**Ideation Phase**

**Define the Problem Statements**

|  |  |
| --- | --- |
| Date | 28 June 2025 |
| Team ID | LTVIP2025TMID36031 |
| Project Name | **Revolutionizing Liver Care : Predicting Liver Cirrhosis using Advanced Machine Learning Techniques** |
| Maximum Marks | 2 Marks |

**Customer Problem Statement :**

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 developed predictive model holds promise for early detection and prognosis of liver cirrhosis, enabling healthcare professionals to initiate timely interventions and personalized treatment strategies. By accurately identifying individuals at risk of cirrhosis, this research contributes to improved patient outcomes and the optimization of healthcare resources. Moreover, it highlights the potential of machine learning in the field of hepatology, showcasing its ability to leverage clinical data for predictive modelling and decision support.

**Example: How Liver Care AI Predicts Liver Cirrhosis Risk**

**🧑‍⚕️ Use Case: Patient Risk Assessment**

Let’s say a doctor is examining a 45-year-old patient who has chronic liver issues and recent lab test results. Instead of waiting for multiple consultations or specialist reviews, the doctor uses **Liver Care AI** to get an instant risk prediction.

**📝 Patient Inputs:**

The doctor enters the following values into the prediction form:

* **Total Bilirubin : 0.8 mg/dL**
* **Direct Bilirubin : 0.2 mg/dL**
* **Alkaline Phosphatase : 110 U/L**
* **ALT (Alanine Transaminase) : 28 U/L**
* **AST (Aspartate Transaminase) : 28 U/L**
* **Total Proteins : 7.0 g/dL**
* **Albumin : 4.0 g/dL**
* **A/G Ratio (Albumin/Globulin) : 1.33**

**🤖 Model Prediction:**

Once the values are submitted, the XGBoost model processes the data and returns:

* **Prediction:** *Negative for Liver Cirrhosis*
* **Risk Level:** *Low*
* **Confidence Score:** *50 %*

**📊 Visual Output:**

* A green “Low Risk” badge appears.
* A confidence meter shows a 50 % likelihood.
* A short explanation like:  
  *“The input pattern closely matches clinical profiles of liver cirrhosis patients in our dataset. Continue regular health monitoring and maintain a healthy lifestyle.*

**🩺 Outcome:**

This quick, data-driven insight reassures the doctor of normal liver function, allowing them to avoid unnecessary referrals, continue routine monitoring, and confidently assure the patient—all within seconds.**.**