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# PREDICTING HEART DISEASES USING MACHINE LEARNING TECHNIQUES: A REVIEW

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***Abstract*— Heart diseases are emerging as fatal health issues globally throughout the world. It is causing million of deaths each year of numerous people all around the world.For the purpose of saving many lives, it is crucial to detect this cardiac disease in its early stages. Correct and accurate prediction of heart disease can prevent from heart attack. The goal of this paper is to contrast various machine learning models for early heart disease prediction and their performance to detect and predict heart related problem.**

***Keywords*— Heart disease, Machine learning, KNN, Decision tree**

## I. INTRODUCTION

Machine learning strategy is widely used and the foremost important method for analyzing in different areas. Through machine learning, we can predict various heart diseases. It is used for early prediction and detection of heart related problem in advance. This can help both the patient and the doctor to start the treatment at the earliest. A number of studies have been conducted through various machine learning techniques and methods.

Machine learning is the subset of an artificial intelligence. It is required to increase the accuracy and precision of predictive models. Using a machine learning algorithm, a machine can decide itself, make prediction and learn from prior experiences. Supervised and unsupervised machine learning are the two categories. Models are trained via supervised learning using labeled data. Various techniques in supervised learning are classification, regression, KNN, decision tree, support vector machine. On the other hand unsupervised learning finds the hidden pattern from the unlabelled data. Various unsupervised learning techniques are clustering and association rules.

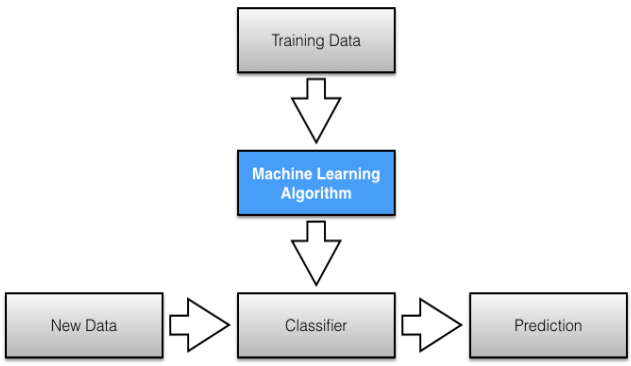


Figure1: Steps in Machine learning model

## II. IMPORTANCE OF STUDY

People's lives have been significantly impacted by today's lifestyle or "fast forward living.". Regardless of their age, a large number of people worldwide experience heart-related illnesses or heart attacks as a result of stress, poor lifestyle choices, and some genetic factors. The majority of heart-related issues are dealt with in hospitals using a traditional approach, but because most of them are dormant, doctors can only diagnose them after they manifest. Additionally, hospitals are unable to handle the massive amounts of patient or person data that are generated every day, making it challenging and complex for doctors to predict heart disease. In this paper, machine learning approaches are examined for their high performance and ability to handle vast amounts of data. This paper's major goal is to review the effectiveness of various machine learning methods so that we can decrease mortality.

## III. LITERATURE REVIEW

In this paper we have reviewed some of other related work. Jayshril S. Sonawane et al had done the study to various multilayer sensory neural networks are used to forecast heart disease. As per the study the neural network which was taken by him to accepts the 13 clinical attributes as a input and these attributes is trained by algorithm like back-propagation to predict whether there is any diseases is present or absent in heart in the patient where accuracy is highest of 98% it is comparative better accuracy to other systems. This accuracy shows that it is better and efficient than other systems [1].

In another study by Ketut Enricoet et al the study was carried out to predict heart diseases for heart using KNN algorithm

with simplifying parameters used. As per his study KNN is used with sampling weighting parameters are used for better accuracy.In his paper accuracy of KNN algorithm is 81.85% [2].

M.Akhil Jabbar et al had done the study to predict cardiovascular early identification of heart disease by disease prediction utilizing Lazy Associative categorization. In his study, he used a decision support system to estimate a patient's high risk score, which would help for doctor to take accurate decisions and take precautionary steps to reduce the risk and provide better treatment for patient and increase their life time[3].

As per the data mining techniques Mr. Jaymin Patel et.al had done the investigation into applying To forecast cardiac illness, machine learning methods such as Random Forest, Decision Tree, and Logistic Regression are used. The accuracy achieved 56.76% [4].

In another study by Mr. Rifki Wijaya et al the study tells about e development of model that predict early estimating heart disease using an accurate machine learning artificial neural network was 81.85%. He collected 13 variables that, when combined with various heart rate data sets, can predict cardiac disease in a patient over the course of a year. Various instruments, like smart watches, smart chairs, and smart phones, are used to collect data etc [5].

In the study carried out by Mr. Carlos Ordonez et al the study was carried out to predict system using associative rules. His investigation led us to the conclusion that a technique for minimizing the number of rules on a training set and validating them on a data set had been developed. It creates a set of rules with great accuracy by reducing the number of association rules and the validation test set signify in line with the search criteria 70% [6].

In the study of Ms. Jyoti Soni et al. In the study, doctors used a tool similar to a graphical user interface to collect patient records, and from those records they were able to determine if the patient had a heart-related illness or not (WAC). The prediction is performed on the basis of collecting patient's data or data repository. As per the analysis WAC provide the improved accuracy81.51% as compared with other Classifiers [7].

In another study of Mr. Idticeme Sedjelmaci this study was carried out to predict accurate detection of premature ventricular contractions with accuracy of 80% [8].

## IV. CONCLUSION

On the basis of above review we can conclude that by using different machine learning algorithms, we can significally improves the accuracy of heart diseases risk prediction. Different ML algorithm can be used to predict the early stage of disease and additionally, it may be stated that machine learning algorithms have enormous potential for forecasting heart related diseases. Various algorithms like KNN, regression, decision tree produced excellent results on publically available datasets.

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