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Patient Sickness Prediction System using Machine Learning

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Abstract: *In this paper, we have introduced the techniques and applications of machine learning in the healthcare system. We know that day by day large amount of data is generating in healthcare industry and other industries as well. Such large amount of data cannot be processed by humans manually in a short time to make diagnosis of diseases and treatments. To reduce this manual work, we have explored data management techniques and machine learning algorithms in healthcare applications to develop accurate decisions. It also gives the detailed description of medical data which improves various aspects of healthcare applications. It is the latest powerful technology that will reduce the manual work of professionals. In this paper, we will be using the Naïve Bayes machine learning algorithm to train our machine to predict the different types of diseases. It uses existing medical information in various databases to rework it into new results and researches. It will extract the new patterns from large datasets to make prediction and knowledge associated with these patterns. Particularly, the important task is to get data by means of automatic or semi-automatic.*

Keywords: Naïve Bayes, machine learning

I. INTRODUCTION

Machine learning is programming computers to optimize a performance using ML example data or past data. Machine learning is the study of computer systems that learn from data and experience. Machine learning algorithm has two tracks: Training, Testing. Prediction of a disease by using patient's symptoms and history machine learningtechnology is striving from past decades. Machine Learning technology gives an immeasurable platform in the medical field so that healthcare issues can be resolved efficiently.

We are applying machine learning to maintained complete hospital data Machine learning technology which allows building models to get quickly analyze data and deliver results faster, with the use of machine learning technology doctors can make a good decision for patient diagnoses and treatment options, which leads to improvement of patient healthcare services. Healthcare isthe most prime example of how machine learning is used in the medical field.

To improve the accuracy from massive data, the existing work will be done on unstructured and textual data. For the prediction of diseases, the existing will be done on Decision Tree, Naive Bayes and Random forest algorithm. The order ofreference in the running text should match with the list ofreferences at the end of the paper.

II. OBJECTIVE

There is a need to study and make a system which will make it easy for an end-user to predict the permanent diseases without visiting a physician or doctor for a diagnosis. To detect the Various Diseases through the examining Symptoms of patient's using various methods of Machine Learning Models. To Manage Text data and Structured data is no Proper method. The Recommended system will examine both structure and unstructured data. The Predictions Accuracy will Improve using Machine Learning.

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III. LITERATURE SURVEY

The prediction of diseases has been challenging task for the system. The goal of this paper is to develop machine learning algorithms for prediction of diseases. We carry out a medical observation for some time for prediction purpose. The machine learning consists of analysis of large amount of data available in healthcare field and obtains the useful information. The information can be converted to knowledge using different algorithms. Divya Tomar and Sonali Agarwal have presented a concise presentation of machine learning techniques in healthcare area. This contains additional features, applications, difficulties and future scope of machine learning techniques.

[1] Priyanka Pawar, Megha Walunj and Pallavi chitte presented a procedure to anticipate elements in view of client input side effects. It predicts possible illness by data collections and and gives proposed specialists and medical arrangements.

[2] Divya Jain presents a review of the implementation of machine learning algorithm on datasets

[3] In this paper, we set out to identify efficient algorithm for results

IV. PROPOSED SYSTEM

This system is used to predict disease according to symptoms. This system uses decision tree classifier for evaluating the model. This system is used by end-users. The system will predict disease based on symptoms. This system uses Machine Learning Technology. For predicting diseases, the decision tree classifier algorithm is used.

We have named this system as 'AI THERAPIST'. This system is for those people who are always fretting about their health, for this reason, we provide some features which acknowledge them and enhance their mood too. So, there is a feature for the awareness of health 'Disease Predictor', which recognize disease according to symptoms. The various parameters include in the prediction process Include integration ,forecasting ,path analysis and prediction analysis .there are three modules in the system Patient module, Doctor module and Admin module.

V. CONCEPTUAL ARCHITECTURE

Machine learning disease prediction forecasts the user's existence of the disease on the basis of different symptoms, and the information provided to them by the user such as headache, back pain, runny nose and much more about the symptoms. Machine learning consists of a variety of datasets to equate the user's symptoms and simulate the configuration of the device disease detection, the data sets shall then be converted into smaller sets and then sorted according to classification algorithms and subsequently transformed into machine learning systems from which the data is being processed, using all the user inputs indicated above, and entering the disease prediction model. The patient then integrates and checks on the prediction model of the system after entering the details and the data processed as a whole and forecasts the disease.

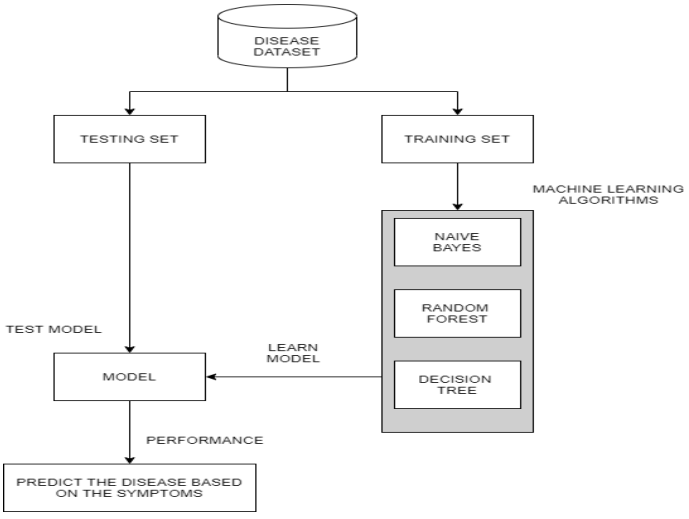

Fig. Conceptual Architecture of the System

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1. The train-test split procedure is used to estimate the performance of machine learning algorithms. Our dataset consists of symptoms and their corresponding diseases.
2. The dataset is split into training set and testing set using sklearn library. Once the data is preprocessed and split into training set different classification algorithms are tested over the data.
3. Algorithms such as Naive Bayes, Random Forest, Decision Tree gave us the most accurate results.

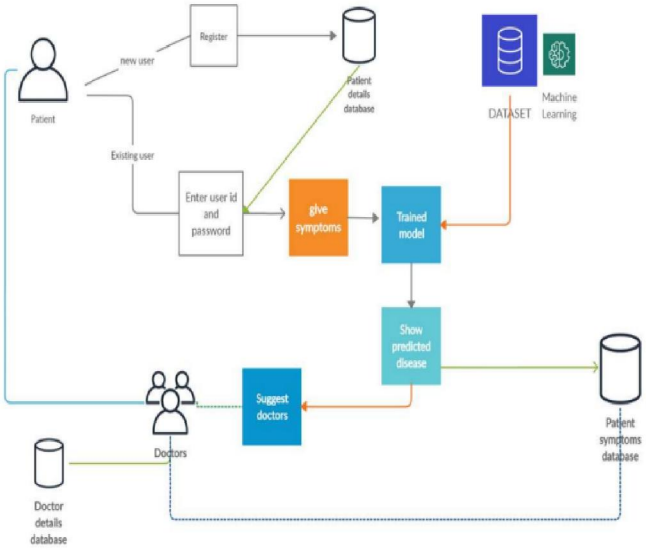
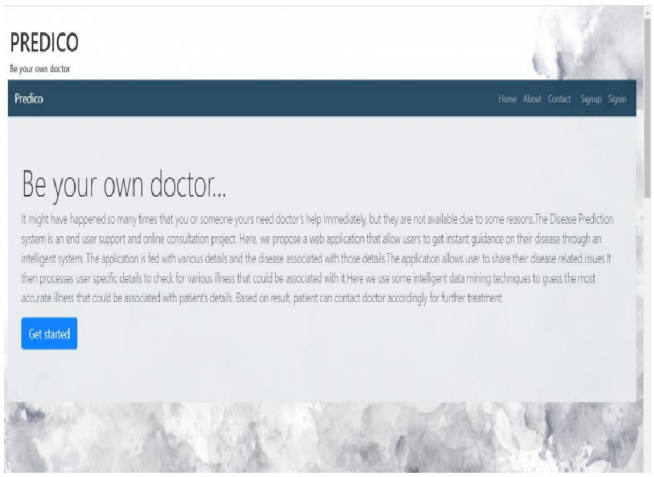


Fig. Block Diagram of the System

1. The disease prediction method has three users: a doctor, patient, and an administrator.
2. The system authenticates each users.
3. The system has a role-based access system.
4. The machine allows the patient to enter the symptoms, and the system then predicts an illness based on those symptoms.
5. 5.For diseases that are predicted, the system recommends the corresponding doctors.
6. 6.The system allows online consultation for patients.
7. 7.The system allows patients to consult with doctors from the comfort of their own homes.

VI. HOMEPAGE OF SYSTEM



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6.1 Login Module

6.2 Disease Prediction Page

Fig.2 Input(Add symptoms) page

6.3 Consult A Doctor

VII. ALGORITHM USED

7.1 Naïve Bayes Algorithm

The proposed framework utilizes "Naïve Bayes" algorithm for the development of the framework. Naïve Bayes algorithm is a simple technique which is used for developing the models that are used to assign class labels to problem instances. The class labels are drawn from the problem set. This algorithm is a family of algorithm which is based on a general principle, not a particular algorithm. According to this principle, the value of each function of all Naïve Bayes classifiers is independent of the value of other features.

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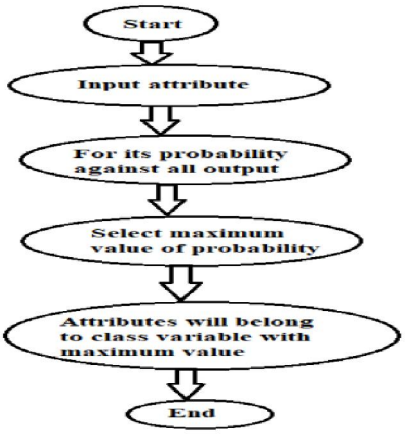

Fig. Naive Bayes Algorithm

Naïve Bayes Algorithm steps Following advances are actualized in Bayes calculation: Bayes Theorem: P(c|x)=P(x|c) P(c) / P(x) where, P(c|x)= Posterior probability P(c) = Prior probability P(x|c)= Probability of predictor P(x)= Predictor's prior probability Different kind of medical data was taken in program was prepared with the data indexes to such an extent that the probabilities of the considerable number of classes with each condition were determined.

7.2 Decision Tree:

A decision tree is a flowchart structure in which each internal node represents a test on a particular attribute, each branch represents the test's outcome and each leaf node represents a class name. The grouping laws are shown by the pathways from the root to the leaf. The interconnected diagram is used as an empirical, visual, and decision-making instrument in tree, where the visible values are measured. A decision tree begins with a choice that must be made. To display the tree on the left side of a large sheet of paper, draw a small rectangle. Draw lines in the right-hand direction for each possible solution, then write the solution along the graph. If the decision's outcome isn't clear, draw a wide circle. If the outcome is an alternative decision, you would need to draw a new rectangle. Squares signify choices, while circles represent an unknown outcome. Draw lines denoting alternatives that could be selected starting from the new decision squares from the diagram.

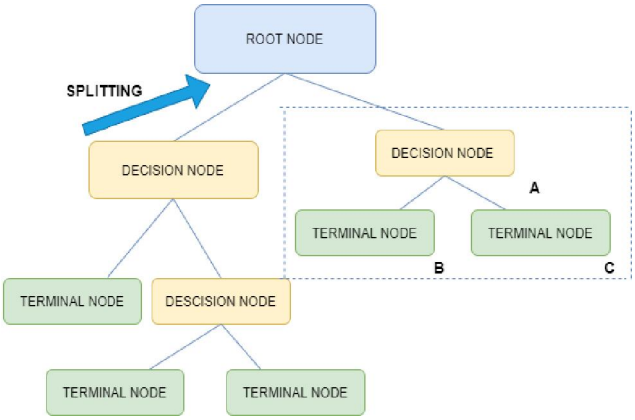

Fig . Decision Tree

7.3 Random Forest

Random forest is a cart-based bootstrapping algorithm. It constructed several trees with various initial variables, taking into account a sample of 100 observations and five randomly selected initial variables to construct a cart model. The procedure will be repeated ten times, and they will make a final prediction for each observation. Each forecast affects the final prediction. This last one will easily be the average of all the predictions. Essentially, the Weka tool is used to complete this operation. Weka is a machine learning platform that includes a wide number of data science algorithms that can be used for classification, estimation, and missing value detection. It's a group learning tool for organisation

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and other activities that works by assembling a collection of decision trees during training and generating a class that's the mode of the classes or the mean predictor of the single trees.

$$MSE = \frac{1}{N} \sum_{i=1}^{N} (fi - yi)^2$$

Where N is the number of data points,
fi is the value returned by the model and
yi is the actual value for data point i.

Fig . Random Forest

VIII. CONCLUSION

To conclude, our system is helpful to those people who are always worrying about their health and they need to know what happens with their body. Ou r main motto to develop this system is to know them for their health. Especially, people who are suffering from mental illness like depression, anxiety. They can come out of these problems and can live their daily lives easily.

Besides, our system provides better accuracy of disease prediction according to symptoms of the user, and also it will provide motivational thoughts and images. In the end, we can say that our system has no boundary of the user because everyone can use this system.

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