

# PERSONALIZED HEALTH PREDICTION USING MACHINE LEARNING

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## ABSTRACT

Advancement in technology has improved the way of identifying a disease. An increase in civilization has led to a decrease in physical activity among various age groups. Also, everyone is leading a hectic life which results in negligence towards healthy well-being. Such situations give rise to health problems, and if not treated on time, health may deteriorate. Sometimes, people require medical assistance immediately. Nevertheless, the medical process of analysing the ailment is time-consuming, and it may delay the medical treatment procedure of the patient. In this paper, we propose an idea to give online personalized health prediction with the help of a machine learning model. It predicts the health of a person by taking current health status. The model understands the vital signs and symptoms and predicts the ailment. Also, the health care system helps patients to find the right hospital to carry out the treatment procedure on time. With the help of this prediction system, a patient can know the disease he is suffering from before meeting a specialist, thus speeding up the medical procedure.

## KEYWORDS

Machine Learning, Gradient Boosting, Health prediction, medical analysis, Decision tree, Explore nearby hospitals, Emergency contacts.

## INTRODUCTION

Sometimes we need medical assistance immediately, but due to some reasons, they are unavailable. In our project, we design a system that is user favourable to get suggestions on health issues instantly through an online health care system. Our system uses a machine learning model which is based on the Gradient Boosting algorithm. It is one of the most powerful techniques for building a predictive model. It is one of the boosting algorithms. Gradient boosting classifier combines prediction from multiple decision trees to generate an outcome.

"Personalized Health Prediction System" is the automation of medicinal information to help and upgrade:

- (1) First-hand health advice
- (2) Clinical care
- (3) Medical analysis

It optimizes health information by storage, reliable recovery in due time. The system helps data recovery in the right way and avoids human errors. Imagine a specialist who needs to look at ten patient records; the person will handle them effortlessly. Anyway, if the amount of records increases with time, it is definite that the precision with which the specialist gives suggestions on the results will not be as high as the ones got when he had only ten records to be handled.

# LITERATURE SURVEY

Everybody needs medical help sooner or later. We accept the fact that specialists are medicinal experts and that their research includes all the perspectives. That can't be the situation all the time. They cannot possibly keep in mind all the knowledge they require for each condition. Sometimes they require massive measures of information expected for verifying treatment results for all the illness the patient may experience, they may also need time to analyse that data and incorporate it with the patient's medicinal profile. This type of research and measurable examination is not part of a doctor's work. They need an expert adviser who will engage in conversation with them, understand what they state, and give them suggestions on how to show signs of improvement and procure their wellbeing.

The drawback of a current framework would be that the patients need to visit the health consultant in person and still do not get appropriate treatment, as the specialists are not suitable to predict the accurate disease. A computer-based system can escape human error. It is unfair when there are colossal measures of information to be grouped. Also, the effectiveness of decisions and precision of choices will diminish when people are under pressure and immense work.

Consider a specialist who needs to look at ten patient records; the person will handle them effortlessly. Anyway, if the amount of records increases with time, it is definite that the precision with which the specialist gives suggestions on the results won't be as high as the ones got when he had only ten records to be handled.

## METHODOLOGY

### Features of the system:

For a better understanding of the proposed model, we have added diagrams that explain the control flow of the system.

Firstly, the patient logs in to the framework using a username and password. If a patient is a new client, the framework asks for personal details such as name, age, gender, mobile number, email address and also creates a password through which he can log in to the framework. After successful login, the patient can enter the signs and symptoms he is suffering. After the user has entered multiple signs and symptoms, the system will analyse the data and predict the probable disease. The framework provides a facility to search hospitals and also provides the contact details of the hospitals, thus making it easier for the user to connect with concerned medical support.

### Gradient Boosting

Gradient boosting is one of the most well-built techniques for building a predictive model. Boosting technique is a type of ensemble learning.

Ensemble learning is a machine learning term where multiple models, also known as weak learners, are trained to solve the same problems and combined them to get a better result. It combines several decision tree classifiers to produce a better predictive model than a single decision tree classifier. Thus, it increases the efficiency, accuracy and precision of the model.

Gradient Boosting classifier combines prediction from multiple decision trees to generate the final output. In every decision tree, the nodes take a different subset of features for selecting the best split. Each new tree considers the error or mistake made by the previous trees. So, every successive decision tree is created on the error of the earlier trees. In this way, the gradient boosting algorithm is created sequentially.

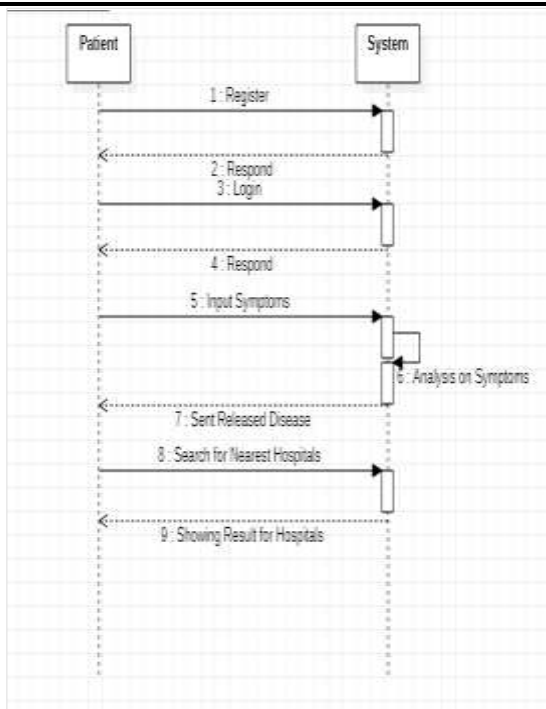


Fig 4.1. Sequence diagram for personalized health prediction using machine learning

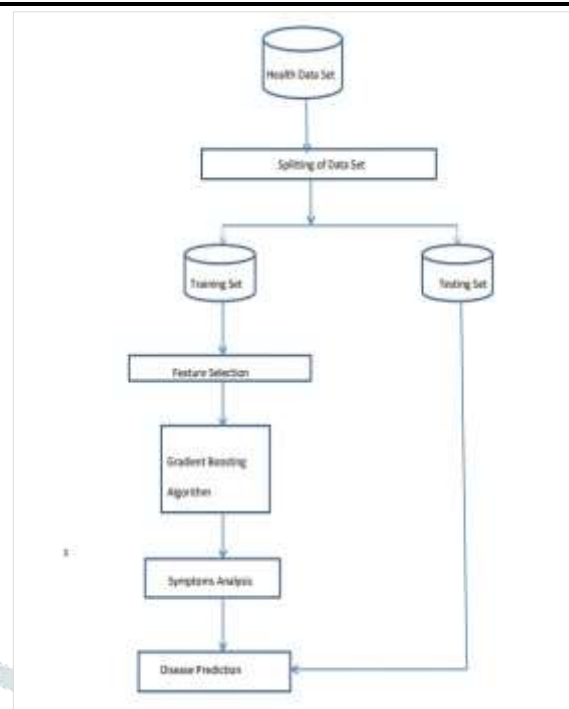


Fig 4.2. System architecture for personalized health prediction using machine learning

## RESULTS

The dataset is based on a collection of 11 diseases, namely Cardiovascular Disease, Covid-19, Dengue, Pneumonia, Diabetes, Jaundice, Malaria, Diarrhoea, Stroke, Chronic Obstructive Pulmonary Disease, Cholera.

Firstly, a new user will enter personal details and register themselves. After getting registered successfully, if the user wants to get an idea about his health, he can log in and get a probable prediction about his health. When the user enters symptoms related to any of mentioned diseases, the trained model will try to match the input values and values in the dataset and give the appropriate result. The accuracy of the model is approximately 72%. The user can also search for hospital nearby his locality by selecting a specific region. The system provides emergency contact numbers of various frontline workers.

## CONCLUSION

Machine Learning gives the power to the system to automatically learn and improve from experience. The existing system does not provide proper data management, immediate assistance and has a lengthy analysis procedure. Sometimes, circumstance happens when you need the specialist's attention immediately however they are not available due to some reason. We have developed a health prediction framework which is an online framework, and different patients from any area can access it. Our framework involves fundamental parts, for example, quick login, registration, enter signs and symptoms in the system, prediction of probable disease, and search nearby hospitals. The application takes different signs and symptoms from the patient, examines the entered symptoms, and gives the most probable prediction.

Thus, our predictive model is user-friendly, speeds up the medical procedure, and increases the effectiveness of decisions and precision of choices made.

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