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Performance Evaluation of Supervised Machine Learning Algorithms in Prediction of Heart Disease

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Abstract:
Big challenge in health care industry is to record and analyze the massive amount of information about patients. Innovations in technologies made revolution in the healthcare industries. In recent years the data analytics developed as promising tool for problem solving and decision making in healthcare professions. Data analytics process the data automatically to make healthcare system more dynamic and robust. It systematically uses and analyses the data of health care for better treatment with low costs. The chief applications of Machine learning in healthcare are the detection and diagnosis of diseases. The heart is the chief organ of human body. Heart disease increases the mortality rate in the world. Around 90% of heart diseases are preventable. Machine learning plays a remarkable role in the health care industry in prediction of heart disease. In this research paper, the presence of heart disease is predicted by employing Decision Tree, Naïve Bayes, Random Forest, Support Vector Machine, K-Nearest Neighbor and logistic Regression algorithms. The performance of the algorithms was analyzed using parameters such as Accuracy, Precision, AUC and F1-score. From the experimental result, it is found that the Random Forest is more accurate for predicting the heart disease with accuracy of 83.52% compared with other supervised machine learning algorithms. The F1- Score, AUC and precision score of Random forest classifiers are 84.21%, 88.24% and 88.89% respectively.

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I. Introduction

Major causes of increasing mortality rate are heart disease. The unhealthy life style, stress, obese and health history of patients are the risk factors of heart disease. Heart disease leads to complications like heart attack, heart failure and strokes etc. Most of the heart diseases are preventable with proper diagnosing system and simple lifestyle modification. Usage of Machine Learning techniques has been increased to develop screening tools with pattern recognition and classification. Such tools provide more accuracy to compare with other traditional approaches. Machine learning is used to extract the hidden facts from medical data. Machine learning is a multi-disciplinary filed. It consists of statistics, algebra, data processing and knowledge analytics etc., Machine learning aims to make machine capable of learning. Machine learning is classified into three categories: Supervised, Unsupervised Machine Learning and Reinforcement Learning. Fig. 1. shows the classification of machine learning techniques.

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