Volume 6, Issue 8, August 2016 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Heart Disease Using Data Mining Algorithm on Neural Networks and Genetic Algorithm

J.Banupriya
Research Scholar, Department of Computer Science,
P.K.R. Arts College for Women, Gobichettipalayam,
Tamilnadu, India

S. Kiruthika
Assistant Professor, Department of Computer Science,
P.K.R. Arts College for Women, Gobichettipalayam,
Tamilnadu, India

Abstract: ***The heart disease is a significant and tedious task in medicine field. The healthcare industry is gathers enormous amounts of the heart disease data that regrettably, are not "mined" to determine concealed information for effective decision making healthcare practitioners. The availability of huge amount of data leads to the need of powerful data analysis tool to extract useful knowledge. The term Heart disease encompasses the diverse to eases that affect the heart. Heart disease is the major cause of the death all over the world in last few years. Many researchers are using different data mining tools to help professionals in the diagnosis of the heart disease. Using single data mining technique in heart disease diagnosis has been showing great levels of accuracy. In this paper the neural network is trained with selected significant pattern for the diagnosis of heart disease and Genetic Algorithm has been used and applied for optimizing the neural network.***

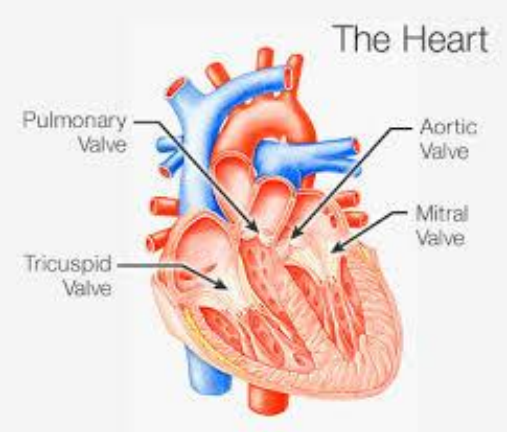
Keywords: Data Mining, Diagnosis, Heart Diseases, Genetic Algorithm, Neural Networks, ECG, CAD.

I. INTRODUCTION

Heart is the significant part of the our body. Life is fully dependent on efficient working of heart. If heart is not proper, it will also influence the other body parts such as brain, kidney, etc. It is intended to deal only with the condition commonly called "Heart Attack" and the factors, which lead to such condition. Cardiomyopathy and Cardiovascular disease are some categories of heart diseases. The heart and the blood vessels and the manner in which blood is pumped and circulated through the body.

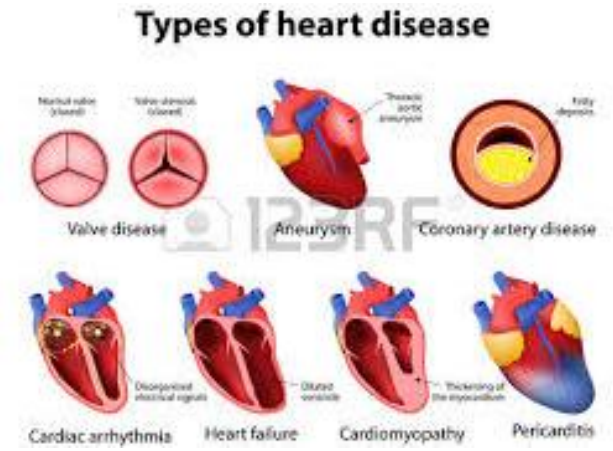
The initial diagnosis of a heart attack is made by a combination of clinical symptoms and characteristic electrocardiogram (ECG) changes.

The World Health Organization has estimated that 12 million deaths occur due to the cardio vascular diseases. should be done. Discovering of Heart Disease is usually based on symptoms, physical examinations and signs of patient body. Normally, doctors are predicting heart disease by knowledge and experience.



II. TYPES OF HEART DISEASE

Although coronary heart disease (CAD) is the most common type of heart disease, there are several other types. Some of the other more common types of heart disease include abnormal heart rhythms (*arrhythmias*), heart failure, heart valve disease, heart muscle disease, and congenital heart disease.



- **Coronary artery disease (CAD)** is the most common type of heart disease. In CAD, the arteries carrying blood to the heart muscle (the *coronary arteries*) become lined with *plaque*, which contains materials such as cholesterol and fat. This plaque buildup (called *atherosclerosis*) causes the arteries to narrow, allowing less oxygen to reach the heart muscle than it needs to work properly. When the heart muscle does not receive enough oxygen, chest pain (*angina*) or heart attack can occur.
- **Arrhythmia** is an irregular or abnormal heartbeat. This can be a slow heart beat (*bradycardia*), a fast heartbeat (*tachycardia*), or an irregular heartbeat. Some of the most common arrhythmias include *atrial fibrillation* (when the atria or upper heart chambers contract irregularly), *premature ventricular contractions* (extra beats that originate from the lower heart chambers, or *ventricles*), and *bradyarr hythmias* (slow heart rhythm caused by disease of the heart's conduction system).
- **Heart failure** (*congestive heart failure*, or CHF) occurs when the heart is not able to pump sufficient oxygen-rich blood to meet the needs of the rest of the body. This may be due to lack of force of the heart to pump or as a result of the heart not being able to fill with enough blood.
- **Heart valve disease** occurs when one or more of the four valves in the heart are not working properly. Heart valves help to ensure that the blood being pumped through the heart keeps flowing forward. Disease of the heart valves (e.g., stenosis, mitral valve prolapse) makes it difficult for the heart to work efficiently.
- **Heart muscle disease** (*cardiomyopathy*) causes the heart to become enlarged or the walls of the heart to become thick. This causes the heart to be less able to pump blood throughout the body and often results in heart failure.
- **Congenital heart disease** is a type of birth defect that causes problems with the heart at birth and occurs in about one out of every 100 live births. Some of the most common types of congenital heart disease include:
  - *atrial septal defects (ASD)* and *ventricular septal defects (VSD)*, which occur when the walls that separate the right and left chambers of the hearts are not completely closed
  - *patent ductus arteriosus (PDA)*, which occurs when the ductus arteriosis doesn't close properly after birth.

III. LITERATURE REVIEW

Numerous works have been done related to heart disease diagnosis using different data mining techniques. Here is a brief discussion about the work which has already carried out in the past few years.

3.1 Heart disease diagnosis using Classification Methods

Milan Kumari diagnose cardiovascular disease by using different data mining algorithms such as: Support Vector Machine, Artificial Neural Network (ANN), Decision Tree and RIPPER classifier.

3.2 Heart Attack Prediction System Using Clustering

Shantakumar B. Patil applied efficient methodology for the extraction of significant patterns from the heart disease warehouses for heart attack prediction. In this firstly the data warehouse is pre-processed in order to make it suitable for the mining process and secondly the K-mean clustering algorithm has been applied for clustering the heart disease warehouse.

The neural network is trained with the selected important patterns for the effective prediction of Heart Attack.

3.3 Heart Disease Prediction System Using Feat Selection

The prediction of Heart Disease, Blood Pressure and Sugar with the help of neural network was proposed by Niti Guru . Tests were carried out on a specimen database of patient records. The Neural Network is tested and trained with 13 input variables such as Age, Blood Pressure, Angiography's report and etc. The supervised network has been focused for diagnosis of heart diseases.

IV. REVIEW OF PROPOSED DATA MINING

4.1 Techniques Used in Data Mining

4.1.1 Classification

Classification is a classic data mining technique based on machine learning. Mainly classification is used to classify every item in a set of data into one of predefined set of classes or groups. Classification technique makes use of mathematical techniques such as decision trees, linear programming, neural network and statistics.

4.1.2 Clustering

Clustering is a data mining technique that makes significant or helpful cluster of substance that have similar feature using mechanical technique. Dissimilar from classification, clustering technique also defines the classes and put objects in them, as in classification objects are assigned into predefined classes.

V. CONCLUSION

In this paper, we have discussed that how different types of data mining techniques are used for diagnosis of heart diseases and also studied that how these techniques have performed better results when applied on different data sets. hybrid data mining techniques has shown promising results in the diagnosis of heart disease, so applying hybrid data mining techniques in selecting suitable treatment for heart disease patients needs further investigation. The process on the data mining in hearts disease on ffectively used in Heart Diseases Diagnosis. In our future work, neural network by using Swarm Intelligence Optimization on neural network Algorithm to optimize the system to get better results and more accuracy. Using the any other types of various algorithm in data mining.

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