**Project : Heart Disease Prediction**

**The Goal**

The main goal of this project was to **predict whether a person has heart disease** using their medical information like age, blood pressure, cholesterol levels, symptoms, etc. We used machine learning to help doctors make faster and better decisions.

**What data did we use?**

We used a dataset of **918 patients** that included:

* **Personal details**: Age, Sex
* **Symptoms**: Chest pain type, Exercise-induced angina
* **Medical results**: Blood pressure, Cholesterol, Heart rate, ECG reports
* **Target**: Whether the person has heart disease (1 = Yes, 0 = No)

**Data Preprocessing**

1. **Cleaned the data** – Made sure it had no missing values and converted text data into numbers so the computer could understand it.
2. **Explored the data** – We made graphs to understand patterns. For example:
   * Older people are more likely to have heart disease.
   * People with “asymptomatic” chest pain often had heart disease.
   * Men had more heart disease than women in this dataset.
3. **Scaled the data** – We normalized the numbers so the models could perform better.

**Model Used**

We tried **four machine learning models**:

* **SVM (Support Vector Machine)**: Finds the best boundary between the two classes.
* **Logistic Regression**: Predicts the chance of heart disease.
* **Random Forest**: Uses many decision trees to make accurate predictions.
* **XGBoost**: A powerful model that works very well on medical data.

**Results**

* All models worked well, but **XGBoost gave the best results** overall.
* Our models could correctly predict who had heart disease in most cases.
* Machine learning can really help doctors detect heart problems early!