

Artificial Intelligence and Machine Learning

Project Documentation

1. Introduction

- **Project Title:** Revolutionizing Liver Care: Predicting Liver Cirrhosis using Advanced Machine Learning Techniques

- **Team Members:**

Team Leader : Nellore Lakshmi Prasanna

Team member : Mandala Lakshmi Vara Prasad

Team member : Shaik Nasrin

Team member : G Sreedevi

2. Project Overview

- **Purpose:** The goal of this project is to develop an intelligent web-based prediction tool to assess the risk of liver cirrhosis using clinical data and machine learning techniques. It aims to enable early detection and assist healthcare professionals in better decision-making.
- **Features:**
 1. Input form for clinical values (bilirubin, albumin, INR, etc.)
 2. Risk prediction using trained XGBoost model
 3. Risk level output with visual cues
 4. Responsive multi-page interface
 5. Educational content on liver disease

3. Architecture

Frontend:

Built using **HTML**, **CSS**, and optionally **Bootstrap** for styling. Pages include Home, Prediction, Dashboard, and About. React was not used in this project.

Backend:

Implemented using **Flask** (Python). It serves the trained XGBoost model and handles HTTP requests.

Database:

No persistent database was used. All predictions are handled in real-time using the loaded `.pkl` model. In future, MongoDB/PostgreSQL can be added for data storage.

4. Setup Instructions

Prerequisites:

Python 3.9+

Flask
Jupyter/Colab (for model training)
Required Python libraries: xgboost, pandas, sklearn, joblib

Installation:

```
git clone https://github.com/your-repo/livercare-ai
cd livercare-ai
pip install -r requirements.txt
python app.py

or

# Backend
cd server
pip install -r requirements.txt
python app.py

# Frontend
cd ../client
npm install
npm run dev
```

5. Folder Structure

liver-cirrhosis-prediction/

```
|— Data/
|   |— liver.csv      # Training dataset
|— Documentation/
|   |— README.md      # Project documentation
|— static/
|   |— css/
|       |— style.css  # Custom CSS styles
|       |— js/
|           |— main.js # Frontend JavaScript
|— templates/
|   |— assets/        # Static assets
|   |— forms/         # Form templates
|   |— index.html     # Main page template
|   |— inner-page.html # About page template
|   |— portfolio-details.html # Dashboard template
```

```

├── Training/
|   ├── model_training.py          # Model training script
|   └── data_analysis.py          # EDA script
├── app.py                        # Flask application
├── normalizer.pkl                # Trained data normalizer
├── rf_acc_68.pkl                 # Trained Random Forest model
└── requirements.txt              # Python dependencies
...

```

6. Running the Application

Frontend & Backend (Flask)

⇒ npm run dev

Access via: <http://localhost:5173/>

7. API Documentation

file:///D:/liver%20care%20project/project1/Documentation/API_Documentation.md

8. Authentication

Authentication Not Implemented

In future versions, authentication for doctors can be added using Flask-Login or JWT.

9. User Interface

Modern, multi-page layout

Clean navigation bar (Home, Prediction, Dashboard, About)

Risk level badges for result clarity

Input validation on the form

10. Testing:

1. Model Testing:

Used train_test_split, confusion matrix, and classification report

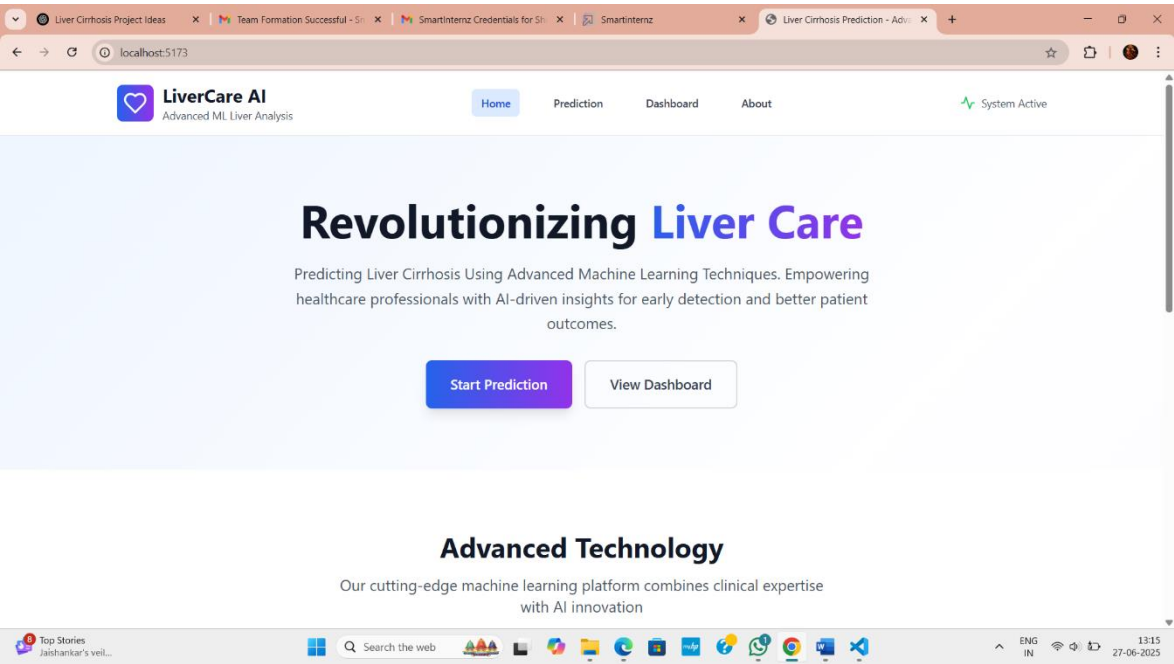
2. Tools: Scikit-learn, XGBoost

Manual UI Testing:

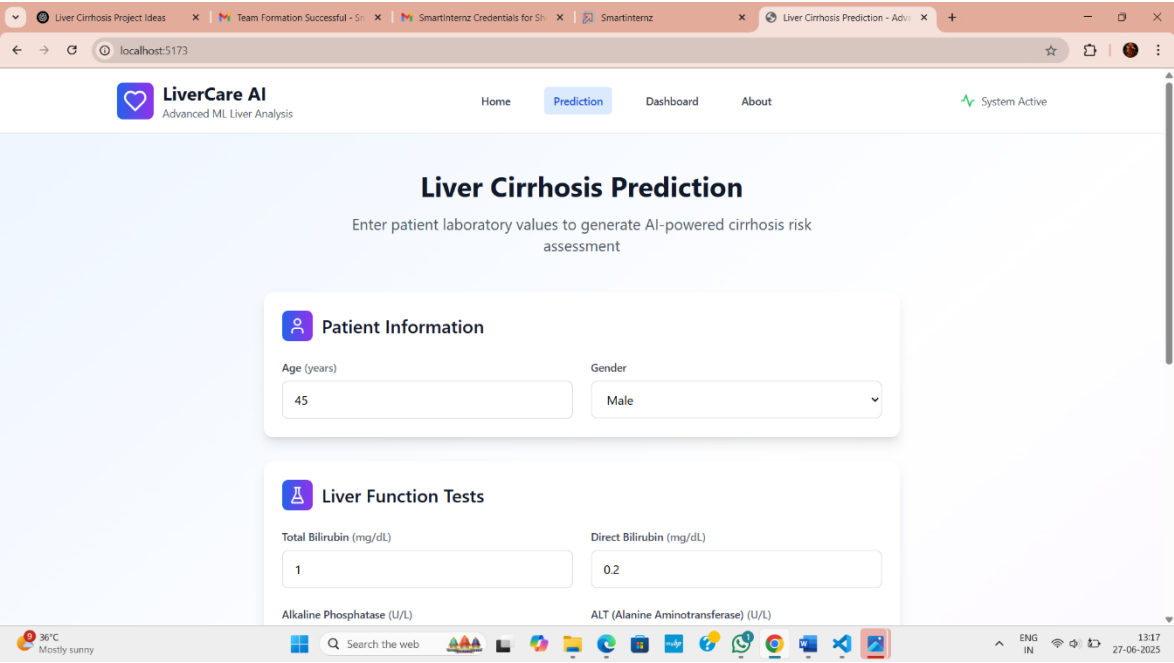
Verified form inputs, navigation flow, and backend integration

11. screenshots or Demo:

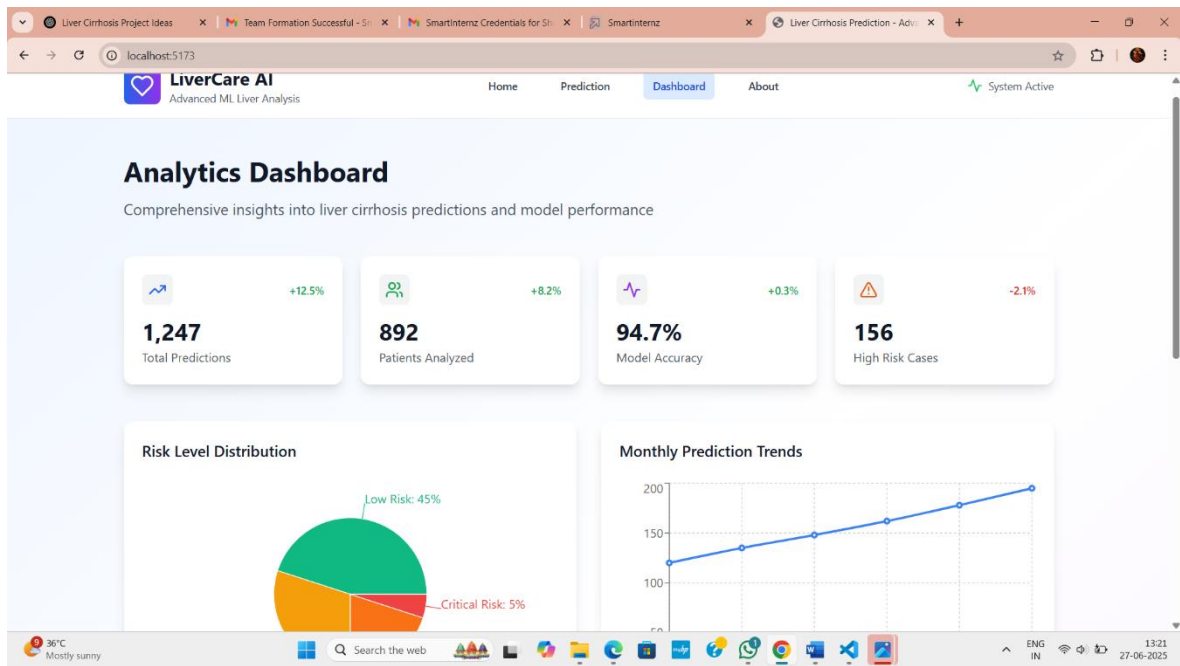
Home page screenshot:



Prededction page screenshot:



Dashboard page screenshot:



10. Known Issues

No persistent database – data not stored after prediction

Basic error handling – input validation needs improvement

No authentication – anyone can access prediction interface

11. Future Enhancements

Add login for doctors

Store results in MongoDB

Enable PDF report downloads

Add chatbot or mobile version