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ijircce@gmail.com



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# Heart Disease Prediction Using Machine Learning

**Prof. Archana Burujwale, Suyog Natake, Rohan Desale, Abhishek Nighojkar, Hrushikesh Walgude**

Department Computer Engineering, Genba Sopanrao Moze College of Engineering, Pune, India

**ABSTRACT:** In today's modern world cardiovascular disease is the most lethal one. This disease attacks a person so instantly that it hardly gets any time to get treated with. So diagnosing patients correctly on a timely basis is the most challenging task for the medical fraternity. A wrong diagnosis by the hospital leads to earning a bad name and losing reputation. At the same time, treatment of the said disease is quite high and not affordable by most of the patients, particularly in India. The purpose of this paper is to develop a cost-effective treatment using data mining technologies for facilitating a data base decision support system. Almost all the hospitals use some hospital management system to manage healthcare in patients. Unfortunately, most of the systems rarely use the huge clinical data where vital information is hidden. As these systems create a huge amount of data in varied forms but this data is seldom visited and remains untapped. So, in this direction, lots of efforts are required to make intelligent decisions. The diagnosis of this disease using different features or symptoms is a complex activity. In this paper, using varied data mining technologies, an attempt is made to assist in the diagnosis of the disease in question.

**KEYWORDS:** cardiovascular disease, data mining, intelligent decisions, symptoms

## I. INTRODUCTION

Today, many hospitals manage healthcare data using a healthcare information system; as the system contains a huge amount of data, used to extract hidden information for making intelligent medical diagnosis. The value of machine learning in healthcare is its ability to process huge datasets beyond the scope of human capability, and then reliably convert analysis of that data into clinical insights that aid physicians in planning and providing care, ultimately leading to better outcomes, lower costs of care. The main objective of this research is to build an Intelligent Heart Disease Prediction System that gives diagnosis of heart disease using a historical heart database. To develop this system, medical terms such as sex, blood pressure, and cholesterol like 13 input attributes are used. To get more appropriate results, two more attributes, i.e. obesity and smoking, are used, as these attributes are considered as important attributes for heart disease. The data mining classification techniques viz. Neural Networks, Decision Trees, and Naive Bayes are used.

The healthcare industry collects huge amounts of healthcare data which, unfortunately, are not "mined" to discover hidden information for effective decision making. Discovery of hidden patterns and relationships often goes unexploited. Advanced data mining techniques can help remedy this situation. This research has developed a prototype Intelligent Heart Disease Prediction System (IHDPS) using data mining techniques, namely, Decision Trees, Naive Bayes, and Neural Network. Results show that each technique has its unique strength in realizing the objectives of the defined mining goals. IHDPS can answer complex "what if" queries which traditional decision support systems cannot. Using medical profiles such as age, sex, blood pressure, and blood sugar, it can predict the likelihood of patients getting a heart disease. It enables significant knowledge, e.g. patterns, relationships between medical factors related to heart disease, to be established. IHDPS is web-based, user-friendly, scalable, reliable, and expandable. It is implemented on the Java-Python platform by using the MLP Algorithm.

## II. LITERATURE SURVEY

Very few systems use the available clinical data for prediction purposes and even if they do, they are restricted by the large number of association rules that apply. Diagnosis of the condition solely depends upon the Doctors' intuition and patient's records. Detection is not possible at an earlier stage.

In the existing system, practical use of various collected data is time-consuming. There are only few decision support systems available in the medical industry whose functionalities are very limited. As mentioned earlier, medical decisions are made with the doctor's intuition and not from the rich data from the medical database. Wrong treatment due to misdiagnosis causes a serious threat in the medical field. In order to solve these issues, a data mining solution was introduced with the help of medical databases.

The leading cause for mortality and morbidity is cardiovascular disease

[1]. Ahmed M. Alaa[2] et.al proposed machine learning techniques for Cardiovascular disease risk prediction. But they achieved maximum accuracy of 77%. As the dataset is unbalanced, there is a need to apply sampling techniques. But they directly applied Machine learning models on the dataset. Stephen F. Weng[3] et.al studied application of machine learning algorithms to improve cardiovascular risk prediction. They shown that Machine-learning algorithms are successful in improving accuracy of cardiovascular risk prediction, but the required number of patient records must be more to achieve better results. Rine Nakanishi

[4] et.al evaluated ML methods for improving the prediction rate of coronary heart disease (CHD). They applied machine learning approaches on 6814 patient records and achieved good accuracy rate. Senthil kumar Mohan[6] proposed a machine learning model that finds significant features for improving the prediction rate of cardiovascular disease. They tried with various combinations of features and achieved an accuracy of 88.7% with hybrid MLP.

### III. PROPOSED SYSTEM

The Heart Disease Prediction application is an end user support and consultation project. Here, we propose a application that allows users to get instant guidance on their heart disease through an intelligent system. The application is fed with various details and the heart disease associated with those details. The application allows user to share their heart related issues. It then processes user specific details to check for various illness that could be associated with it. Here we use some intelligent data mining techniques to guess the most accurate illness that could be associated with patient's details. Based on result, the can contact doctor accordingly for further treatment. In general, the more trees in the forest the more robust the forest looks like. In the same way in the MLP classifier, the higher the number of trees in the forest gives the high accuracy results.

#### Module 1 User module:

In this module patient and doctor will register themselves. Once registration is done, patient can take appointment ,post query and chat with the doctor. Once doctor is register he can post comment and can chat with patient.

#### Module 2 Report module:

In this module Patient report will be generated in doc format.

#### Module 3 Clustering module:

- Randomly select “k” features from total “m” features.
- └ Where  $k \ll m$
- Among the “k” features, calculate the node “d” using the best split point.
- Split the node into daughter nodes using the best split.
- Repeat 1 to 3 steps until “l” number of nodes has been reached.
- Build forest by repeating steps 1 to 4 for “n” number times to create “n” number of trees.

### IV. ARCHITECTURE DIAGRAM

The overall objective of our work is to predict more accurately the presence of heart diseases. In this topic two more input attributes obesity and smoking are used to get more accurate results. Data mining's classification techniques were applied namely KNN. This technique will help us to achieve 97% accuracy as per algorithm.

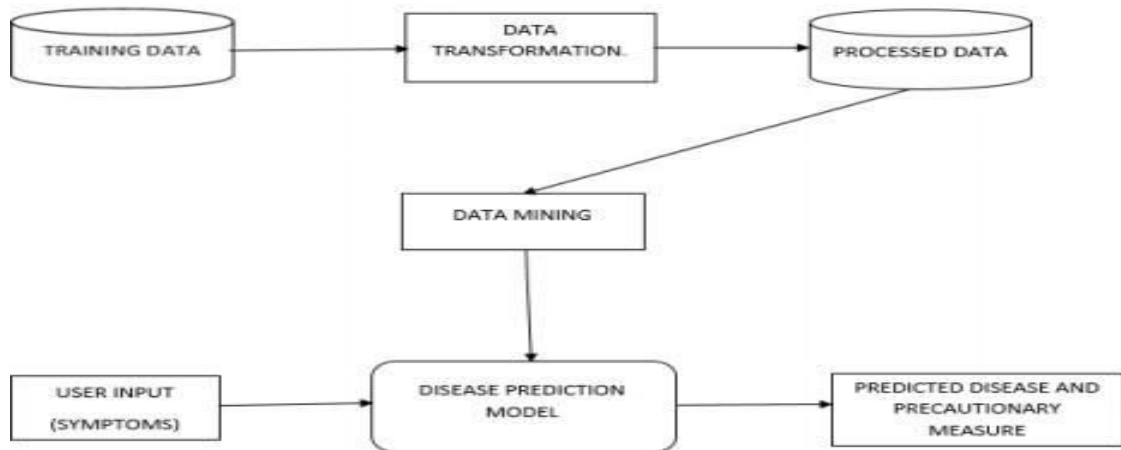


Fig 1. Architecture Diagram

## V. CONCLUSION

The overall objective of our work is to predict more accurately the presence of heart disease. In this topic two more input attributes obesity and smoking are used to get more accurate results. Data mining classification techniques were applied namely MLP and KNN algo. This technique will help us to achieve 97% accuracy as per algorithm

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