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A Survey of Predicting Heart Disease

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Abstract— **This paper describes various methods of data mining, big data and machine learning models for predicting the heart disease. Data mining and machine learning plays an important role in building an important model for medical system to predict heart disease or cardiovascular disease. Medical experts can help the patients by detecting the cardiovascular disease before occurring. Now-a-days heart disease is one of the most significant causes of fatality. The prediction of heart disease is a critical challenge in the clinical area. But time to time, several techniques are discovered to predict the heart disease in data mining. In this survey paper, many techniques were described for predicting the heart disease.**

Keywords— **Data Mining, Prediction, Cardiovascular Disease, Machine Learning.**

I. INTRODUCTION

Heart disease defines a range of conditions that affect human heart. The name "heart disease" is often used commonly with the name "cardiovascular disease". Heart disease is a term that allow to a large number of medical circumstances related to heart. These medical circumstances characterize the irregular health condition that directly affects the heart and all its parts. Heart disease generally allows to some conditions that involve narrowed or blocked blood vessels which can lead to a heart attack, stroke or chest pain. Other heart conditions, such as those that affect your heart's muscle, valves or rhythm, also are considered forms of heart disease .There are various types of cardiovascular disease. The most similar types are heart failure (HF) and Coronary Artery Disease (CAD). The main root cause of heart failure (HF) is occur due to the blockade or narrowing down of coronary arteries. Coronary arteries also supply blood to the heart. Data mining is a non trivial extraction of implicit, previously unknown potential useful information called as knowledge from the medical data using complex algorithms. Big data (BD) can be referred as huge record of information set. Big Data and Data Mining are two various things. The task carried out by these two methods are similar focusing on collecting the huge amount of data, handling them and preparing report on the data by taking out the information which is knowledgeable. Data Mining is basically an activity of observing the patterns in the data which is relevant and with particular information by using Big Data. The useful patterns with hidden patterns, unknown correlations are analytically handled for making

knowledgeable decision through this Big Data analytics process.

II. LITERATURE REVIEW

Several studies have been used in the literature to predict the heart disease.

Bo Jin, Chao Che et al. (2017) proposed a "Predicting the Risk of Heart Failure With EHR Sequential Data Modeling" model designed by applying neural network. This paper used the electronic health record (EHR) data from real-world datasets related to congestive heart disease to perform the experiment and predict the heart disease before itself. We tend to used one-hot encryption and word vectors to model the diagnosing events and foretold coronary failure events victimization the essential principles of an extended memory network model. By analyzing the results, we tend to reveal the importance of respecting the sequential nature of clinical records [1].

Aakash Chauhan et al. (2018) presented "Heart Disease Prediction using Evolutionary Rule Learning". This study eliminates the manual task that additionally helps in extracting the information (data) directly from the electronic records. To generate strong association rules, we have applied frequent pattern growth association mining on patient's dataset. This will facilitate (help) in decreasing the amount of services and shown that overwhelming majority of the rules helps within the best prediction of coronary sickness [2].

Ashir Javeed, Shijie Zhou et al. (2017) designed "An Intelligent Learning System based on Random Search Algorithm and Optimized Random Forest Model for

Improved Heart Disease Detection". This paper uses random search algorithm (RSA) for factor selection and random forest model for diagnosing the cardiovascular disease. This model is principally optimized for using grid search algorithmic program.

Two forms of experiments are used for cardiovascular disease prediction. In the first form, only random forest model is developed and within the second experiment the proposed Random Search Algorithm based random forest model is developed. This methodology is efficient and less complex than conventional random forest model. Comparing to conventional random forest it produces 3.3% higher accuracy. The proposed learning system can help the physicians to improve the quality of heart failure detection[3].

"Effective Heart Disease Prediction Using Hybrid Machine Learning Techniques" proposed by Senthilkumar Mohan, Chandrasegar Thirumalai et al. (2019) was efficient technique using hybrid machine learning methodology. The hybrid approach is combination of random forest and linear method. The dataset and subsets of attributes were collected for prediction. The subset of some attributes were chosen from the pre-processed knowledge(data) set of cardiovascular disease .After prep-processing , the hybrid techniques were applied and disgnosis the cardiovascular disease [4].

K.Prasanna Lakshmi, Dr. C.R.K.Reddy (2015) designed "Fast Rule-Based Heart Disease Prediction using Associative Classification Mining". In the proposed Stream Associative Classification Heart Disease Prediction (SACHDP), we used associative classification mining over landmark window of data streams.This paper contains two phases: one is generating rules from associative classification mining and next one is pruning the rules using chi-square testing and arranging the rules in an order to form a classifier. Using these phase to predict the heart disease easily [5].

M.Satish, et al. (2015) used different Data Mining techniques like Rule based, Decision Tree, Navie Bayes, and Artifical Neural Network. An efficient approach called pruning-classification association rule (PCAR) was used to generate association rules from cardiovascular disease warehouse for prediction of Heart Disease. Heart attack data warehouse was used for pre-processing for mining. All the above discussed data mining technique were described [6].

Lokanath Sarangi, Mihir Narayan Mohanty, Srikanta Pattnaik (2015) "An Intelligent Decision Support System for Cardiac Disease Detection", designed a cost efficient model by using genetic algorithm optimizer technique. The weights were optimized and fed as an input to the given network. The accuracy achieved was 90% by using the hybrid technique of GA and neural networks [7].

I.S.Jenzi, P.Priyanka, Dr.P.Alli (2013) designed "A Reliable Classifier Model Using Data Mining Approach for Heart Disease Prediction". This paper proposed a reliable classifier methodology using Association rules and classification techniques like decision tree, Naive Bayes and Neural Network. The relationship between key patterns was established and predicts the cardiovascular disease. All of the above were described [8].

G.Purusothama and P.Krishnakumari, "A Survey of Data Mining techniques on risk prediction: Heart disease". This paper compared several classification techniques to form of risk prediction model for cardiovascular disease. The two types of models compared were 1. Single model to test data 2. Combined model to test data (hybrid model). These two methods were used for data analysis. This paper considered only the classification methodology in case of single model and combined model. It was concluded that by applying hybrid data mining techniques promising results were obtained in predicting the cardiovascular disease [9].

"Intelligent and Effective Heart Attack Prediction System Using Data Mining and Artifical Neural Network" designed by Shantakumar B.Patil and Y.S.Kumarasamy (2009).This paper contains a smart & efficient methodology proposed using Neural Network. Some of the significant frequent patterns are generated "by 'K-means clustering' and 'MAFIA' algorithm"[10].

III. CONCLUSION

In this paper, a survey gives the idea of different methodology available and the various data mining techniques has been studied and literature review of predicting the heart disease or cardiovascular disease using many different approaches. The main aim of this paper diagnosing the cardiovascular disease or the heart disease and using different methods and many approaches to get final result

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