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Disease Prediction: Study of Disease Prediction, Applications and Future Challenges

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Abstract

Disease Prediction is a Machine Learning based system which primarily works according to the symptoms given by a user. Disease detection and monitoring is the process of screening, diagnosing, and then tracking the progression of an illness or condition and effectiveness of a treatment. It is frequently used for chronic illnesses such as cancer but can be utilized for any disease that requires consistent care

It can also access a patient's health based on knowledge collected from large data sets.

Keywords: Disease prediction, machine learning symptoms

Introduction

Medicine and healthcare are some of the most crucial parts of the human life. There is a tremendous amount of change in the world we are living in now and the world that existed a few weeks back. Machine Learning can improve the accuracy of predictions.

Virtual doctors are specialized doctors who choose to practice online via video and phone appointments, rather than in-person appointments but this is not possible in the case of emergency. Machines are always considered better than humans as, without any human error, they can perform tasks more efficiently and with a consistent level of accuracy.

What is Disease Prediction?

A disease predictor can be called a virtual doctor, which can predict the disease of any patient without any human error.

Some models of virtual doctors do exist, but they do not comprise the required level of accuracy as all the parameters required are not being considered. The primary goal was to develop numerous models to define which one of them provides the most accurate predictions.

While ML projects vary in scale and complexity, their general structure is the same.

Several models were initiated by using various machine learning (ML) algorithms that collected raw data and then bifurcated it according to gender, age group, and symptoms. The data-set was then processed in several ML models.

How it Works?

Disease prediction using machine learning is an important application Machine learning in healthcare. Machine learning models can analyze and interpret medical data to predict the likelihood of an individual developing a particular disease. Here are the key steps involved in disease prediction using machine learning:

i). **Data Collection:** Collect relevant medical data from various sources, such as electronic health records, medical imaging, wearable devices, and patient surveys. Ensure data privacy and security to comply with healthcare regulations.

ii). **Data Preprocessing:** Clean and preprocess the data to handle missing values, outliers, and noise. Normalize or scale data to make it suitable for machine learning algorithms.

iii). **Feature Selection:** Identify the most relevant features (variables) for disease prediction. Feature may also involve creating new features from existing data.

iv). **Model Selection:** Choose an appropriate machine learning algorithm or model for disease prediction. The choice of model depends on the nature of the data and the specific disease being predicted.

v). **Model Evaluation:** Evaluate the model's performance using various metrics such as accuracy, precision, recall, F1 score.

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vi). **Deployment:** Once the model is evaluated, deploy it in a healthcare setting, such as a hospital or a mobile app. Ensure that the deployment adheres to regulatory and ethical standards.

vii). **Continuous Monitoring:** Continuously monitor the model's performance and update it as more data becomes available data is dynamic, and models may need periodic retraining to remain accurate.

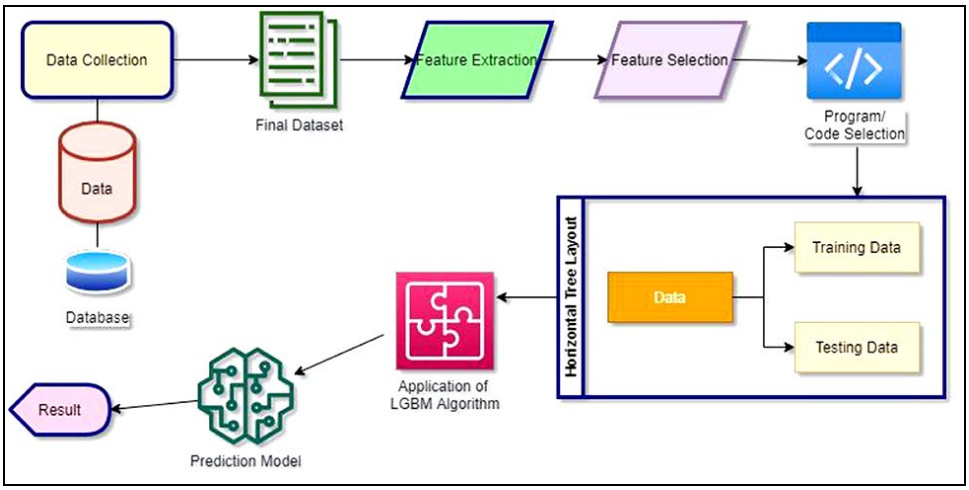

Fig 1: Disease Prediction Model

Proposed System

Proposed system for disease prediction. The doctor may not be available always when needed. But, in the modern time scenario, according to necessity one can always use this prediction system anytime. The symptoms of an individual along with the age and gender can be given to the ML model to further process. After preliminary processing of the data, the ML model uses the current input, trains and tests the algorithm resulting in the predicted disease.

Functioning of the ML models. The dataset was split into input consisting of age, gender, and symptoms and the output as the diseases based on the input factors. We randomly split the available data into train and test sets. These sets were then encoded and further trained using different algorithms. After which the algorithms test the training set and predict the values, resulting in the accuracy of different ML algorithms.

Applications

Disease Prediction using Machine Learning is the system that is used to predict the diseases from the symptoms which are given by the patients or any user. The system processes the symptoms provided by the user as input and gives the output as the probability of the disease.

Future Scope of Study

Machine learning models can predict disease risk based on patient data. This serves as an early warning system, allowing healthcare providers to intervene promptly and prevent potentially negative outcomes. The System is to provide prediction for the the general and more commonly occurring disease that when unchecked can turn into fatal diseases. Machine learning in healthcare examples include diagnostic support systems, risk assessment tools, and patient monitoring applications.

Conclusion

Different machine learning models were used to examine the prediction of disease for available input dataset.

The aim of this paper is to predict disease based on symptoms. The project is set up in such a way that the device takes the user's symptoms as input and generates an output, which is disease prediction. A prediction accuracy probability of 95% is obtained on average. The Machine learning system was used to successfully incorporate Disease Predictor.

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