Feature Selection and Prediction of Heart Disease Using Machine Learning Approaches

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Abstract Heart Disease (HD) is the world's most serious illness that seriously impacts human life. The heart does not push blood to other areas of the body in cardiac disease. For the prevention and treatment of cardiac failure, accurate and timely diagnosis of heart disease is critical. The diagnosis of cardiac disease has been considered via conventional medical history. Non-invasive approaches like machine learning are effective and powerful to categorize healthy people and people with heart disease. In the proposed research, by using the cardiovascular disease dataset, we created a machine-learning model to predict cardiac disease. In this paper, it is capable of recognizing and classifying the heart disease patient from healthy people by using three standard machine learning algorithms: Random Forest (RF), Support Vector Machine (SVM) and K-Nearest Neighbor (KNN). In addition, the Area Under Curve (AUC) value is calculated for each classification algorithms. In the proposed scheme, we also used the feature selection algorithm to reduce dimensions over a qualified heart disease dataset. After that, the whole structure for the classification of heart disease has been created. On complete features and reduced features, the performance of the proposed approach has been verified. The decrease in features affects the accuracy and time of execution of the classifiers. With the selected features, the highest classification accuracy is obtained for the KNN algorithm is about 93%, with a sensitivity is 0.9750 and specificity is 0.8529. Therefore, with the complete features, the classification accuracy is about 91%.

Keywords Support vector machine (SVM) · K-Nearest Neighbor (KNN) · Random forest (RF) · Heart disease · Machine learning · Cancer

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