## Introduction

Liver cirrhosis is a chronic and progressive liver disease characterized by the irreversible scarring of liver tissue, which can lead to severe complications and liver failure if left untreated. This project aims to develop a predictive model for the early detection and prognosis of liver cirrhosis using machine learning techniques. The model facilitates early intervention and personalized treatment by healthcare professionals, showcasing the power of machine learning in hepatology and predictive analytics.

## Project Flow

1. User interacts with the UI to enter input.
2. The input is analyzed by the integrated model.
3. The prediction is displayed on the UI.

## Project Activities

- Define Problem / Problem Understanding
  - Specify the business problem
  - Business requirements
  - Literature Survey
  - Social or Business Impact
- Data Collection & Preparation
  - Collect the dataset
  - Data Preparation
- Exploratory Data Analysis
  - Descriptive statistics
  - Visual Analysis
- Model Building
  - Train models using multiple algorithms
  - Test the model
- Performance Testing & Hyperparameter Tuning

   - Use evaluation metrics

   - Compare accuracy before and after tuning

- Model Deployment

   - Save the best model

   - Integrate with Flask

- Project Demonstration & Documentation

   - Record explanation video

   - Step-by-step documentation

## Prior Knowledge Required

- Supervised Learning: https://www.javatpoint.com/supervised-machine-learning

- Unsupervised Learning: https://www.javatpoint.com/unsupervised-machine-learning

- Decision Tree: https://www.javatpoint.com/machine-learning-decision-tree-classificationalgorithm

- Random Forest: https://www.javatpoint.com/machine-learning-random-forest-algorithm

- KNN: https://www.javatpoint.com/k-nearest-neighbor-algorithm-for-machine-learning

- XGBoost: https://www.analyticsvidhya.com/blog/2018/09/an-end-to-end-guide-tounderstand-the-math-behind-xgboost/

- Evaluation Metrics: https://www.analyticsvidhya.com/blog/2019/08/11-important-model-evaluation-error-metrics/

- Flask Basics: https://www.youtube.com/watch?v=lj4I_CvBnt0

## Project Structure

The project folder includes:

- templates/: HTML pages

- static/, assets/: CSS, JS files, images

- rf_acc_68.pkl, normalizer.pkl: saved models for integration

- app.py: Flask script

- training/: Jupyter notebooks for model training