

# FINAL PROJECT: PROPOSAL -

## Heart attack prediction using Multi-Layer Perceptron model:

Early detection and treatment of a heart attack are critical and can save a person's life. A heart attack differs from cardiac arrest, which occurs when the heart stops functioning altogether. Both are medical emergencies, and a heart attack without care can progress to cardiac arrest.

In this project, I would like to address this issue by estimating the chance of a heart attack based on the patient's health data. The heart.csv dataset, which is available on kaggle.com, is being used to train my model (<https://www.kaggle.com/datasets/rashikrahmanpritom/heart-attack-analysis-prediction-dataset>). The input parameters in the given dataset that are to be given as inputs: **Age**, **Sex**, **exand** (Exercise induced angina (1 = yes; 0 = no)), **ca** (Number of major vessels (0-3)), **cp** (Chest Pain type - Value 1: typical angina; Value 2: atypical angina; Value 3: non-anginal pain; Value 4: asymptomatic), **trtbps** (Resting blood pressure (in mm Hg)), **chol** (Cholesterol in mg/dl fetched via BMI sensor), **lbs** (Fasting blood sugar > 120 mg/dl (1 = true; 0 = false)), **rest\_ecg** (Resting electrocardiographic results - Value 0: normal; Value 1: having ST-T wave abnormality (T wave inversions and/or ST elevation or depression of > 0.05 mV); Value 2: showing probable or definite left ventricular hypertrophy by Estes' criteria), **thalach** (Maximum heart rate achieved) and **target** : 0= less chance of heart attack 1= more chance of heart attack.

In my project, I choose to employ the Multi-Layer Perceptron model since it may have more number of hidden layers, is capable of working with non-linear datasets, and performs well with huge datasets. It also gives faster prediction for classification problems after training, which will be extremely useful in the project's future development.

Once the model has been trained, the overall evaluation metrics is calculated with the confusion matrix - where the accuracy, precision, recall, and F1 score may be derived with the accompanying true positive, true negative, false positive, and false negative values. If the accuracy is not up to par, I'll try adding new features to the dataset or splitting the data to train and test in different combinations and randomizing the data, or lastly, using TensorFlow to train the different hidden layers with different activation functions and increase the number of iterations until there is maximum convergence and yields the best output value.