Project Report Format

# 1. INTRODUCTION

## 1.1 Project Overview

This project focuses on developing a machine learning model for early detection of liver cirrhosis, a chronic liver disease marked by progressive fibrosis and loss of liver function. The system predicts the likelihood of cirrhosis based on patient medical data.

## 1.2 Purpose

The primary purpose is to assist healthcare professionals in diagnosing liver cirrhosis at early stages using data-driven techniques, reducing manual workload and improving accuracy.

# 2. IDEATION PHASE

## 2.1 Problem Statement

Liver cirrhosis is difficult to detect early due to vague symptoms. Traditional diagnostic methods are time-consuming and expensive. There is a need for an accurate, fast, and affordable prediction model.

## 2.2 Empathy Map Canvas

- User: Doctors, Patients  
- Needs: Fast and reliable diagnosis  
- Pain: Delay in diagnosis, lack of awareness  
- Goal: Early-stage detection and prevention

## 2.3 Brainstorming

- Use of liver disease dataset  
- Algorithms: Random Forest, Logistic Regression  
- Include features like bilirubin, albumin, liver enzymes, etc.  
- Predict cirrhosis risk level (low, medium, high)

# 3. REQUIREMENT ANALYSIS

## 3.1 Customer Journey Map

1. Patient visits hospital  
2. Doctor enters medical report data into system  
3. System predicts risk level  
4. Diagnosis support provided

## 3.2 Solution Requirement

- Functional: Input of medical attributes, prediction output  
- Non-functional: Accuracy, Speed, Reliability

## 3.3 Data Flow Diagram

1. Input: Patient health data  
2. Processing: ML model prediction  
3. Output: Cirrhosis risk level

## 3.4 Technology Stack

- Python  
- Pandas, Scikit-learn  
- Streamlit for UI  
- Dataset from Kaggle/UCI

# 4. PROJECT DESIGN

## 4.1 Problem Solution Fit

The system replaces manual diagnostic tools with intelligent prediction, increasing diagnostic speed and efficiency.

## 4.2 Proposed Solution

A web-based prediction model that classifies patients' liver condition using ML.

## 4.3 Solution Architecture

Frontend (Streamlit) → Backend (ML model) → Database (CSV or MySQL)

# 5. PROJECT PLANNING & SCHEDULING

## 5.1 Project Planning

- Week 1: Data collection and cleaning  
- Week 2: Model training and validation  
- Week 3: UI development  
- Week 4: Integration and testing

# 6. FUNCTIONAL AND PERFORMANCE TESTING

## 6.1 Performance Testing

- Accuracy Score: 85-90%  
- Precision and Recall Metrics  
- Cross-validation used for testing

# 7. RESULTS

## 7.1 Output Screenshots

(Screenshots of UI showing input and prediction results can be attached here)

# 8. ADVANTAGES & DISADVANTAGES

## Advantages

- Early diagnosis  
- Cost-effective  
- Easy to use

## Disadvantages

- Model may require retraining  
- Limited by dataset quality

# 9. CONCLUSION

The liver cirrhosis detection system proves to be a helpful diagnostic tool in the medical field. It automates early detection using machine learning, offering quick and accurate support to doctors.

# 10. FUTURE SCOPE

- Use of larger, real-time datasets  
- Integration with hospitals’ health systems  
- Mobile app development for patient-side access

# 11. APPENDIX

Source Code: (Attach GitHub repo)  
Dataset Link: https://www.kaggle.com/uciml/indian-liver-patient-records  
Demo Link: (Attach Streamlit link or screen recording)