VISUALIZING AND PREDICTING HEART DISEASES WITH INTERACTIVE DASH BOARD

INTRODUCTION

The World Health Statistics 2012 report enlightens the fact that one in three adults worldwide has raised blood pressure - a condition that causes around half of all deaths from stroke and heart disease. Heart disease, also known as cardiovascular disease (CVD), encloses a numberof conditions that influence the heart – not just heart attacks. Heart disease was the major cause ofcasualties in the different countries including India. Heart disease kills one person every 34 seconds in the United States. Coronary heart disease, Cardiomyopathy and Cardiovascular disease are some categories of heart diseases. The term "cardiovascular disease" includes a wide range ofconditions that affect the heart and the blood vessels and the manner in which blood is pumped and circulated through the body. Diagnosis is complicated and important task that needs to be executed accurately and efficiently. The diagnosis is often made, based on doctor's experience &knowledge. This leads to unwanted results & excessive medical costs of treatments provided to patients. Therefore, an automatic medical diagnosis system would be exceedingly beneficial.

LITERATURE REVIEW

[A] Health monitoring devices are integral parts of smart health in the era of smart connected communities. In recent years, remote heart monitoring systems are developed to harness advanced machine learning methods to identify heart disorders by processing electrocardiogram (ECG) signals. However, current technologies suffer from two important drawbacks: i) the lack of prediction capacity to predict heart abnormalities ahead of time, and ii) failure in capturing inter-patient variability. In this paper, we propose a novel two-step predictive framework for ECG signal processing, where a *global classifier* recognizes severe abnormalities (red alarms) by comparing the signal against a universal reference model. The seemingly normal signal samples undergo a subsequent *deviation analysis* and yellow alarms are called by identifying mild and yet informative signal morphology distortions comparing to the learned patient-specific baseline that can be indicative of upcoming heart conditions. To facilitate an accurate deviation analysis, a controlled nonlinear transformation with optimized parameters is proposed to increase the symmetry of signals for different abnormality classes in the feature space. The proposed method achieves a classification accuracy of 96.6% and provides a unique feature of *predictive analysis* by generating precaution warning messages about the elevated risk of heart abnormalities to take preventive actions according to physician orders. In particular, the chance of observing a severe problem (in terms of a *red* alarm) is raised by about 5% to 10% after observing a *yellow* alarm of the same type. The main goal of this technology is providing quality healthcare for elderly and high-risk heart-patients, however, the developed methodology is general and applicable to other biomedical signals such as EEG, Pleth, and PPG.

ADVANTAGES

It is used to diagnose various cardiac diseases.this paper proposes a method of detecting arrhythmia using the raw ECG signal.

DISADVANTAGES

Poor Ability To Charcterise Arrhythmic Events.Low diagnostic yield.

[B] The health care industries collect huge amounts of data that contain some hidden information, which is useful for making effective decisions. For providing appropriate results and making effective decisions on data, some advanced data mining techniques are used. In this study, a Heart Disease Prediction System (HDPS) is developed using Naives Bayes and Decision Tree algorithms for predicting the risk level of heart disease. The system uses 15 medical parameters such as age, sex, blood pressure, cholesterol, and obesity for prediction. The HDPS predicts the likelihood of patients getting heart disease. It enables significant knowledge. E.g. Relationships between medical factors related to heart disease and patterns, to be established. We have employed the multilayer perceptron neural network with backpropagation as the training algorithm. The obtained results have illustrated that the designed diagnostic system can effectively predict the risk level of heart diseases.

ADVANTAGES

Improvements that could be explored to improve the scalability and accuracy of this prediction system.

DISADVANTAGES

The dimensionality of the heart database is high, so identification and selection of significant attributes for better diagnosis of heart disease are very challenging tasks .

[C] Healthcare industries generate enormous amount of data, so called big data that accommodates hidden knowledge or pattern for decision making. The huge volume of data is used to make decision which is more accurate than intuition. Exploratory Data Analysis (EDA) detects mistakes, finds appropriate data, checks assumptions and

determines the correlation among the explanatory variables. In the context, EDA is considered as analysing data that excludes inferences and statistical modelling. Analytics is an essential technique for any profession as it forecast the future and hidden pattern. Data analytics is considered as a cost effective technology in the recent past and it plays an essential role in healthcare which includes new research findings, emergency situations and outbreaks of disease. The use of analytics in healthcare improves care by facilitating preventive care and EDA is a vital step while analysing data. In this paper, the risk factors that causes heart disease is considered and predicted using K-means algorithm and the analysis is carried out using a publicly available data for heart disease. The dataset holds 209 records with 8 attributes such as age, chest pain type, blood pressure, blood glucose level, ECG in rest, heart rate and four types of chest pain. To predict the heart disease, K-means clustering algorithm is used along with data analytics and visualization tool. The paper discusses the pre-processing methods, classifier performances and evaluation metrics. In the result section, the visualized data shows that the prediction is accurate.

ADVANTAGES

Quickly process large amount of data. It is scalable.

DISADVANTAGES

For better accuracy local is required.

[D] This paper is the attempt to make the heart disease prediction at very early stage. As it is well known fact that most of the death causing disease all over the world is heart disease then comes cancer which is also very chronic and dangerous disease which has haunted the human being all over the globe. This disease and problem do not occur all of a sudden. Scientist and Doctors reveals that it is a continues process and is the result of being on a particular lifestyle for long time and also results after giving some basic and common symptoms being occurring all of a sudden. Eventually what does happen in the heart attacks is, the heart is not able to pump the required amount of blood to the parts of the body and more over it itself also does not get enough blood supply due to blocked arteries in the heart chambers there, for it results in heart failure and deaths. This paper brings the concepts of data science and its algorithms to make a hybrid model which can predict the disease of heart in the patient in comfortable ample of time advance. Moreover, the system must suggest useful and precautionary steps to the patient which are of globally accepted standards well in advance. The hybrid model is to predict and suggest the heart patient with world class heart solutions made with the help of data science algorithms namely Naïve Bayes, ANN, SVM and Hybrid Naïve Bayes, SVM, and ANN. The Accuracy, specificity, and sensitivity of Naïve Bayes, ANN, SVM and Hybrid Naïve Bayes, SVM, and ANN has been measured. The results nearly 2% increase in the accuracy in predicting the heart disease in hybrid model.

Hybrid model also shows higher specificity and sensitivity by having 82.11% and 91.47 % respectively. This paper also considers different attributes and has shown positivity in the connections with the heart disease like genetics, physical activity, total fat consumption, stress and working conditions. This research shows new direction to the research area where these concepts can be applied to the smart devices, data science to revolutionize the heart disease diagnosis and cures. This project can be effective to the make awareness of the complexities of the heart disease.

ADVANTAGES

It has given best accuracy, specificity, and sensitivity.

DISADVANTAGES

It is a Hybrid model. Hybrid model also shows higher specificity and sensitivity

[E] Heart disease is one of the most significant problem that is arising in the world today. Cardiovascular disease prediction is a critical challenge in the area of clinical data analysis. Hybrid Machine learning (ML) has been showing an effective assistance in making decisions and predictions from the large quantity of data produced by the healthcare industries and hospitals. We have also seen ML techniques being used in recent developments in different areas of the Internet of Things (IoT). Various studies give only a glimpse in predicting heart disease with ML techniques. In this paper, we propose a narrative method that aims at finding significant features by applying machine learning techniques that results in improving the accuracy in the prediction of cardiovascular disease. The prediction model is proposed with combinations of different features and several classification techniques. We produce an enhanced performance level with an accuracy level of 92% through the prediction model for heart disease with the hybrid random forest with a linear model.

ADVANTAGES

Increased accuracy for effective heart disease diagnosis. 2Handles roughest(enormous) amount of data using random forest algorithm and feature selection.Reduce the time complexity of doctors. Cost effective for patients.

DISADVANTAGES

Prediction of cardiovascular disease results is not accurate Data mining techniques does not help to provide effective decision making Cannot handle enormous datasets for patient records.