

ABSTRACT

Heart Disease Prediction Using Machine Learning - A Predictive Health Analytics Solution

Heart disease is one of the leading causes of death globally, and early detection is critical to reducing mortality rates. This project aims to develop a machine learning-based system that predicts the likelihood of heart disease in individuals based on clinical and lifestyle features such as age, cholesterol, blood pressure, and more. The solution leverages supervised learning algorithms including Logistic Regression, K-Nearest Neighbors, Random Forest, and Support Vector Machines, using Python and libraries like Pandas, Scikit-learn, and Matplotlib. The dataset is sourced from the UCI Machine Learning Repository. The workflow involves data preprocessing, exploratory data analysis, model training, evaluation (using metrics like accuracy, precision, recall, and F1-score), and prediction. The model helps healthcare professionals make data-driven decisions, offering a scalable and modular architecture for potential integration with hospital systems. The expected outcome is a reliable, accurate prediction system that enhances early diagnosis and contributes to a more proactive, cost-effective healthcare environment.