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Heart Disease Prediction Using ECG Signal Classification

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Abstract
The major life threatening disease is the arrhythmia. The cardiac arrests are mainly due to arrhythmia. Most of the people can be suffered from the heart disease. The main reason is the high pressure and the food habit. In this paper they propose the heart disease detection using the image processing technique and the classification of the arrhythmia. The arrhythmia can be classified using the Discrete Wavelet transform method DWT it can be applied to the each heart beat which helps in getting dynamic and morphological features. The periodic value can be obtained by the ECG signal. The RR interval can helpful in improving arrhythmia classification. The various set of bands has been subjected for the noise reduction and the extraction of the morphological data. The neural network algorithm is applied for the classification of the arrhythmia. This method is been compared with the MIT-BIH arrhythmia database in which has 12456 beats and the ventricular arrhythmia database in which as 23456 beats. This method has the high accuracy.

Keywords: *Heart Rate, Data Mining, Throughput, Electro Cardio Gram.*

1. Introduction

In India nearly 60% of the death occurring due to the heart attack. This percentage includes both the young age people and the old age people. The main reason of is that the food habit. The food habit is get changed from the old period to the current period. In olden days the food is grown in a quality manner which has the sufficient numbers of nutrients. The nutrients content are differing from the product to product. They can consume more number of natural food products. So they can live a healthy life with long period of living range. At that period very less percentage are get affected by the heart disease. But today's food is not much quality like previous food. The peoples are taking fast foods, fatty foods it can affect the heart valves. The fat get blocked the heart valves, it can create stroke. The attack are three stages initial stage, middle stage and the final stage. The final stage is the severe stage in that stage it will lead. The first two stages are the mild stage. We want to be aware after the first attack. The second major reason of the heart attack is the pressure.

The pressure can affect the heart rate. In normal the heart rate pumps for 60 beats per minute it will vary up to 72 beats. When the heart beat may goes beyond and above the value the health is not good. By this prediction we want to take some treatment. So in this paper they propose the heart rate monitoring system. The use of the heart beat sensor. The sensor can monitor the heart beat value when the heart rate value increase or decreases they sends some message. By this system it can saves most of the people life. The food habit is get changed from the old

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period to the current period. In olden days the food is grown in a quality manner which has the sufficient numbers of nutrients. The data transfer can takes place through the protocols. The heart beat value measure the accurate value of the heart rate. When the old peoples are lonely in the home this system is more helpful to save their life. At that period very less percentage are get affected by the heart disease. But today's food is not much quality like previous food. The peoples are taking fast foods, fatty foods it can affect the heart valves. Data comparison can be takes place in the datasets. The data is get updated at period of time. The updated data is get stored. The value can be changed at every time.

2. Literature Survey

Rashmi Phalnikaret., al., proposed in before system the patient health data are manually noted in the record. The record contains all the patient data if the record is missed or the data get erased we can't able to recollect it. After the technology improvement they use the database to store the data of the each patient. The increase in the medical field and the health care there are enormous amount of data are accumulated these data are not able to collect manually. So they move to the database system. In which it can store vast number of data. During the data fetching or storing there is loss in the patient health data. To overcome these problems in this paper they propose the navies bayes and KNN algorithm. The heart disease prediction can be made using the database. The KNN and the navies bayes algorithm can make the more secured and avoid the missing of the data. They can undergo data cleaning and made the incomplete data to the complete data. This method can be further extended in risk determination in the heart disease prediction. They can use the convolution neural network CNN method to determine the risk in the heart disease prediction. The CNN algorithm can reaches the accuracy of about 87%. The data base can plays a vital role in the many fields. [1]

Kailas Devadkaret., al., proposed Nowadays the human life change can be totally changed when compared to the past. The major things are food habit, way of living. Due to the change in the food habit and the life style form the young age people to the old people they are affected by various disease. The main common disease is the heart strokes, it can affect the human in the deep manner. So to avoid the heart stroke disease we want to take some preventive measures. So the proper health care check is need at each stage to avoid the heart stroke. We need to maintain a record of the each particular person. The basic parameters such as the age, sex, heart rate level. By using this method we can able to avoid the heart stork problem. If the person is affected by the heart stroke he/ she want to take ECG it cost more and we need to undergo the test frequently. To avoid these kind problems in these paper we proposes the heart disease monitoring with the help of the parameters which is already mentioned. The machine learning algorithm and the neural network method can predict the heart disease at earlier stage. The results are more accurate and effective. The another main reason of the stroke is the pressure which can affect the health in the deeper path. [2]

Vikas Deepet., al., proposed in today's situation most of the people are died due to the heart disease it is not the major reason for the short life span. As the population has become increased the number of health care department are also get increased. Due to the increased population and the health care department there is large accumulation of the data takes place. The data are stored in the database. So the data can be fetches for the particular person is easy and it takes less amount of time. The data of the patient can be stored in the daily basis. To make the data extraction more faster the weighted association rule is the type of data mining which can extract the data directly from the record. In this method the can says about the risk of the coronary disease. The data of the disease can be stored in the data base. By using the data mining technology this method is more effective and less cost. By the fast fetching of the data it can saves the patient life. The several simulation analysis are made to predict the accurate result. This method can shows the exact result of the data extracting. [3]

Shriya Aroraet., al., proposed the heart disease can affect the people in the major way. The people who are suffered from the coronary artery can lead to the heart disease. But we will not able to confirm that all the people who suffered from the coronary artery will lead to chest pain. There are some other symptoms like blood pressure, cholesterol, R-ECG and block in the blood vessels. These symptoms will lead to the heart disease. The heart disease prediction in the initial stage can save the life of many people. Heart disease indicates the type of condition which leads to heart malfunction. Not all people with coronary artery disease have chest pain as a symptom. By using the data mining concept the disease can be predicted in the earlier stage. The health parameters of the person can be monitored and it get stored in the data base. By using the naviesbayes and the Decision tress, k-means which can help in the prediction of the heart disease. The various factors of the person can

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be collected based upon the factors the heart disease is identified. [4]

S. Balajiet., al., proposed the major death are occurring due to the heart problem is cardiovascular disease CVD. The heart can convert the impure blood to the pure blood with the help of the oxygen which can circulate throughout the body. If the oxygen content is low or decreased supply in oxygen can cause chest pain. This paper propose the cause of the heart disease with the help of the frame work such as pre-processing step, Interval Vague set, Fuzzy associated rule mining. The framework is mainly designed to predict the major cause of the heart disease and destroy the causing agent. The initial stage is the pre processing step which can reduce the size of the dataset for the heart disease. By suing the fuzzy mining method it can formulate the several rules to predict the heart disease. The data mining concept is involved in extraction if the data from the database. The data extraction can be made through the data mining algorithm. The supply of the oxygen is the major thing for the heart. Without oxygen to the heart any method for prediction is not useful. The various sort of algorithm has been proposed to improve the prediction. The researchers are made for the prediction for the heart disease in the short span of time. The accuracy of the method is about 78%. By use of this method it can saves the life of the people.[5]

V. Thiagarasuet., al., proposed due to the population is get increases the use of the health care department is also increased day by day. The people can affect by various kinds of disease the major is the heart disease. This can leads to death. The medical data are enormous amount of information but in knowledge is less. There are several problem rise about the false treatment it will leads affects the patient more. In this paper they proposes the treatment based upon the data mining technology. The data mining can gives the better result about the treatment. For which disease which treatment is provided all the things are mentioned in the data mining. It can act as human robot and will guide the doctor. The data mining algorithm can be classified by using SVM, neural network, K-nearest, Bayesian method etc. These can helps in the classification of the data in the data base. Among the various algorithm Support Vector Machine is the best algorithm for the classification. [6]

S Deepa Rajanet., al., proposed the disease are of two types communicable disease and non- communicable disease. The disease which can be spread from the one person to another person is known as communicable disease. The disease which cannot spread to another person is known as non communicable disease. The heart disease and diabetes are the two diseases which cannot be spread from person to person. These are the two deadly diseases which affects the people. The researchers are made in this paper to produce the software. This software can be used by the doctor and the medical practices for the prediction of the occurrence of the Non communicable disease. The data mining concept is involved in extraction if the data from the database. The data extraction can be made through the data mining algorithm. Data mining is used in the medical field for the collection of the patient data. The patient of Bahrain Defense force hospital to applied the propose software method. This method can give the accurate data of about 85%. It is highly active. This software can be more useful to save the life of the patient. [7]

W. Picardet., al., proposed in today the smart watches getting evolved all over the world. The fitness watches as the sensor in which can monitor the heart rate value. Most of the companies like Samsung, MI, TATA can release the smart watch. It uses the PPG for the heart rate monitoring. In before method the heart rate can be monitored using the heart beat sensor or using the ECG system and using the sound system. The ECG can be monitored in the form of waves and the pulse can be monitored by the pumping of the artery at which can touch the skin. It can filters the noise signal can coverts the analog to digital or digital to analog for the displaying the value. It can exactly monitors the heart rate value with less period of time. So it can helps in monitoring the value every period of time. The low battery is get consumed and the efficiency more. [8]

Purushottam Sharmaet., al., proposed the cardiovascular disease is the most infectious disease which can affects the people extremely in the young age. In this paper they designed the framework to predict the heart disease in the patient. The frame work is used to analyze the image of the disease affected part. The mining method is implemented in the database to analyze the data. The image processing method is applied to compare the given image with the dataset. By use of this method the heart disease can be predicted in the initial stage. The researches are made in this method about the frame work. [9]

Purushottam Sharmaet., al., proposed The vast amount of data is gathered to find the disease in the medical field. But all the data are not much useful to predict the disease. To detect the disease the skilled and

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the knowledge based upon the symptoms of the heart disease can be more useful to predict the disease The medical data set are widespread and collection of large set of data. In this paper they propose the feature selection and gathering technique for the removal unnecessary data in the sets. Various classification techniques have been implemented such as naviesbayes, logistic regression, decision tree, random forest. The logistic regression is performed better and gives the accuracy of about 92%. [10]

3. Proposed Method of Heart Disease

This paper mainly proposes the prediction of the heart disease using the image processing technique. The arrhythmia is the kind of the heart disease. The disease can be classified by using the Discrete Wavelet transform method. It can be classified into several of pattern. The data are get stored in the database by using the data mining method the heart parameters are get extracted. The neural network can be used for the further classification of arrhythmia. This method can give the accurate result of about 89%.

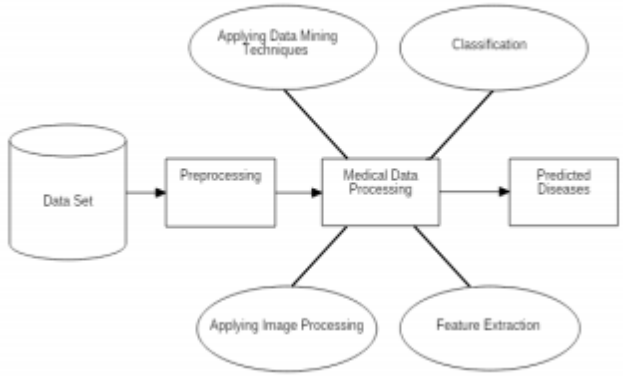

Figure 1: Flow Diagram Representing Heart Disease Prediction

4. Results and Discussions

In the proposed system we are going to do two types of works that is collecting the data's from and patients and one more is the bench mark datasets. Collecting the data's from the patients will be the input file and bench mark datasets will be the stored datasets. Here we are going to do the combination of pathology results and graphical reports. When we compare both the results it's very easy to find out the heart disease rate that is going on in a human. Here two techniques are been followed the first technique is the Data Mining technique which is followed for Handling Pathology results and second technique is the process of image processing which is used to handle graphical reports. By following these two techniques Prediction of Heart Disease will be very accurate.

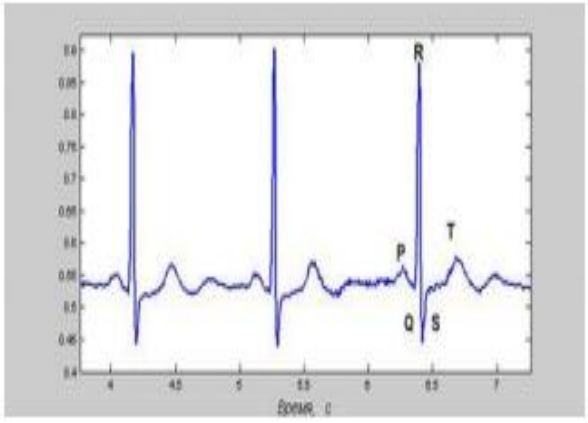

Figure 2: ECG Signal

5. Conclusion

In this paper we have done a detailed study about the ECG signal classification according to the data sets that we have gathered. Here we are following the concept of pattern marching between the input data's from the patient and the data's mined from the bench mark data sets. It is found that pattern matching algorithm gives us more accuracy than the existing methods in predicting the heart diseases.

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