INTRODUCTION

In day to day life many factors that affect a human heart. Many problems are occurring at a rapid pace and new heart diseases are rapidly being identified. In today’s world of stress Heart, being an essential organ in a human body which pumps blood through the body for the blood circulation is essential and its health is to be conserved for a healthy living. The health of a human heart is based on the experiences in a person’s life and is completely dependent on professional and personal behaviors of a person. There may also be several genetic factors through which a type of heart disease is passed down from generations. According to the World Health Organization, every year more than 12 million deaths are occurring worldwide due to the various types of heart diseases which is also known by the term cardiovascular disease. The term Heart disease includes many diseases that are diverse and specifically affect the heart and the arteries of a human being. Even young aged people around their 20-30 years of lifespan are getting affected by heart diseases. The increase in the possibility of heart disease among young may be due to the bad eating habits, lack of sleep, restless nature, depression and numerous other factors such as obesity, poor diet, family history, high blood pressure, high blood cholesterol, idle behavior, family history, smoking and hypertension.

The diagnosis of the heart diseases is a very important and is itself the most complicated task in the medical field. All the mentioned factors are taken into consideration when analyzing and understanding the patients by the doctor through manual check-ups at regular intervals of time.

The symptoms of heart disease greatly depend upon which of the discomfort felt by an individual. Some symptoms are not usually identified by the common people. However, common symptoms include chest pain, breathlessness, and heart palpitations. The chest pain common to many types of heart disease is known as angina, or angina pectoris, and occurs when a part of the heart does not receive enough oxygen. Angina may be triggered by stressful events or physical exertion and normally lasts under 10 minutes. Heart attacks can also occur as a result of different types of heart disease. The signs of a heart attack are like angina except that they can occur during rest and tend to be more severe. The symptoms of a heart attack can sometimes resemble indigestion. Heartburn and a stomach ache can occur, as well as a heavy feeling in the chest. Other symptoms of a heart attack include pain that travels through the body, for example from the chest to the arms, neck, back, abdomen, or jaw, lightheadedness and dizzy sensations, profuse sweating, nausea and vomiting.

Heart failure is also an outcome of heart disease, and breathlessness can occur when the heart becomes too weak to circulate blood. Some heart conditions occur with no symptoms at all, especially in older adults and individuals with diabetes. The term 'congenital heart disease' covers a range of conditions, but the general symptoms include sweating, high levels of fatigue, fast heartbeat and breathing, breathlessness, chest pain. However, these symptoms might not develop until a person is older than 13 years. In these types of cases, the diagnosis becomes an intricate task requiring great experience and high skill. A risk of a heart attack or the possibility of the heart disease if identified early, can help the patients take precautions and take regulatory measures. Recently, the healthcare industry has been generating huge amounts of data about patients and their disease diagnosis reports are being especially taken for the prediction of heart attacks worldwide. When the data about heart disease is huge, the machine learning techniques can be implemented for the analysis.

Data Mining is a task of extracting the vital decision-making information from a collective of past records for future analysis or prediction. The information may be hidden and is not identifiable without the use of data mining. The classification is one data mining technique through which the future outcome or predictions can be made based on the historical data that is available. The medical data mining made a possible solution to integrate the classification techniques and provide computerized training on the dataset that further leads to exploring the hidden patterns in the medical data sets which is used for the prediction of the patient’s future state. Thus, by using medical data mining it is possible to provide insights on a patient’s history and is able to provide clinical support through the analysis. For clinical analysis of the patients, these patterns are very much essential. In simple English, the medical data mining uses classification algorithms that is a vital part for identifying the possibility of heart attack before the occurrence. The classification algorithms can be trained and tested to make the predictions that determine the person’s nature of being affected by heart disease[1].

In this research work, the supervised machine learning concept is utilized for making the predictions. A comparative analysis of the three data mining classification algorithms namely Random Forest, Decision Tree and Naïve Bayes are used to make predictions. The analysis is done at several levels of cross validation and several percentage of percentage split evaluation methods respectively. The Stat Log dataset from UCI machine learning repository is utilized for making heart disease predictions in this research work. The predictions are made using the classification model that is built from the classification algorithms when the heart disease dataset is used for training. This final model can be used for prediction of any types of heart diseases.[2][3]

Health-care is a field of the most needed service and an economically 2ndlargest industry in 21stcentury. While we talk about the affordability and quality assurance in health-care industry, several statistical analyses are carried on making health solutions more precise and flawless in this current era of increasing health problems and chronic diseases. Advancements on data driven intelligent technologies is disease diagnosis and detection, treatment and research are remarkable. Medical image analysis, symptom-based disease prediction is the part where the most sought-after brains are working. In this paper we aim to present our proposed model on the prediction on diagnosis of cardio vascular disease with ECG analysis and symptom-based detection. The model aims to be researched and advance in further to become robust and end to end reliable research tool. We will discuss about the classical methods and algorithms implemented on CVD prediction, gradual advancements, draw comparison of performance among the existing systems and propose an enhanced multi-module system performing better in terms of accuracy and feasibility. Implementation, training and testing of the modules have been done on datasets obtained from UCI and Physio net data repositories. Data format have been modified in case of the ECG report data for betterment of action by the convolutional neural network used in our research and in the risk prediction module we have chosen attributes for training and implementing the multi-layered neural network developed by us. The further research and advancement possibilities are also mentioned in the paper.