DECISION TREE ALGORITHM WITH RISK LEVELS TO ESTIMATE THE CRITICALITY OF CARDIOVASCULAR DISEASE

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Abstract

Globally, heart diseases are the number one cause of death. About 80% of deaths occurred in low- and middle income countries. If current trends are allowed to continue, by 2030 an estimated 23.6 million people will die from cardiovascular disease (mainly from heart attacks and strokes). The healthcare industry gathers enormous amounts of heart disease data which, unfortunately, are not "mined" to discover hidden information for effective decision making. The reduction of blood and oxygen supply to the heart leads to heart disease. However, there is a lack of effective analysis tools to discover hidden relationships and trends in data. This research paper intends to provide a survey of current techniques of knowledge discovery in databases using data mining techniques which will be useful for medical practitioners to take effective decision. The objective of this research work is to predict more accurately the presence of heart disease with reduced number of attributes. Originally, thirteen attributes were involved in predicting the heart disease. Thirteen attributes are reduced to 9 attributes. Three classifiers like Naive Bayes and Decision Tree algorithm are used to predict the diagnosis of patients with more accuracy as obtained before the reduction of number of attributes. . Classification tree uses many factors including age, blood sugar and blood pressure; it can detect the probability of patients fallen in CD by using fewer diagnostic tests which save time and money. It has been considered as an activist approach to improve the quality and accuracy of healthcare service while lowering the healthcare cost and diagnosis time. Using this technique presence of heart disease can be predicted accurately.

IndexTerms: Data Mining, Decision tree, classification technique, Heart Disease, Prediction Model

I.   INTRODUCTION

The successful application of data analysis [1] is the most crucial factor in the modern day world where the source of data is generated round the clock. One such field where the data generated and is not mined or analysed in health care sector. The abundant availability of the data made many experts to focus more to obtain valuable knowledge for their research. Even though there is unlimited opportunities to transform these datasets into valuable knowledge, researchers have to navigate more complexities in these analysis. These large amounts of data are very important in the field of Data Mining to extract useful information and generate relationships amongst the attributes. Heart disease is the single largest cause of death in developed countries and one of the main contributors to disease burden in developing countries.

Mostly there will be no symptoms to find the non functionality of heart but sometimes it may cause heart pain or problems in breathing. The heart diseases are often diagnosed by considering the medical history, listening to the heart-beats with a stethoscope, ECG, and ultrasound. The reports collected from the above factors can be used to supplement disease management or population health management efforts. The poor heart conditions include diseased vessels, structural problems and blood clots. The most common types of Cardio Vascular Diseases [2] are

- Coronary artery disease: The heart's major blood vessels might be damaged from birth or destroyed due to any other factors.
- High blood pressure: A condition in which the force of the blood against the artery walls is too high.
- Cardiac arrest: Sudden, unexpected loss of heart function, breathing and consciousness.
- Congestive heart failure: A chronic condition that affects the chambers of the heart.
- Arrhythmia: Improper beating of the heart, whether irregular, too fast or too slow.
- Peripheral artery disease: A disease in which plaque builds up in the arteries that carry blood to the head, organs, and limbs which reduce blood flow to the limbs.
- Stroke: Damage to the brain from interruption of its blood supply.
- Congenital heart disease: A defect or a problem with the structure of the heart. It is present at birth.

II. RELATED WORK:

Tree based learning algorithms are considered to be one of the best and mostly used supervised learning methods. Tree based methods empower predictive models with high accuracy, stability and ease of interpretation. Even though many algorithms are obtainable in the field of Data mining, for our research, Decision tree algorithm is more appropriate. A decision tree typically starts with a single node, which branches into possible outcomes. Each of those outcomes leads to additional nodes, which branch off into other possibilities. This gives it a tree like shape. The attribute list from the inter heart study helps more to predict the problems of Cardio vascular Disease.

The attributes which are to be considered for analysis of cardiac diseases (Done in 52 Countries) as described below.

{ Hypertension, lipids, diabetes,

Smoking, obesity, diet, physical activity,

Alcohol consumption and psychosocial factors }

PRIORITY LEVEL 1:{Age,Hytertension,Diabetes}
PRIORITY LEVEL 2:{Lipids,Obesity,ECG}
PRIORITY LEVEL 3:{Echo,TMT}

These attributes can be grouped into three levels based on the priority as it is diagnosed by the Cardiac Expert.

III. Proposed Methodology

A new model is planned which gives finest result and perfections over previous models. In this section full framework has been discussed The first step in model is the selection of data that is the data source. After sourcing field option is used and a type field is selected that allows field metadata to be determined and controlled. And then the modeling phase occurs, the Decision tree algorithm is selected to constructs a predictive Cardiac Problem. After executing this predicted model, performance analysis is performed as shown in Fig. 1.
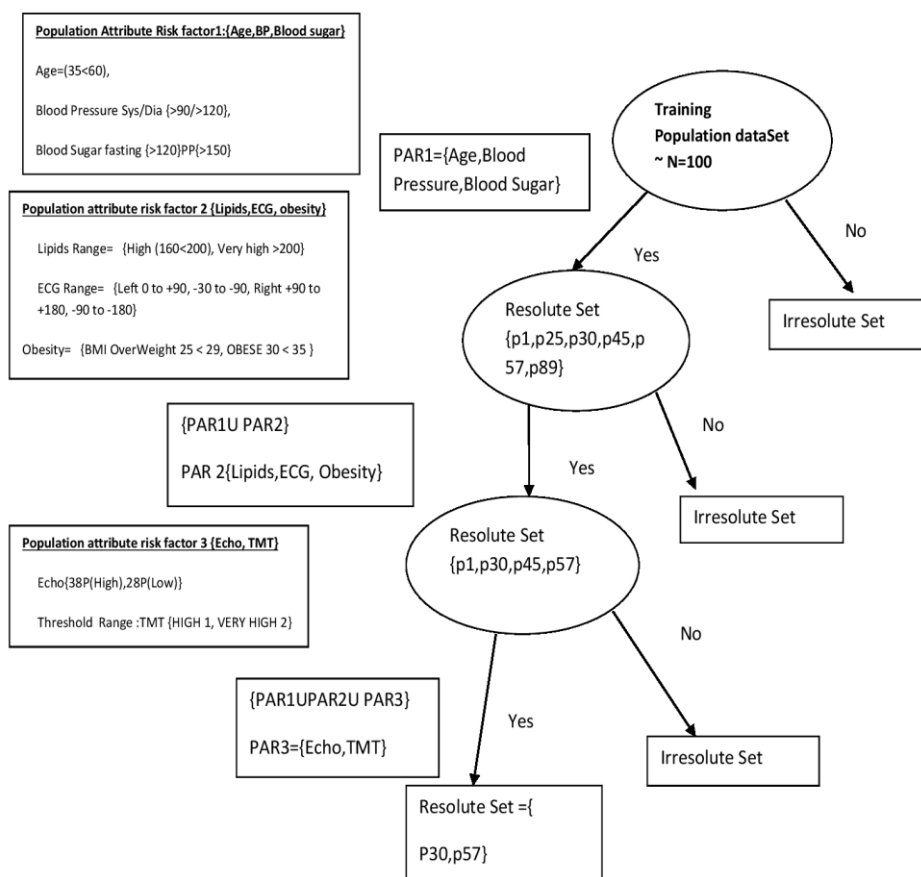
Fig.1 Decision Tree Algorithm

IV. CONCLUSION

The most widely used technique of Data Mining in healthcare sector is the classification. The extensive classification method used for the prediction of heart disease is the decision tree that is used in this research. Sometimes poor observations lead towards death. All practitioners are not so expert to diagnose the heart disease with minimal number of tests. The main purpose of this research is to diagnose the heart patients more precisely and more accurately with minimum number of tests (reduction of attributes). This research plays a vital role in the cost reduction of treatment, diagnose disease and additional enhancement of the medical studies. The purposed research work can further be boosted and expended for the prediction of various types of heart diseases.

There are several treatment methods for a patient once diagnosed with a particular form of heart disease. Data mining can be of very good help in deciding the line of treatment and the particular disease in future.

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