Predicting heart attack based on historical risk factors of the patient analysis-prediction dataset with high accuracy

Introduction

For examining the complex dynamics of heart health and its predictors, the Heart Attack Risk Prediction Dataset is an invaluable tool. Myocardial infarctions, also known as heart attacks, continue to be a major global health concern, calling for a fuller understanding of their causes and potential preventative measures. Age, cholesterol levels, blood pressure, smoking habits, exercise routines, food choices, and more are all included in this dataset, which aims to clarify the intricate interactions between these factors in predicting the chance of a heart attack.

Researchers and healthcare practitioners can develop proactive strategies for heart disease prevention and management by applying predictive analytics and machine learning to this dataset. The dataset is proof of our group's efforts to deepen our comprehension of cardiovascular health and open the door to a better future.

Content

Including patient-specific information like age, gender, cholesterol levels, blood pressure, heart rate, and indicators like diabetes, family history, smoking habits, obesity, and alcohol consumption, this dataset offers a thorough array of features pertinent to heart health and lifestyle choices. In addition, lifestyle characteristics like sedentary time, eating patterns, stress levels, and exercise frequency are taken into account. Medical factors such as past heart issues, drug use, and triglyceride levels are taken into account. Geographical characteristics like country, continent, and hemisphere are combined with socioeconomic factors like income. The dataset, which includes 8763 patient records from all around the world, culminates in a vital binary classification characteristic indicating the existence or absence of a heart attack risk, offering a thorough resource for cardiovascular health research and predictive analysis.

Prediction

Overabundance of plaque can obstruct blood flow in arteries, although it's frequently difficult to detect. Heart disease prognosis has never been a precise science. Future risk can be predicted by some

indicators, including diabetes, smoking, high blood pressure, elevated cholesterol (particularly LDL or "bad" cholesterol), and high cholesterol levels.

Existing Algorithm

During the model development process, a 10-fold cross-validation strategy was used. The findings showed that the decision tree algorithm, which had a rate of 93.19%, had the best accuracy in predicting heart disease, followed by the SVM algorithm, which had a rate of 92.30%.

Proposed methodology

One of the leading causes of death worldwide is coronary heart disease. One of the most difficult issues in the area of clinical data analysis is predicting a heart illness. In terms of decision-making and prediction, machine learning (ML) is helpful in the diagnostic process based on the data generated by the global healthcare industry. We have seen ML methods being used in the realm of disease prediction in medicine. A large number of research works on heart disease prediction using an ML classifier have been presented. To better predict cardiac disease, we can employ eleven ML classifiers in this research to uncover critical features. Numerous feature combinations and well-known classification methods can be employed to introduce the prediction model and increase the accuracy.

Key contributions of the future effort:

The first thing the authors do is talk about datasets, which they subsequently standardize and polish. The datasets are then used to train and test several classifiers to see which one has the best accuracy. The correlation matrix is then used by authors to classify the best values or characteristics. The authors used parameter-tuned ML classifiers to apply to the preprocessed dataset in order to get the highest accuracy. The accuracy, precision (specificity), recall (sensitivity), and F-Measure of the suggested classifiers are assessed. Finally, compared to state-of-the-art classifiers, the proposed classifiers provide greater accuracy.

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