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Effective Prediction Of Cardiovascular Diseases Using Machine Learning

DR. P. RATNA BABU, Associate Professor,Dept of CSE,KHIT,Guntur
K.CHARAN Kallam Haranadhareddy Institute of Technology,Guntur
SK.MAAZ Kallam Haranadhareddy Institute of Technology,Guntur
SK.YASEEN Kallam Haranadhareddy Institute of Technology,Guntur
SK.BATHUL Kallam Haranadhareddy Institute of Technology,Guntur

ABSTRACT

The field of bio sciences has advanced to a larger extent and has generated large amounts of information from Electronic Health Records. This has given rise to the acute need for knowledge generated from this enormous amount of data. Data mining methods and machine learning play a major role in this aspect of bio sciences. Heart is a condition in which the heart are damaged and cannot filter blood as they always do. Early detection of heart disease can improve the quality of life to a greater extent. This calls for a good prediction algorithm to predict heart disease at an earlier stage. Literature shows a wide range of machine learning algorithms employed for the prediction of heart disease. We use data pre processing, data transformation, and various classifiers to predict heart disease and propose the best Prediction framework for heart disease. The results of the framework show promising results of better prediction at an early stage of heart disease. The heart disease prediction and also the covid detection are also developed in the interface the input should be given according to the requirement. The correct prediction of heart disease can prevent life threats, and incorrect prediction can prove to be fatal at the same time

INTRODUCTION

The disability of the heart to perform their regular blood filtering function and others are called heart disease. This disease is a major heart failure where the heart sans blood filtering process and there is a heavy fluid build up in the body. This leads to the alarming increase of potassium and calcium salts in the body. The existence of high levels of these salts

results in various other ailments in the body. The prime job of heart is to filter extra water and wastes from the blood. The efficient functioning of this process is important to balance the salts and minerals present in our bodies. The right balance of salts is necessary to control blood pressure, activate hormones, build red blood cells, etc. A high concentration of calcium leads to various bone diseases and cystic ovaries in women. Heart also may lead to sudden illness or allergy to certain medicines. Literature also presents evidence of early identification and care of the heart can improve the quality of the patient's life. Prediction algorithms in machine learning can be intelligently used to predict the occurrence of heart and present a method of early medication. Here we are also predicting heart disease, by using some algorithms and techniques under one interface. The dataset will be trained in the model to predict the accurate result.

LITERATURE SURVEY

Bo Jin, Chao Che et al. (2018) proposed a "Predicting the Risk of Heart Failure With EHR Sequential Data Modeling" model designed by applying neural network. This paper used the electronic health record (EHR) data from real-world datasets related to congestive heart disease to perform the experiment and predict the heart disease before itself. We tend to used one-hot encryption and word vectors to model the diagnosing events and foretold coronary failure events victimization the essential principles of an extended memory network model. By analyzing the results, we tend to reveal the importance of respecting the sequential nature of clinical records .

Aakash Chauhan et al. (2018) presented "Heart Disease Prediction using Evolutionary Rule Learning". This study eliminates the manual task that additionally helps in extracting the information (data) directly from the electronic records. To generate strong association rules, we have applied frequent pattern growth association mining on patient's dataset. This will facilitate (help) in decreasing the amount of services and shown that

overwhelming majority of the rules help within the best prediction of coronary sickness.

Two forms of experiments are used for cardiovascular disease prediction. In the first form, only random forest model is developed and within the second experiment the proposed Random Search Algorithm based random forest model is developed. This methodology is efficient and less complex than conventional random forest model. Comparing to conventional random forest it produces 3.3% higher accuracy. The proposed learning system can help the physicians to improve the quality of heart failure detection.

PROPOSED

Here, we are providing a user-friendly platform to predict the presence of 3 main diseases that are encountered as most dangerous and common in our daily life. We are predicting the presence of Heart-related. The user is just required to choose the disease that the user is in doubt of. Next, provide genuine and accurate information to all the questions asked on the platform. After answering all the questions the result stating the user condition i.e., safe or unsafe is displayed. So, the user can just proceed further for the required treatment. We are providing accurate results to the user by analyzing the data provided by the user. All the predictions completely depend on the data provided by the user. How accurate the generated result will be is depended on how accurate the user provides data. Machine Learning based Cardiovascular Disease Diagnosis framework intends to improve the overall accuracy via handling of missing values and imbalanced data. The missing values have been handled by replacing the missing value with the mean of all the values of a corresponding feature. In order to deal with data imbalance, We propose Synthetic Minority Over-sampling Technique (SMOTE).Once data become balanced, We employ feature importance technique for the selection of optimum set of features. Finally, Random Forest algorithm is proposed for improved prediction with accuracy of 90.8%.

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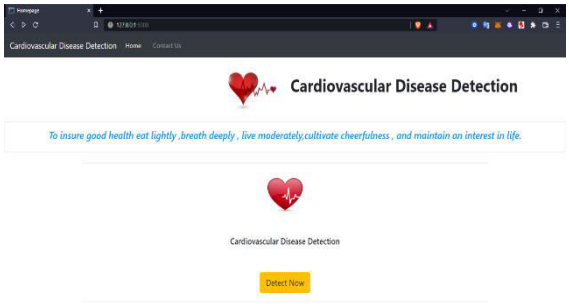
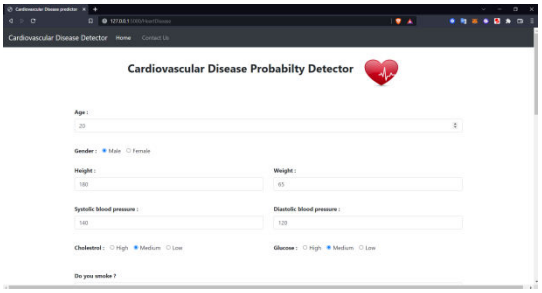
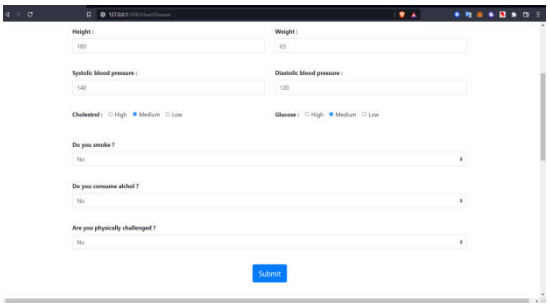
RESULTS







CONCLUSIONS

Heart diseases are a major killer in India and throughout the world, application of promising technology like machine learning to the initial prediction of heart diseases will have a profound impact on society. The early prognosis of heart disease can aid in making decisions on lifestyle changes in high-risk patients and in turn reduce the complications, which can be a great milestone in the field of medicine. The number of people facing heart diseases is on a raise each year. This prompts for its early diagnosis and treatment.

The proposed system is GUI-based, user-friendly, salable, reliable and an expandable system. The proposed working model can also help in reducing treatment costs by providing Initial diagnostics in time. The model can also serve the purpose of training tool for medical students and will be a soft diagnostic tool available for physician and cardiologist. General physicians can utilize this tool for initial diagnosis of cardio-patients.

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