

TITLE: Predicting Cardiovascular Risk: A Machine Learning Framework for Heart Disease

- **PROBLEM STATEMENT:**

Heart disease is a primary reason for death globally, with numerous instances going undetected until they advance significantly. This project seeks to create an online tool using machine learning to forecast the probability of heart disease using health information provided by the user. Through the use of different predictive models, the tool aims to aid in detecting and intervening earlier, which could lead to a decrease in severe outcomes and a better overall outcome for patients.

- **ALGORITHM USED:**

1. Collect and Preprocess Data: Data Collection & Preprocessing involves collecting patient information, addressing missing data, standardizing features, and converting categorical variables.
2. Select Features: Select important factors that influence the risk of heart disease, such as age, gender, blood pressure, cholesterol levels, smoking habits, diabetes status, family medical history, and ECG findings.
3. Train a Model Training the selected features with a Random Forest Classifier involves tuning hyperparameters using Research or RandomizedSearchCV, and evaluating performance with cross-validation.
4. Model Evaluation: Test the model on the testing set, measuring performance using metrics such as accuracy, precision, recall, F1-score, and ROC-AUC, and visualize results using a confusion matrix.
5. Model Deployment:: Integrate the trained model into a web page or application, allowing users to input their data and receive heart disease risk predictions, with a user-friendly interface and clear output.

- **DATA SET:**

<https://www.kaggle.com/datasets/fedesoriano/heart-failure-prediction/data>

EXPECTED OUTPUT:

The anticipated result from the Heart Disease Detection Model includes forecasting the person's risk level of heart disease (High, Medium, Low, or No Risk) with a probability score (a number between 0 and 1) showing the chance of heart disease, along with tailored suggestions for future actions based on the forecasted risk level.

- 2320040009-SHAIK HANIFA 2320040085-M.PAVANI 23200400135-M.UMA MAHESH