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A Smart Digital Health Care Record with Prediction of Health Condition

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ABSTRACT
Humans are known to be the most intelligent species on the earth and are inherently more health conscious. Since Centuries mankind has discovered various healthcare systems. To automate the process and predict diseases accurately machine learning methods are attending popularity in research community. We are implementing machine learning methodologies to identify the best-predicted values related to the patients in their respected health condition and also need to analyze the previous health records. The accuracy in prediction is achieved bymaintaining a repository or the warehouse wherein the digital data related to the patients and their treatment is maintained.

Keywords : Healthcare, Health Card, QR Code, Prediction, Methodology, Algorithms.

I. INTRODUCTION

keep In this paper,we are proposing the health care system that stores the overall health information of the patient in a Digital card. This card will consist of all the medication details, reports etc. of the patient.The implementation of the project has done using Machine learning in python.

Machine Learning

Machine learning is the main background of this prediction process and the data we acquired from the medical application. The information we gathered can be used for the machine learning models for better prediction of what is going to happen for the patient in future and what are the main constrains the patients have to follow if there are any problems withtheir health condition.[9][10]

II. LITERATURE SURVEY

The table given below shows various existing system or models used so for in the context of fruit classifications.

Table i: Literature Survey Table

Sr. No.	Paper Name	Advantages	Limitations
1.	A Smart Card Based Healthcare System	-Access accurate health data quickly. -Encryption	-Internet supported system ,Network issue.

		Keys and Digital signature. -Software Resuability.	-Technical problem risks are high.
2.	A Case Study For Bangladesh for Healthcare System	-Secure and Authenticated and Data Communication. -Speed ,Portability -Efficent to use and easy interface.	-Less Cost-efficent. -User needs to put correct data or else it behaves abnormally.
3.	Electronic Healthcare Model Based on Smart Card For Saudi Medical Centers.	-Pharmacists provide the prescription only when insurance company allows. - Synchronization system synchronizes data every time patient uses card. by this data loss probability is less	- Redundancy of data is seen. -No unique ID is provided to the card. -Some security issues are observed.

III. TAXONOMY CHART

The following table shows comparison between the existing system and our system. And gives the overview about what are the features are included in it.

Table ii: Taxonomy Chart

parameter → / Systems ↓	QR CODE ON CARD	DOWNADOF HEALTH INFORMATION	TRACKING of DATA USING UNIQUE ID	HEALTH PREDICTION	EASE of ACCESS
A Smart Card Based Healthcare System	✗	✗	✗	✗	✓
A Case StudyFor Bangladesh for Healthcare System	✗	✗	✓	✗	✓
Electronic Healthcare Model Based on SmartCard For Saudi Medical Centers	✓	✗	✗	✓	✗
PROPOSED SYSTEM	✓	✓	✓	✓	✓

IV. SYSTEM ARCHITECTURE

In system architecture how system works the collecting, flow and distribution of the data we get know in diagrammatic format in Fig.1.

Also the how the prediction algorithm system works also determined in Fig.2.

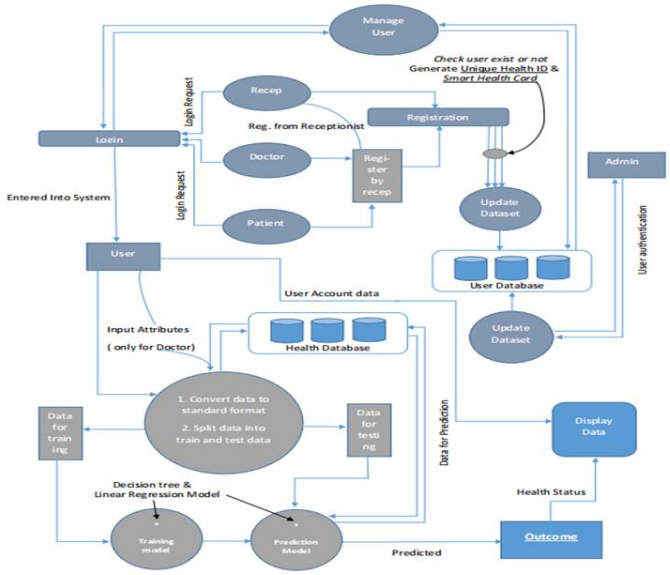

FIG-1: SYSTEM ARCHITECTURE

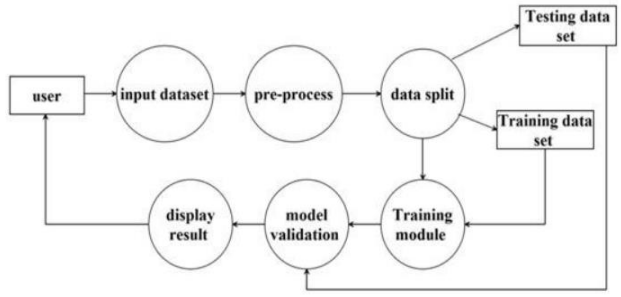

FIG-2: PREDICTION ALGO. SYSTEM

V. ALGORITHM

We have used two algorithms in our system like Decision Tree and Linear Regression. The decision tree is mainly used for the prediction of the disease and linear regression used for the health status accuracy in the numeric state. Implementation and explanation is determined below,

A. Decision Tree Algorithm

A Decision Tree has influenced a wide area of machine learning, covering both classification and regression. In decision analysis, a decision tree can be used to visually and explicitly represent decisions and decision making. As the name goes, it uses a tree-like model of decisions. Though a commonly used tool in data mining for deriving a strategy to reach a particular goal, it's also widely used in machine learning.[11]as shown in the fig-.example.

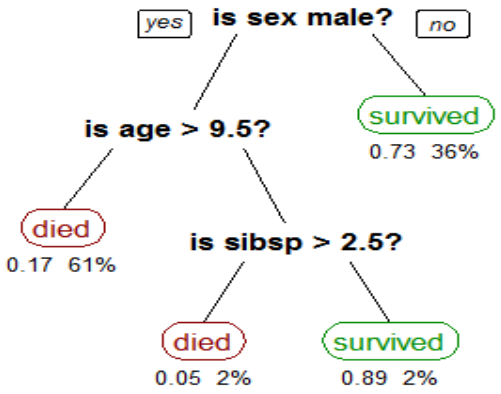

Fig-3: Decision Tree Algorithm

Steps:

1.Import all the basic libraries required for the data,like

-import pandas as pd

- import numpy as np

2.Now we will import the csv files which contains the data of patients undergoing treatment to diagnose whether they have particular disease or not. The dataset is small so we will not discretize the numeric values present in the data. It contains the symptoms of the disease.

Let us read the data.

- df = pd.read_csv('disease_name.csv')

3.The dataset is normal in nature and further preprocessing of the attributes is not required. So, we will directly jump into splitting the data for training and testing.

-from sklearn.model_selection import train_test_split

- X = df.drop('disease_outcome',axis=1)

- y = df['disease_outcome']

- X_train, X_test, y_train, y_test = train_test_split (X,y, test_size=0.30)

Here, we have split the data into 70% and 30% for training and testing. You can define your own ratio for splitting and see if it makes any difference in accuracy.

4.Now we will import the Decision Tree Classifier for building the model. For that scikit learn is used in Python.

- from sklearn.tree import DecisionTreeClassifier
- dtree = DecisionTreeClassifier()
- dtree.fit(X_train,y_train)

5. Now that we have fitted the training data to a Decision Tree Classifier, it is time to predict the output of the test data.

- y_pred = classifier.predict([disease_name])

There are also two steps next to it in the algorithm like confusion matrix and model building and data visualization, but in our model there no need for that.

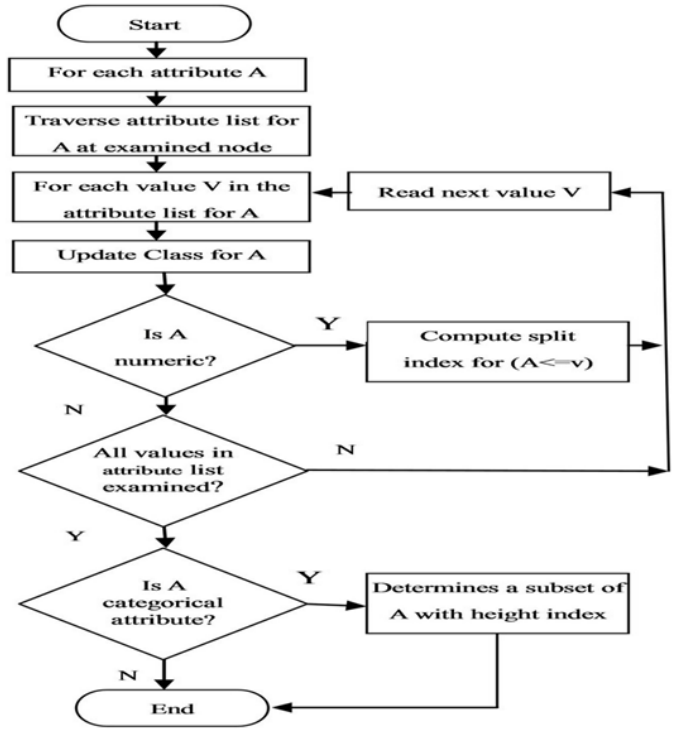

Fig-4: Flowchart for Decision Tree

B. Linear Regression Algorithm

Linear regression is the simplest and most extensively used statistical technique for predictive modelling analysis. It is a way to explain the relationship between a dependent variable (target) and one or more explanatory variables(predictors) using a straight line.

Linear regression performs the task to predict a dependent variable value (y) based on a given independent variable (x).

Steps:

1.Import the libraries that are necessary for the algorithm.

- import numpy as np
- import pandas as pd

2. Import the dataset. Here we in the dataset we have taken the data items(symptoms) from the disease datasets.

- dataset = pd.read_csv('health_status_data.csv')

3.Seperate X and y variables form the dataset.

- X = df_getdummy.drop('sum',axis=1)
- y = df_getdummy[sum]

4.Split the dataset into the Training set and Test set.

- from sklearn.model_selection import train_test_split
- X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.25, random_state = 0)

5.Feature scaling.

- from sklearn.preprocessing import StandardScaler
- sc = StandardScaler()
- X_train = sc.fit_transform(X_train)
- X_test = sc.transform(X_test)

6.Fit Logistic Regression to the training set.

- from sklearn.linear_model import LogisticRegression

-classifier = LogisticRegression(random_state = 0)

- classifier.fit(X_train, y_train)

7. predict the Test set results and accuracy of the result.

- y_pred = classifier.predict(X_test)

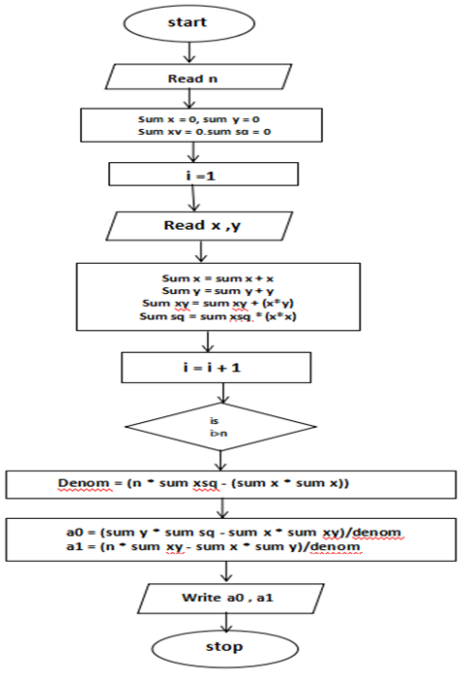

Fig-5: Flowchart for Linear regression

VI. RESULT

We are going to see pages of the system(project) and also the disease prediction and health status of patientsalso the 3health card page.

Fig-6: Login page of our syste

Fig-7: Patient portal dashboard

Fig-8: Receptionist portal dashboard

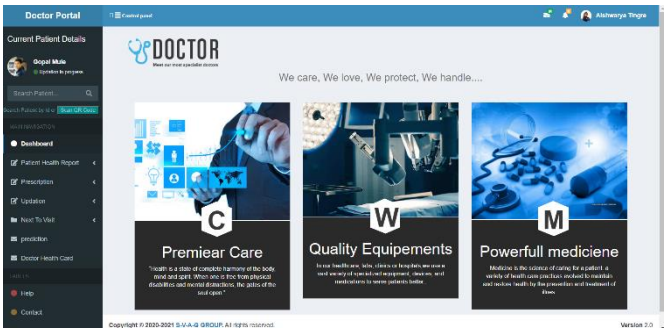

Fig-9: Doctor portal dashboard

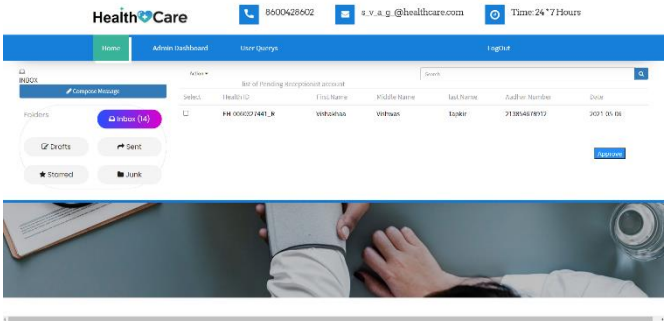

Fig-10: Admin Receptionist Approve portal dashboard

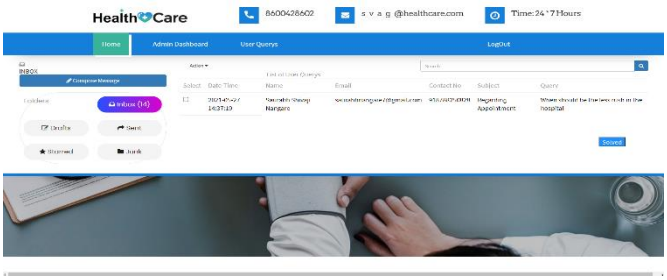

Fig-11: Admin User Query portal dashboard

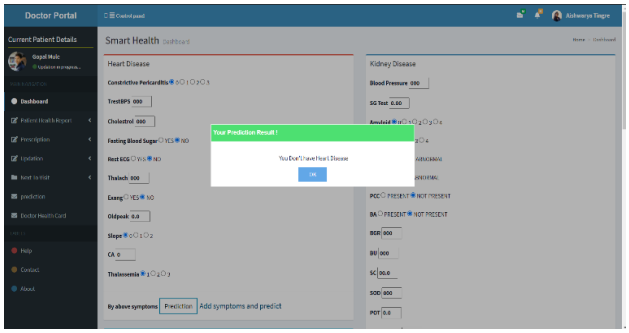

Fig-12: prediction ofdisease(1)

The above fig.12 shows the recommendation box layout in green which shows that patient doesn't have the disease.

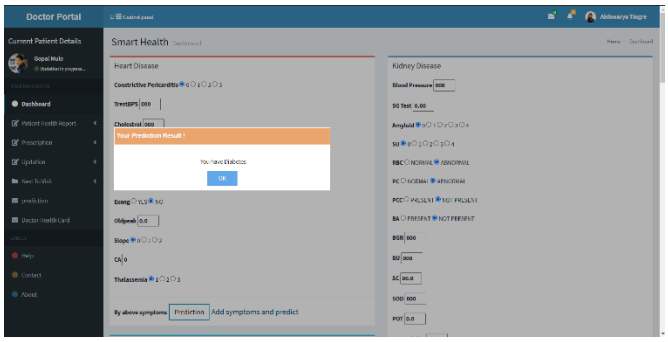

Fig-13: prediction of disease(2)

The above fig.13 shows the recommendation box layout in red which shows that patient have the disease.

Fig-14: Health status in numeric manner

The above fig.14 shows the health status of the patient we have calculated by the linear regression algorithm in numeric format.

Fig-15: Virtual E-Health Card.

The above fig.15is the health card of our users like patient, receptionist and doctor.

VII. ADVANTAGES

1. Accurate results of the diseases and the health status.
2. Easy to use interface of the system.
3. The health card is easy to carry anywhere and is citizencentric.
4. The data losing percentage by our system is less.

VIII. LIMITATIONS

1. Sometimes if user does not fill the proper data, it does not give accurate prediction.
2. User needs to have internet connection for accessing the system.

IX. FUTURE WORK

1. To gives more interactive interface for our system.
2. Using health dataset predict the future health condition of the patient in data visualization format.
3. To give more accurate results in health status.

X. CONCLUSION

The main purpose of this paper is to determine work on medical database with the help of digital card to store information and analyse.This research paper focuses on storing the patients' health information in the digital card,analysing and designing a system where patients real-time information can be processed and evaluated based on previous symptoms and on current symptoms for different diseases. By this paper we have concluded that Decision tree and Linear regression is the best algorithms with higher accuracy rate than others for predicting and analysis. This paper also outlines the technique to deploy this method to android and web platform to analyse and predict using real time data of users by collaborating with doctors and various medical organization.[5]

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XII.REFERENCES

[1]. M.A.NisharaBe.anu, B.Gomathy, "Disease Predicting System Using Data Mining Techniques", International Journal of Technical Research and Applications e-ISSN: 2320-8163,www.ijtra.com Volume 1, Issue 5 (NovDec 2017), PP. 41-45.

[2]. M.A.NisharaBanu, B.Gomathy, "Disease Predicting System Using Data Mining Techniques", International Journal of Technical Research and Applications e-ISSN: 2320-8163,www.ijtra.com Volume 1, Issue 5 (NovDec 2017), PP. 41-45.

[3]. "Inpatient clinical information system", Kathrin M. Cresswell, 2017, Science Direct.

[4]. https://www.researchgate.net/publication/332188767

[5]. A. Danny, S. Li, P. Houle, M. Wilcox, R. Phillips, P. Mohseni, S. Zeiger, H. Bergsten, M. Ferris, J. Diamond, M. Bogovich, M. Fleury, K. Vedati, A. Halberstadt and A. Patzer, Professional Java Server Programming: with Servlets, Java Server Pages (JSP), XML, Enterprise Java Beans (EJB), JNDI, CORBA, Jini and Java spaces (Wrox Press Inc., USA,1999).

[6]. D Kumar, R Singh, A Kumar, N Sharma An adaptive method of PCA for minimization of classification error using Naïve Bayes classifier Procedia Computer Science, 2015. Elsevier, pp.9-15.

[7]. Kumar, A., & SAIRAM, T. (2018). Machine Learning Approach for User Accounts Identification with Unwanted Information and data. International Journal of Machine Learning and Networked Collaborative Engineering, 2(03), 119-127.

[8]. Rawat K., Kumar A., Gautam A.K. (2014) Lower Bound on Naïve Bayes Classifier Accuracy in Case of Noisy Data. In: Babu B. et al. (eds) Proceedings of the Second International Conference on Soft Computing for Problem Solving (SocProS 2012), December 28-30, 2012. Advances in Intelligent Systems and Computing, vol 236. Springer, New Delhi DOI: https://10.1007/978-81-322-1602-5_68.

[9]. https://towardsdatascience.com/decision-trees-in-machine-learning-641b9c4e8052 https://towardsdatascience.com/linear-regression-in-machine-learning-641b9c4e8052

[10]. I. J. Goodfellow, D.Warde-Farley, M. Mirza, A. Courville, and Y. Bengio. Maxout networks. In Proceedings of the 30th International Conference on Machine Learning, pages 1319-1327. ACM, 2013.

[11]. G. Hinton and R. Salakhutdinov. Reducing the dimensionality of data with neural networks. Science, 313(5786):504-507.