

# SMART PREDICTION OF HEALTH USING MACHINE LEARNING ALGORITHMS

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## ABSTRACT

*The main aim of this project is to discuss about the use of machine learning in the field of Medical Health care. The main aim is to provide a web application to predict the diseases in advance based on the various symptoms. This project allows users to get a accurate guidance on their health issue. Based on the symptoms, the "Smart Health Prediction Using Machine Learning" system predicts the disease of patients. Users can share their symptoms and issues with the system. It then examines the user's symptoms to look for possible illnesses. Here we use some Machine learning techniques to guess the accurate illness that could be associated with patient's symptoms.*

**Keyword:** - Machine Learning, Prediction Models, Health care.

## 1. INTRODUCTION

Machine learning is a generative method for creating predictive modelling from specific instances. It is a subfield of artificial intelligence that promotes the idea that machines can learn from data, recognize patterns, and make decisions with minimal human intervention. Machine learning is a programming algorithm that optimizes results with high accuracy by using sample data or previously collected data. The machine learning algorithm has two stages: preparation and research.

Machines are thought to be superior to humans in the absence of human error because they can complete tasks faster while maintaining a consistent level of precision. Machine learning is used to keep track of all signs and diseases. Machine learning technology enables predictive models to analyze data more quickly and produce meaningful results.

## 2. LITERATURE SURVEY

A well-functioning healthcare system is critical to the economy and humanity's well-being. There has been a significant amount of change between the world we live in today as well as the world we lived in a few decades ago. Everything has become more disorderly and unappealing. In this situation, doctors and nurses are doing everything they can to save people's lives, even if it involves putting one's own lives in danger. Virtual doctors are board-certified doctors who prefer to practice online through video and phone consultations rather than in-person consultations, though this is not always possible in an emergency. Machines are thought to be superior to humans in the absence of human error because they can complete tasks faster while maintaining a consistent level of precision. A disease predictor, also known as a virtual doctor, can accurately predict a patient's illness without requiring human intervention. In extreme cases, such as COVID-19 and EBOLA, a disease predictor can save a person's life by recognizing their health without requiring physical contact. There are virtual doctors on the market now, but they are incapable of providing the level of precision required.

### 3. METHODOLOGY

The Prognosis of This Illness To forecast sickness, we'll use hospital data and Machine Learning methods built with Python and the Tkinter interface. We used a variety of approaches, algorithms, and technologies to create a system that can forecast a patient's status based on their symptoms for this project. The symptoms are compared to previously saved information in the system. By combining these datasets with the patient's symptoms, we can accurately predict the percentage of disease in a patient. Before the user selects the features and enters the symptoms, the dataset and symptoms are uploaded to the system's prediction model, where the data is pre-processed for future references. After that, the data is classified using a variety of algorithms and approaches, including Decision Tree, KNN, and Naive Bayes, to name a few. We used four machine learning algorithms to build a disease prediction based on symptoms: Decision Tree, Random Forest, KNN, and Naive Bayes. Using these techniques, we can obtain an accurate forecast for our model. The Illness's Prognosis The effort is currently in full swing. In its early stages, machine learning is being used to diagnose and prevent disease. As we all know, humanity has become so preoccupied with economic advancement that it has lost sight of its own well-being. According to studies, 40% of people ignore minor symptoms, which may lead to more serious problems in the future. Tkinter, a Python library interface, is also used to build the project's interface. The user must first enter their name, followed by symptoms from a drop-down menu; alternatively, the user must enter all symptoms, and the system will return an exact result. This forecast was created using four machine learning approaches: Decision Tree, Random Forest, KNN, and Naive Bayes. When the user enters all of the symptoms and simply clicks the Random Forest button, the result is computed using that method; similarly, we've used four methods to provide a more comprehensive perspective of the data, and the user must be satisfied with the expected conclusion.

#### 3.1 Data and Sources of Data

The dataset came from a study at Colombia University. It consists of 150 diseases, each with an average of 8-10 symptoms. 70% of the dataset used for training was created with all combinational inputs in mind. The presence of symptoms for the corresponding disease was marked as 1 and the remainder as 0. It consists of five drop-down menus through which we have passed a list of symptoms. The user can choose any five symptoms and then click the predict button to see the disease predicted in the text-box.

#### 3.2 Algorithms

##### 3.2.1 Decision Tree

The Decision Tree Algorithm belongs to the category of directed learning calculations. The goal of using a Decision Tree is to create a planning model that can be used to predict the class or value of the objective variable by taking in basic choice guidelines alluded from a set of qualities. In Decision Trees, we begin at the bottom of the tree to predict a class mark for a record. The benefits of the root trait are contrasted with the property of the record.

##### 3.2.2 Random Forest

Random woodland is a classifier that uses various choice trees on different subsets of a given dataset to improve the dataset's predictive exactness. It can be useful for dealing with decision-making issues. It helps with considering all of the potential outcomes for a problem, and it requires less information cleaning than other calculations.

##### 3.2.3 Naïve Bayes

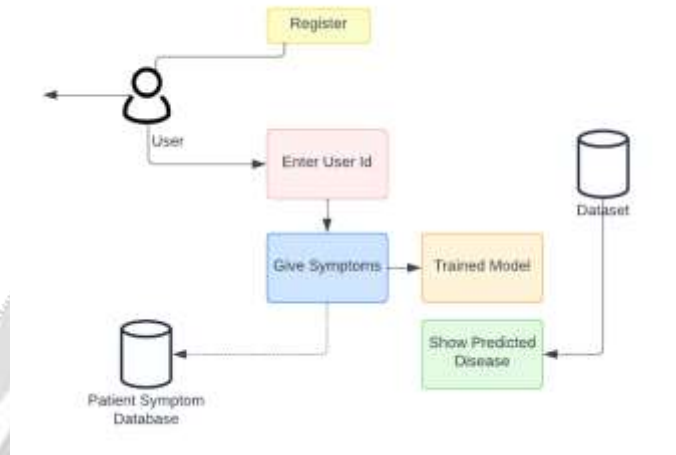
The Naive Bayes calculation is a managed learning calculation that is based on the Bayes Theorem and is used to solve arrangement issues. The Naive Bayes calculation is one of the simplest and best Classification calculations for building quick AI models that can make quick forecasts. When compared to other Algorithms, it performs well in multi-class forecasts. It is used in text arrangement, for example, spam sifting and sentiment analysis.

##### 3.2.4 K-Nearest Neighbor

The K-Nearest Neighbor approach is one of the most fundamental Machine Learning algorithms. It is based on the Supervised Learning method. Because K-NN considers the new case/data to be comparable to the previous cases, the new case is assigned to the category that is most similar to the previous categories. The K-NN method maintains

a record of all available data and classifies new data points based on how similar they are to existing data. The K-NN algorithm can quickly filter new data into the appropriate suite category as it arrives. Although this method is useful for both regression and classification, classification is the most common application.

**3.3 Architecture**



**Fig -1:** Architecture

**4. RESULTS AND DISCUSSION**

Algorithm	Accuracy
Decision Tree	94
Random Forest	94.5
Naïve Bayes	95
K-nearest neighbors	95

Table 4.1: Algorithm accuracy

Algorithms	Results
Decision Tree	Hepatitis E
Random Forest	Migraine
Naïve Bayes	Migraine
K-nearest neighbors	Drug Reaction

Table 4.2: Output

**5. CONCLUSIONS**

The proposed project was implemented in Anaconda for application development in Python. This work's tasks are broken down into modules. The proposed system is effective and has a user-friendly interface. A smart system for accurate disease prediction and medical facility referral is critical to effective treatment. Accurate results have been obtained by using Machine Learning techniques for disease prediction on many real-world datasets. The purpose of

illness prediction is to provide prediction for the many and commonly occurring illnesses that, if left unchecked and sometimes ignored, can lead to fatal illness and cause a slew of problems for the patient and their family members.

## 6. FUTURE WORK

Every one of us wishes for a good medical care system. A patient-login portal could be built on top of the current solution, resulting in a customized health tracking system that patients can use to track both their current health and their health history over time. Integrating information into a case's individualized profile and conducting in-depth investigation are thus beyond the scope of a croaker.

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## 8. FUTURE WORK

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