or more wireless devices to be connected. Ad Hoc network to each other without requiring typical all network infrastructure equipment, such as a wireless device router or access network point.

Load balancing, Wi-Fi networks in network switch mode are created and managed using some equipment such as Wi-Fi routers; wireless access points (WAPs) and wireless controllers.

Types of Ad hoc Connections

Ad Hoc networks are very simplified and can consist of many devices, each network connected in a different network mode and each providing different resources to the network. Assign of the connection type, the ad hoc networks different function remains the same.

MCANETs

The mobile and computer ad hoc network or MCANET is a mobile ad hoc network that can change locations. It is not limited on single physical location. This type of network, all devices are mobile, and the computer network is move anywhere the devices are, inside or outside.

IMCANETs

The Internet Based ad hoc network or IMCANET is very simple and similar to the MCANET with one more then large exception. The IMCANET has one or multiple devices on the network on provide internet access to the all devices on the network.

Devices on the IMCANET network on the able to use the internet connection of the more devices to access the internet. Using the ad hoc example of Wi-Fi connected tablets in a MCANET but now add a Smartphone.

SPANs

A Smartphone using ad hoc network, or SPAN, is a network which uses phones to connect to each other smart phone but we are not using a cellular technology. Instead they are using smart phone Wi-Fi or Bluetooth to connect to each other smart phone and transfer data.



A Review: Different Approaches of Sentiment Analysis

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ABSTRACT

Sentiment Analysis plays vital role for analyzing the opinion of people. It is useful for taking decision on the basis of feedbacks, at individual, organizational and government level. There are different approaches of analyzing the sentiment of given data. Research work presented in this paper focuses on the different approaches such as Lexicon based and Machine Learning Based and their uses according to the different situation and variety of data. It has been observed that hybrid based approach is more suitable for language specific Sentiment Analysis.



Electrochemical synthesis of polyaniline conducting composite films using various dopants

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ABSTRACT

The synthesis of conducting composite films is novel concept as well as challenging technology in thin film. In proposed work conducting composite films were electrochemically synthesized by using various dopants such as zinc sulphate, silver nitrate, potassium chromate and potassium dichromate, ferrous sulphate etc. These composite films were characterized and analyzed by X-ray, FTIR, SEM and UV Spectroscopy, Basically its conductivity measured by four probe methods and compared.

Keywords: Electrochemical, Composite films, conductivity, dopants.



Cost-Effective Carbon Cathode for Dye-Sensitized Solar Cell Using Eco-Friendly Eosin Y Dye

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Abstract

Due to high catalytic properties and stability against deterioration, Platinum coated films on fluorine-doped tin oxide (FTO) glass surfaces have been preferred commonly as the cathodes in the research of dye-sensitized solar cells (DSSCs). The platinum cathode films have been synthesized by drop casting the alcoholic solution of hexachloroplatinic acid (H_2PtCl_6) on the cleaned TiO_2 -coated glass plates. Still, the cost of platinum is too high, being a heavy and rare element. Consequently, the intention of producing a low-cost and eco-friendly DSSC suffers. In the current study, efforts have been done to replace the heavy and expensive platinum cathode with a light and cost-effective carbon cathode. An attempt has been done to prepare the DSSC using Platinum and Carbon cathode under similar circumstances. i.e. using Al-doped TiO_2 nanoparticles photoanode, eco-friendly Eosin Y dye has been used for sensitization of anode and iodine triiodide has been employed as the electrolyte. Study reveals carbon cathode can successfully replace the platinum cathode as the efficiency of DSSC using carbon cathode has been found to be greater as compared to the DSSC using the platinum cathode.

Key Words: Dye Sensitized Solar Cell, Al doped TiO_2 photo anode, carbon cathode, Eosin Y dye



Identification of Emotion from Facial Expression Using Deep Learning

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Abstract

Automatic emotion recognition and classification is an interesting research field which has many applications. Facial expression plays important role during communication which conveys emotional state of an individual. The present project focuses on identification and classification of facial emotion from facial expression using deep learning with convolutional neural network and VGG16 model. The aim of this project is to study the classification of emotion from facial expression with supervised learning by using deep learning. The VGG16 which was pre-trained on Image Net via transfer learning method. The emotion dataset in this study consists of 250 images which has three emotions such as Angry, Happy and Neutral and are used for training, testing and validation purpose. The accuracy achieved using this model is 94 %.

Keywords: Emotion recognition, Facial Expression, Deep Learning, Convolutional neural network (CNN), VGG16.



Evaluation and Survey of security, privacy issues of Cryptocurrency Exchange application

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Abstract

Digital currencies only exist in digital form. They do not have a physical equivalent. Cryptocurrencies, Virtual currency, Central bank digital currency are the types of digital currencies. Cryptocurrency is decentralized digital money that is based on blockchain technology and secured by cryptography. Blockchain technology is a technology that uses distributed database that is shared among the nodes of a computer network. Blockchain stores information electronically in digital format. In recent years, many businesses around the world integrating blockchain technology.

In the present investigation, we have conducted the survey to examine users familiarity, reliance on cryptocurrency, users expectations about security and privacy of cryptocurrency, perception about use, view point of people on different aspect of cryptocurrency and cryptowallet. We have analysed and compared the users responses and expectations. It was observed that there are six commonly used applications for cryptocurrency exchange in india. Based on comparison and survey, It was found that the best crypto currency exchange application which satisfied the user expectations (Parameters selected for comparison) about user friendliness security and privacy of cryptocurrency exchange application.

Keywords: Blockchain Technology, Cryptocurrency, Digital Currency, Security.



A Comparative study of Bio-electric Power Obtained from Bio-Galvanic Cell arrangement using Onion, Lemon, Orange and Aloe-vera for Green power source

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ABSTRACT

A battery or wet cell stores chemical energy and converts it into electrical energy when proper electrodes are used. Fruit or plant as a battery consists of electrolyte solution which conducts current if proper electrodes are inserted. This work is focused on comparative study of bioelectricity obtained from Onion bulb, Lemon, Orange and Aloe vera plant for the development of Eco Friendly- sustainable power batteries using a Direct Galvanic Cell (DGC) type arrangement. The natural organic elements selected to make Biogenic Galvanic Cell (BGC) or battery contain electrolyte or gel type solutions containing acids which form a battery after insertion of positive and negative electrodes. Open circuit voltages obtained from all galvanic cell arrangements were found near about 1V. Lemon BGC was found to have better output power providing capacity. But Onion BGC has shown sustainable continuous and constant power providing more capacity than Lemon BGC even after 40 days. Power conversion efficiency of Lemon BGC was found to be 0.2857 whereas for Onion BGC it was 0.1417.

Keywords: Electrode, DGC, BGC, Power, Lemon.



Study of POA-PVS-DBS Composite Films for the Development of Gas Sensor

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Abstract

In the present investigation, the composite films of poly(o-anisidine)-polyvinylsulphonic acid-dodecylbenzenesulphonic acid (POA-PVS-DBS) were synthesized on silver electrode, using electrochemical polymerization technique. These synthesized composite films were characterized by electrochemical technique, conductivity measurement, UV-visible spectroscopy, Fourier transform infrared (FTIR) spectroscopy and Scanning electron microscopy (SEM). The optimal film growth was achieved for synthesis of the poly(o-anisidine) composite films in the presence of polyvinylsulphonic acid-dodecylbenzenesulphonic acid (PVS-DBS). The synthesized POA-PVS-DBS composite films exhibit good electrochemical properties, conductivity with a uniform porous surface morphology which could be used for development of gas sensor.

Keywords: o-anisidine, galvanostatic method, composite film, gas sensor



Carbon Nanotubes in Biomedical Applications

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ABSTRACT

Nanotechnology involves minimization of the size of molecules that are designed in such a way that it acts at bimolecular level. Nanotechnology-based delivery systems are benefiting the consumers by improving the therapeutic index and reducing the side effects. Surface modification methods are very useful to make biocompatibilities of CNT in biological systems and improve propensity to cross cell membranes. Functionalized CNT can be developed as biomedical application.

Keywords: CNT, Nanotechnology, Surface modifications, Biomedical application.



Artificial Intelligence using Neural Network D.S.S. For Iris Detection

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Abstract: -

Iris recognition is one of important biometric recognition approach in a human identification is becoming very active topic in research and practical application. Iris. Region is the part between the pupil and the white sclera. This field is sometimes called iris texture. The iris texture provides many minute characteristics such as freckles, coronas, stripes, furrows, crypts, etc. These visible characteristics are unique for each subject. Such unique feature in the anatomical structure of the iris facilitates the differentiation among individuals. The human iris is not changeable and is stable. From one year of age until death, the patterns of the iris are relatively constant over a person's lifetime. Because of this uniqueness and stability iris recognition is a reliable human identification technique.

Neural network-based decision support system, is used for persons identification from IRIS recognition. In this case DECISION SUPPORT SYSTEM (D.S.S.) will work as a classifier estimate non-linear and complex decision boundaries between different classes. The neural network configuration using MLP, RBF, SVM. The various parameter of neural network will be varied carefully in order to obtained the optimal configuration in view of minimum mean square error and maximum classification accuracy and simplicity of neural network model, the available data set ratio of these partition will vary gradually. In each of neural network configuration. The variable parameter test and train by neural solution software.

Finally, an optimal neural network based D.S.S. will be designed in each category of neural network and then shall be overall comparison among different neural network configuration. In this case of decision support system confusion matrix and classify accuracy are important to identify person iris image.

Keywords: Iris recognition, neural network-based decision support system,
Classify accuracy.



Energy-Efficient Routing over Mobile Ad-Hoc Networks Model and Protocol

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Abstract-

The Mobile Ad-hoc Network (MANET) nodes are a collection of self-organizing mobile nodes that are placed arbitrarily and without following any predetermined patterns. In the case of unavailability of a router or other data transmission device, these mobile nodes adhere to adhoc modelling. centralised technology. For the purpose of detecting terrestrial irregularities like seismic events, forest fires, and other natural calamities, MANETs are frequently used. In order to detect remarkable natural objects, MANETs are often installed with a large number of adhoc nodes to cover a wide variety of geographic locations. The Internet of Things (IoT) is seen in this context as a decentralised MANET ecosystem [5.1]. IoT base, or any computing node (cloud system) placed outside the local network domain, is necessary to take MANET data into the internet domain. Similar to this, a WSN is a form of network that has homogenous core components and resource-constrained sensor nodes. In this study, WSN sensor nodes are more energy-limited than MANET nodes. In addition, a gateway node is required for sensor nodes installed in a WSN context to connect to the outside network.

Proposed work of MANET-ESO in IOT

In the Internet of Things, the MANET uses the recommended method of MANET-ESO, which boosts the level of credibility and subsequent message transfer among sensor nodes. WSN technologies with internet connectivity make up the Internet of Things



Trend and Impact of Digitalization on Stakeholders

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Abstract:

Today we are experiencing that the world is shifting from analog to digital and marketing is no exception to this. Day by day the use of digital marketing, social media marketing, search engine marketing is increasing with the technological development. Eventually internet users are increasing rapidly which resulted to increase the profit making capacity of business. Consumer's buying behavior is changing and they are more tending towards digital marketing rather than traditional. This research paper aims to focus on the recent trend and impact of digital marketing on various stakeholders. This paper also attempts to offer views on some current and future trends in marketing. The contents of this paper are based on recently published literature and focusing on what is happening in the business world in current scenario. For this purpose secondary data has been reviewed from various articles, researches, reports, newspapers, magazines, various websites and the information on internet.

Currently, Digital transformation in business attracted a lot of attention in research. As far as entrepreneurship is concerned, digitalization is changing business interactions as well as completing different tasks. In this era businesses are not working in isolation, they became part of complex ecosystems interacting with different stakeholders, there is an unexplored research area regarding digitalization of ecosystems. Through this research an attempt has been made to focus on complex multi-stakeholder ecosystems using digital platforms. Similarly it will also be important to see the changing roles and responsibilities of stakeholders. Today whole globe is experiencing a radical change towards the digitalization. The consumer became more aware and techno-savvy. Consumer became habitual and used to in searching on internet to find the best deal form the sellers around India.

It indicates that businesses can really benefit from Digital Marketing such as search engine optimization (SEO), search engine marketing (SEM), content marketing, influencer marketing, content automation, e-commerce marketing, campaign marketing, and social media marketing, social media optimization, e-mail direct marketing, display advertising, e-books, optical disks and games and are becoming more and more common in our advancing technology. It is proved that



majority of consumers are connected through social media which is creating new opportunities for digital marketers to attract the customers through digital platform. It is proved by various research that digital marketing is cost effective hence there is a great commercial impact on the business.

Key Words: Search Engine Marketing(SEM), Digitalization, Stakeholders



Study of Different Machine Learning Tool in Data Mining

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Significant advancements in informational and technical approaches have enabled businesses to compile extensive databases of client information. Data mining is a process that involves information analysis and search to make it useful for human use. To find information that is understandable, a large volume of data is modelled, chosen, and investigated. Several different fields have used artificial intelligence and data mining techniques to handle classification, diagnosis, association, segmentation, and prediction problems. From an AI standpoint, this specific study discusses data mining and KDD techniques. Big data and data mining may be brand-new and rapidly expanding fields. It draws inspiration and resources from many fields, including business, high speed computing, statistics, information analysis, and machine learning. This explains why the field of data mining is dynamic, multifaceted, and always growing. Although there is general agreement that the overarching objective of information mining is to find new and useful material in knowledge bases, this is where the agreement ends and the suggestions for reaching this objective are as varied as the communities themselves. Yet arithmetic is the cornerstone of all data processing techniques. Any discussion of information mining techniques on a moderate scale must inevitably be prejudiced and probably even selective. In large and expanding datasets, data processing techniques are prone to identifying patterns, structures, regularities, and singularities. Real neuron networks are greatly simplified in artificial neural networks (ANN). Big data with the neural network paradigm may represent a brand-new, rapidly expanding field. It draws inspiration and resources from many fields, including business, high speed computing, statistics, information analysis, and machine learning. This explains why the field of data mining is dynamic, multifaceted, and always growing. Although it's generally agreed that information mining's overarching objective is to find fresh and useful data in knowledge sets, this isn't always the case can be wherever the agreement expires, and it is suggested that different communities can contribute in different ways to accomplishing this aim.

We discuss hot topics in data mining and AI, including important AI ideas that have been applied to both data mining and KDD. This particular paper's main objective is to provide a perspective on various AI applications and data mining algorithms. In this essay, we'll analyze a number of historical contributions and discuss these distinct ideas using the example of human intellect. A general foundation for the design of even cleverer gadgets can also be suggested.



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