

# Generalization of IoT Applications : Systematic Review

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## ABSTRACT

Internet of things is a booming technology in our personal life as well as in utilization of payroll system and security implementations in corporate. We all know the impact of IoT in home related applications as well as in corporate. In corporate, if we think to setup a company with high security implementation, IoT is one of the best sources available now. If a person who is holding the card and he checks in and the system is not recognizing him, so he has to hold RSA (Rivest, Shamir, and Adelman) tag with him. The IoT will have that RSA tag and if the person has to enter into the premises he has to give his IRIS(Integrated Risk Information System) or biometric thumb. Biometric data cannot be copied or morphed. This will create security wall for entering any organization or premises. So IoT is adoptable by almost every company to reduce the work load and increase the efficiencies. This paper discusses the environments created by IoT by the companies to manage smart devices and vice versa. This paper focuses on the generalization of IoT application in several domains of companies for managing the smart devices for example sky bell for smart video doorbell, June for intelligent convection oven and many more.

**Keywords :** Information Dissemination, IoT, Smart Devices, Web Server Formatting

## I. INTRODUCTION

A novel universal view named The Internet of Things has been presented in the field of remote correspondences quite a long ago. This term was developed by Kevin Ashton in the year 1998 from which the significance of it has been expanded thoroughly. Bringing IoT into handsets and into extensive variety of machineries would add unsurmountable amount of data and thus would require corresponding innovation. IoT assumes a key part in change of companies. IoT has been thoroughly analyzed in the twentieth Tyrrenian workshop on computerized interchanges. IoT is depicted as an organization of different "things" or "items" around us, similar to, sensors, cell phones, Radio Frequency Identification which work through a special framework with which these things speak

with each other and finish their undertakings successfully[1], [2].

Keeping in mind the end goal to comprehend IoT, first we have to comprehend the part of the RFID frameworks. IoT essentially relies upon Wireless Sensor Networks (which accumulate the data gathering, preparing and change), smart innovations (keeping in mind the end goal to take care of issues and introduce and control the machine-to-machine communication) and Nano-meter advances (to build little machineries so as to combine the internet of things applications). However research is being piloted in the Internet of Things with a specific end goal to make it all the more simple and to utilize it, which further increases the securities issue of the data exchanged through it. The optimum engineering is the Unique Identifier (UID) in China labs is driving the field[3]. The principle point of these

organizations is to plan a framework associating each protest with the assistance of the RFID labels and the remote correspondences on an all inclusive stage that is "Internet." In this instrument each question is given an extraordinary name which is called Electronic item code and is represented by the RFID framework. IBM's Palmisano, in the year 2009 contemplated an idea called "Brilliant Planet" by bringing sensors into every one of the items and different frameworks like railroads, control network and so communicate with each other and different machineries with the assistance of savvy design. In the year 2009, "Detecting China" was discharged and an inside for sensor systems was worked in Wuxi, in Jiangsu domain, which is an imperative wellspring of science and innovation licenses in the nation.

## II. RELATED WORK

The IoT has been depicted or characterized by different viewpoints, along these lines IoT is classified in various ways. The principle purpose for these numerous definitions is a direct result of the two words "Internet" and "Things". Internet focuses towards a mix of systems and things for the most part that comprises of non-exclusive articles [5].At the point when the two words are consolidated it prompts to an unheard level of progression in the ICT globe. The term, "Internet of Things" in a roundabout way implies a system of associated protests all around the globe which have an exceptional ECOMPUTER, that means an extraordinary address (electronic item code). The most changes undertaking in this plan is the ID of the items and the traded data. This prompts another idea of semantic point of view in IoT. The figure.1 portrays the very idea of IoT, in which there is a merging of the these spheres [6].A propelled approach, much superior to the RFID's approach was contemplated by CASAGARAS methods[7].

The Internet of Things is one of the characteristic empowering engineering for the organization of free

unified administrations and applications, described by a high level of self-sufficient information. Internet centers around building up an incorporated system and things focuses on coordinating non specific articles into an edge work which is anything but difficult to get to. A discussion shaped in the year 2009, as per IP for Smart Objects organization together, which has a convention, which interfaces countless machineries that keeps running on a battery based mechanics. This portrays IP has numerous plans which would make the IoT a reality. By consolidating the IEEE 802.15.4 and the IP address and furthermore the 6LoWPAN which would make the Internet of Things work [9].Executing IoT basically relied upon the design, for the most part it incorporates a few layers: the field information obtaining layer to the application layer on the optimum. These layered engineering is actualized such that they can satisfy every one of the prerequisites of different ventures, undertakings, social orders, organizations, governments and so forth. Fig. 1 exhibits a layered engineering for the Internet of Things [10]. The layered design has two distinct classifications with an Internet layer in the middle and in order to fill the need, with a typical media, for correspondence. The two lower layers contribute for holding information and the two layers at the top is in-charge of usage of information.

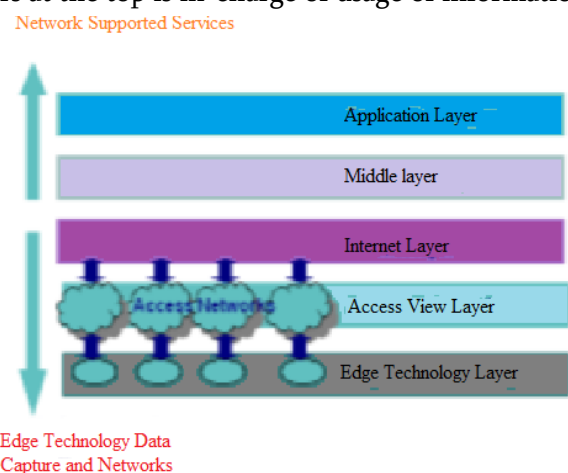


Fig: 1 Network Supported layers and Architecture [10].

In each organization, there are functional areas that gives data, commercial message packets and

numerous warnings to their clients and server. The issue is that it requires some server that is committed to that reason and that must have breakthrough data about the offers and promotions of the organization. Because of the internet of things we can see numerous machineries around us. Numerous individuals hold the view that urban areas and the globe itself will be overlaid with detecting and activation, numerous inserted in "things" making what is alluded to as a shrewd globe. Comparative distinguished work has been as of now done by numerous individuals around the globe. In paper [11]the Internet of Things alludes as astutely associated machineries and frameworks of assembled information from implanted sensors and actuators and other physical articles. Now-a-days, mobile systems convey availability to a wide range of machineries, which can empower the advancement of new administrations and applications.

The Author in [12] explained the notion of sensor systems which has been implemented practically by the meeting of innovation of micro electro-mechanical frameworks and remote correspondences. The sensor systems applications and detection work are investigated, and as indicated by that the audit factors impacts the outline of sensor range. At that point, the calculations and conventions created for each layer and the correspondence design for sensor systems is delineated.

The Authors in [13] built up an Electronic Information Desk System. Here they are utilizing **short message services** based approach. The framework is intended to work freely without the need of any human administrator and when a representative needs any data, they should send a short message services to this framework which will react with the data required by client. Numerous specialized groups are energetically seeking research points that can add to the internet of things.

The motivation behind research is to comprehend the utility of the Internet of Things in transportation framework in Singapore. Singapore, which is exceptionally progressed yet at the same time, has scope of headway in their transportation system. They made a framework by utilizing the internet of things for the customer to comprehend and assess distinctive transport choices in an effective way. Optional research was conducted to anticipate entry timings of transports and the group inside each transport[14].

The Authors [15]presents a three layered system development of Internet of Things specialized technique for high-voltage transmission line which includes the remote self-sorted out sensor(**wireless sensor networks**), optical fiber composite overhead and ground wire.

Many specialized groups are energetically seeking research themes that can add to the internet of things today. More collaboration between the groups is required. To have an open floor to talk about research issues in IoT, a dream for how the IoT could change the globe in the near future. The advantage of IoTis that students or representatives effortlessly gets imperative notice or data by message whenever required in real time. Administrator can change the message display or notice from wherever he wants to.

The Disadvantages of IoT is that If anyone needs data they need to do message and for each new data they need to send message over and over to the framework.

### III. GENERALIZATION OF IoT APPLICATIONS

The Internet of Things empowers the articles in our regular working or living condition to impart and expound the data gathered from the surroundings. The uses of IoT innovations, which are either straightforwardly pertinent or nearer to our present living and natural surroundings.

Fig.2 depicts different dimensions of IoT in different domain like WSN, RFID, Internet, and Smart Semantic Execution etc. The IoT generalization of application is shown and depicted in the below diagram.

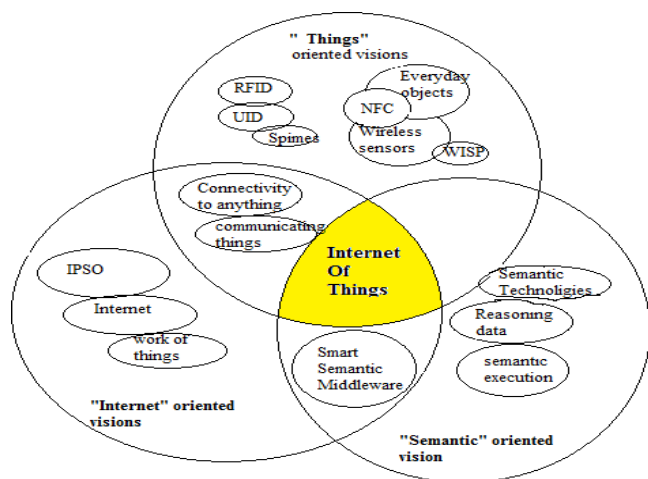


Fig.2 Generalization of IoT application

Domain in real time

1. It advances globalization of the Internet of Things with which we can differentiate between the virtual and genuine.
2. It Supports the current and advancement of the internet and system advancements. [8]

**IoT in Inventory Network Management:**

Ongoing innovation in the field of THE RFID and NFC is being utilized as a part of the internet of things We can disregard precisely and oversee data, work-in-advance, and in-travel stages with dependable due dates can be acquired.

**IoT in Security and Privacy:**

Confirmation and information trustworthiness is the principle worry of security issues. Because of absence of legitimate frameworks and servers to exchange message packets among hubs, verification is especially important in the Internet of Thing. A few arrangements about verification have been contemplated, yet they all have different issues and can't help explain the man-in-the-center violation issue. Information trustworthiness arrangements require that a foe can't alter information in exchange

without the framework of recognizing the change. In customary data zone, the issue of information trustworthiness has been generally contemplated. At the point when the RFID frameworks and sensor systems are incorporated in the Internet, here would be another issue. Sensor hubs or the RFID labels are spread in a wide region and thus can be unattended. Information can be modeled by foes while it is put away in the hub or when it navigates to the system. To ensure information against these kind of violation, memory is secured in most cases and arrangements have been contemplated for remote sensor organizations too [12].

To ensure information against the second sort of violation, messages packets might be secured by the Hash Message Authentication Code (HMAC) plot. Some cryptographic approaches are contemplated to help security issue. Such arrangements can't be totally connected to the Internet of Things, given that they will incorporate the Internet of Things parts such as the RFID labels and sensor hubs that are connected to interchanges, and have calculation abilities. New arrangements are required to have the capacity to adjust between securities issue level and asset shortage. The privilege to securities issue can be considered as an individual right or ownership. In the Internet of Things individuals' protection issue for the most part identifies with information gathering (which of their own information is being gathered, who is gathering such information, and when this is going on), the utilization of gathered (the gathered information ought to be put away just until the point that it is entirely required). In the RFID frameworks, there are two issues concerning information accumulation.

**IoT in Smart Traffic Service Outline**

Real time activity administrations incorporate administrations to counteract unlawful stopping and encourage helpful activities [15], native support, arranged illicit stopping avoidance administrations, and brilliant safe crosswalk administrations. Savvy

stopping refers to the development of a stage that empowers ongoing checking of accessible space and stopping in zones that require stopping and help of reservation/installment through Web and versatile methods. The subject of interest in illicit stopping and counteractive action benefit is a change of the unlawful stopping and crackdown arrangement of the activity specialist by permitting natives (counting casualties of unlawful stopping) to advantageously report such infringement through their cell phones and other mediums. Besides, the keen safe crosswalk administration can add to the aversion of passerby mis-chances and auxiliary auto collisions by distinguishing people on foot in kids security zones, and alarming walkers and moving toward vehicles through electronic show sheets[16].

**IoT in Health care**

- All Detection Assistance for old age or crippled individuals living autonomously.
- Medical cooling machines: Monitoring and controlling of conditions inside coolers putting away meds, antibodies, and other components [17]
- Specific caring of sportsman: Vital signs observing in superior focuses and fields for them.
- Surveillance system for patients: Monitoring of states of patients inside healing facilities and in old individuals' home.

**IoT in Corporate**

Systematic review has been done about application of IoT in Corporate Sectors.

Following tabular report has been prepared, mentioned below:

S. N	Company name	Classification	Offers	Managing
	Kinsa Company (Health Technology Company) Country : USA	IoT Company Categories : Child Care, Fitness, Health Care, mHealth	IoT Thermometer	The IoT Thermometer will track your sickness [18].
	Particle Company(OptiRTC, Inc.) Country: USA	IoT Hardware Company	Platform for connecting IoT Devices.	It provides some platform that will connect the IoT Devices to securely connect to the web [19].
	June Company (June Life Inc) Country:USA	IoT Company Categories : Cooking, E-Commerce, Electronics	Smart oven for your home.	By this intelligent oven will let you know what is there in the oven by help of camera and even will offer you a suggestion on how to make it [20].
	Deako Company(Deako Smart Lighting) Country: USA	IoT Company Categories : (Electronics, Internet of Things, Lighting, Sma	Smart Light Switches.	Its provides a smart lightening by using the smart switches which its connected with the Bluetooth so it will be more easier for the homeowners to upgrade to the

		rt Building).		smart lightening [21].
Skybell Company (SkyBell Technologies, Inc) Country: USA	IoT Company Categories : (Hardware, Internet of Things, Security, Software)	Smart Video Doorbell		By using this technology that allows you to hear, speak and see whether you are home or away [22].
Roost Company(VerticalResponse) Country: USA	IoT Device Company Categories : Email Marketing, Social Media Marketing	Smart Smoke Alarm		Its gives alarm when its time to change the smoke alarm battery [23].
Jasper Company (Jasper Industries Pvt,Ltd) Country: USA	IoT Company Categories : Cloud Computing, Internet of Things, Mobile, SaaS	Cloud Based IoT SaaS Platform		Sub organization of Cisco, Its provide a platform that help all the Companies to launch their product, services of IoT and then manage, distribute and monetize it [24].
Samsara Company(Samsara Networks Inc.) Country: USA	IoT Company Categories : Electronics, Sensor, Software	IoT data Platform		Provides assistance with energy monitoring, asset utilization, and vehicle tracking [25].
Hologram Company Country: India	IoT Company	Cellular Connectivity Platform		That enables IoT device connectivity [26].

#### IV. CONCLUSION

We are infiltrating into a future period of processing innovation. The Internet of things is a kind of "all inclusive globe wide neural system" in the cloud which affiliates distinctive features. Internet of Things is a shrewdly associated machineries and frameworks which include savvy machines cooperating and speaking with different machines, conditions, articles, foundations and other type of communication devices. The Radio Frequency cataloging and sensor standardized innovations address this additional crisis. This paper discusses the positive and negative impacts of Internet of things in developing smart devices and their applications in peoples' life and industry role in it. In this paper, we

focus especially on an urban IoT system that, while up 'til now is a critical and general characterization and is depicted by their specific application territory. This paper truly gives a comprehensive investigation of general and extended application from companies like Jaspara and hologram, Samsara of IoT right from dealing light switches to GPS and also cloud based IoT platform. The impact of IoT environment in companies is for managing smart devices and getting better application from smart devices.

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