Developing A Comprehensive Machine Learning Framework for Accurate Prediction and Cardiovascular Disease Risk

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Abstract: *Cardiovascular diseases are one of the most fatal health conditions worldwide, posing a significant burden on national healthcare systems. Several risk factors, including high blood pressure, family history, stress, age, gender, cholesterol, BMI, and an unhealthy lifestyle, have been identified for these diseases. Early diagnosis is crucial for effective treatment, but the accuracy of existing approaches needs improvement due to the life-threatening nature of cardiovascular disorders. This study proposes a MaLCaDD framework for precise prediction of cardiovascular diseases. The methodology addresses missing data and imbalances, using Feature Importance to select relevant features, and an ensemble of Logistic Regression, SVM, Random Forest, Decision Tree, and KNN classifiers for accurate prediction. The study shows that MaLCaDD outperforms current state-of-the-art techniques, making it a trustworthy tool for early detection of cardiovascular diseases. The developed framework will be thoroughly tested and validated using different evaluation metrics, including sensitivity, specificity, and area under the curve, to ensure its accuracy and reliability. The ultimate goal of this project is to provide healthcare practitioners and policymakers with a reliable tool for predicting an individual's cardiovascular disease risk, which can help in early intervention and management, and ultimately reduce the burden of cardiovascular disease on society.*

Keywords: Cardiovascular, diagnosis, Body Mass Index, MaLCaDD framework, Logistic Regression, Support Vector Machine (SVM), prospective cardiovascular münster (PROCAM)

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