

A METHOD FOR IMPROVING THE PROGNOSIS OF CARDIOVASCULAR DISEASE BASED ON ENSEMBLE CLASSIFICATION TECHNIQUES

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Abstract

Machine learning is a subset of artificial intelligence which is used to solve a wide range of data science challenges. The prediction of an outcome based on existing data is used frequently in machine learning applications. To anticipate the outcome, the machine learns patterns from an existing dataset and then applies them to an unknown dataset. Some classification systems are predicted with reasonable accuracy, whereas others have limitations. This research looks into a technique called ensemble classification, which combines numerous classifiers to improve the accuracy of weak algorithms. Experiments were carried out on a dataset of heart disease patients. This paper uses a relative analytical approach to see how the ensemble technique is used to improve forecasting accuracy in heart disease. This work focuses not only on improving the accuracy of weak classification algorithms, but also in demonstrating the algorithm's utility in predicting disease at an early stage using a medical dataset. With the help of ensemble classification, a maximum increase of 9% accuracy for weak classifiers was achieved. The process was further enhanced with the implementation of feature selection, which resulted in a substantial increase in the accuracy of prediction.

Keywords: Heart disease, Machine learning, Ensemble methods, classification, Prediction model

Introduction

Heart disease is one of the most common diseases that affect many people in their middle or later years, and it often leads to deadly complications [3]. According to WHO figures, cardiac disorders are responsible for 24 percent of non-communicable disease fatalities in India [12,15]. Heart disease is responsible for one-third of all fatalities worldwide [10]. Cardiovascular disease (CVD) is responsible for the death of nearly 19 million people annually [4, 10]. The Cleveland Heart Disease Database (CHDD) is considered to be the most comprehensive database for heart disease research [10].

Cardiovascular diseases include coronary heart diseases, angina pectoris, congestive heart failure, cardiomyopathy, congenital heart disease, arrhythmias, and myocarditis. It is difficult to predict chances of heart disease using risk factors alone [5]. A machine learning technique can be applied to predict the result of existing data. Based on risk factors, this paper uses a machine learning technique known as a classification to predict heart disease risk. To improve the accuracy of forecasting heart disease risk, an ensemble technique is used as well.