

Heart Disease Prediction System

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Abstract:- One of the potentially fatal grievous disease is heart disease that can lead to either death or a serious lifelong impairment. It is estimated by a recent survey that approximately 17.5million people die every year due to heart disease. It is predicted that the death rate may increase upto 75 million in the year 2030. Medical diagnosis is one of the most important and difficult task to be done as it plays an important role in diagnosing disease accurately and efficiently. In order to obtain accurate results an automated computer oriented decision support system must be achieved. For this purpose machine learning algorithm can be used. Presently in the field of medical science the chance of predicting heart attack is around 67%, so doctors are in need of definite decision support system.

Keywords:- Computer Oriented Decision Support System, Decision Support System, Ehrs, Supervised Learning Method, Statistical Method.

I. INTRODUCTION

Heart disease refers to issues and deformities in the structure or in the functioning of the heart or of the blood vessels supplying the heart, that damages its usual operations. It is a stern condition with elevated commonness, about 3-5% of the people who are being admitted to the hospital are associated with heart failure occurrences. Up to 2% of the total health expenses in several countries is being spent for treating the patients associated with heart diseases. The standard of services in medical field infers diagnosing patients correctly and administering treatments which are successful. Faulty infirmity conclusions may lead to unpleasant mishaps which are therefore intolerable. Establishing a probable illness administration structure needs inspection of huge volume of figures, advance prognosis of the illness, examining the gravity and advance forecast of untimely incidents. Large bulk of data in the area of medical science is being saved each day in various digital forms such as Electronic Health Records(EHRs) and registers. The quantity of information in the field of medicine is huge and stored in computers as well. These figures are not deployed

or brought into effective use. This data collected if scrutinized and studied could be utilized in predicting of diseases or preventing them [5].

II. RELATED WORK

Machine learning is a division of artificial intelligence that enables automated data processing systems to study explicitly from examples, data and experience. By allowing such systems to do particular exercises smartly, machine learning technique can perform complicated processes by studying from information, in place of going after pre-programmed rules [3]. The Naive Bayes Classifier is considerably easy to learn by assuming that features are independent in the given class. Even though independence is usually an indigent supposition in practice Naive Bayes often competes very well many sophisticated classifiers. This survey paper is committed for wide extent survey in the field of machine learning approach in heart disease and their relative comparison on various parameters. Decision Support in Prediction of heart disease is developed using Naive Bayesian Classifier method. The system pulls out concealed perception from a historical heart disease database. This is the most efficacious model to predict patients with heart disease. This model can reply to complicated queries, each with its own ability with respect to simplicity of the model interpretation, access to elaborated information and exactness. The aim of this exercise is to provide instructions to a machine learning model to precisely predict whether a sample patient is being diagnosed with heart disease or not, through the training it on the dataset.

A. Implementation of Bayes Classification

According to Bayes Theorem,

$$P(h/D) = \frac{P(D|h)P(h)}{P(D)}$$

Here $P(h/D)$ is the posterior probability of hypothesis h considering training examples D , $P(h)$ is the prior probability which gives prior knowledge about hypothesis. $P(D|h)$ is the likelihood probability for training examples D

that holds hypothesis h [6]. The Naive Bayes Classifier is used for inputs having high spatiality. Irrespective of its simpleness, Naive Bayes can recurrently outdo other advanced classification methods. This system recognizes the features of patients having heart disease and also shows the probability of input attribute for the predicted condition. Supervised learning method and statistical method that is used for classification is represented by Bayesian classification and also allows to record unpredictability of the system by discovering the possibilities of outcomes. Thus it helps to resolve diagnostic and prognostic issues. For classifying the text documents Naive Byes classifier is the most successful one.

➤ Why Naive Bayes Algorithm is Preferred?

- Naive Bayes’ rule is the base for both machine learning and data mining techniques which helps to create models with anticipating capabilities. It also gives the latest ways to explore and understand the data. Naive Bayes can be implemented in the instances where the data is high.
- Attributes are independent of each other.
- More efficient output is required compared to other methods [2].

B. Dataset

In order to approach a problem first we must be familiarized with the data. The dataset used here is heart disease dataset. With the available attributes of dataset we need to predict heart disease. Attributes considered is shown in below dataset structure [4].

age	sex	cp	trestbps	chol	fbs	restecg
63	1	1	145	233	1	2
67	1	4	160	286	0	2
..

thalach	exang	oldpeak	slope	ca	thal	num
150	0	2.3	3	0	6	0
108	1	1.5	2	6	3	2
..

Fig 1:- Dataset Structure

C. Comparison

To compare classification performance among Naive Bayes classifier, Support Vector Machine, Decision Tree and K-Nearest Neighbour machine learning algorithms, we

consider same set of data on which these classifiers are applied and compared on the basis of classification rate. From experiment it is conclude that Naive Bayes Classifier as the best compared to other algorithms.

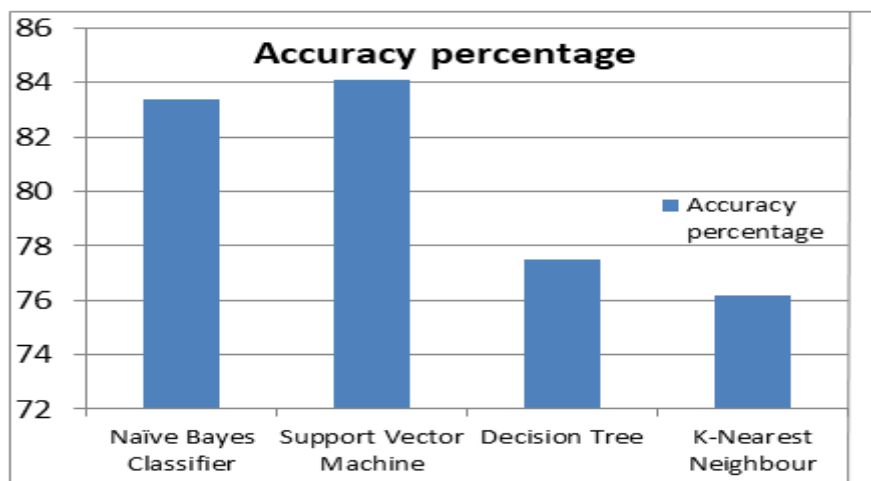


Fig 2:- Comparison of Algorithms based on Accuracy

III. IPROPOSED SYSTEM

The prime objective of proposed system is to predict heart disease within short time for early diagnosis. Based on attributes mentioned before heart disease is predicted

Coronary heart disease, Cardiomyopathy, Cardiovascular disease, Ischaemic heart disease, Heart failure, Hypertensive heart disease, Inflammatory heart disease and Valvular heart disease.

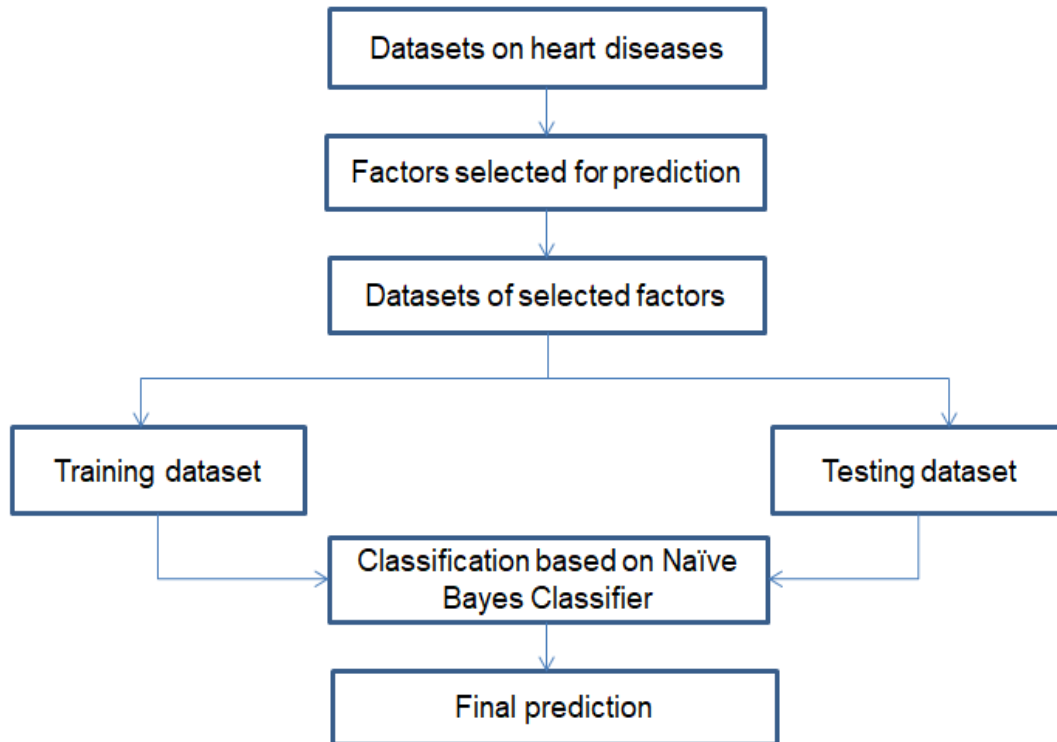


Fig 3:- System Architecture

IV. CONCLUSION

Heart disease must be predicted early because it is one of the prime causes of death in the world. An automated heart disease prediction system can be used as a device by doctors to determine heart disease. This survey paper presents a systematic heart disease prediction model which uses machine learning algorithm with comparatively more accuracy.

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