**Project Design Phase**

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| Date | 30 JUNE 2025 |
| Team ID | LTVIP2025TMID60863 |
| Project Name | Revolutionizing liver care; predicting liver cirrhosis using advanced machine learning techniques |
| Maximum Marks | 2 Marks |

**Problem – Solution Fit Template:**

**Problem-Solution Fit Canvas**

**Project Title:**

**Predicting Liver Cirrhosis Using Advanced Machine Learning Techniques**

**Project Description:**

LiverAI is an advanced machine learning-based platform focused on early prediction and monitoring of liver cirrhosis. Leveraging state-of-the-art algorithms such as Random Forest, XGBoost, and Neural Networks, LiverAI analyzes medical data to identify early signs of cirrhosis with high accuracy. The platform allows healthcare professionals and users to input clinical data (such as bilirubin levels, albumin, AST/ALT ratios, and demographic attributes) and receive predictive insights on cirrhosis risk.

Using Python, Scikit-learn, and Streamlit for deployment, LiverAI ensures ease of use, scalability, and accurate risk stratification. The system integrates visualization tools, risk categorization, and follow-up recommendations, offering a comprehensive decision-support system for clinicians and patients alike.

By addressing the gap in early cirrhosis detection, LiverAI empowers proactive intervention, improved treatment planning, and ultimately better patient outcomes.

**Purpose:**

☑ **Solve complex problems in a way that fits the state of your customers:**  
LiverAI addresses the diagnostic challenges in early-stage liver cirrhosis, especially in patients with vague or overlapping symptoms, by providing accurate, data-driven risk predictions.

☑ **Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior:**  
The platform is compatible with electronic health records (EHRs) and can be integrated into existing healthcare systems, improving clinician workflows and patient engagement.

☑ **Sharpen your communication and marketing strategy with the right triggers and messaging:**  
Clear insights, easy-to-understand reports, and visualization tools make LiverAI a reliable assistant for medical staff, while its user-friendly design supports patient comprehension and trust.

☑ **Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems:**  
By reducing the likelihood of late diagnosis—a costly and often fatal issue—LiverAI builds credibility with both patients and healthcare providers.

☑ **Understand the existing situation in order to improve it for your target group:**  
The project is based on a detailed analysis of existing medical datasets and real-world diagnostic challenges. It helps doctors intervene early, monitor disease progression, and personalize patient care plans.

**Scenarios:**

**Scenario 1: Symptom & Lab Input for Prediction**

A clinician or user inputs lab results and demographic details (e.g., bilirubin, albumin, age, sex). The model analyzes this data to provide a cirrhosis risk score, including the probability of disease presence and classification into severity stages (e.g., compensated vs. decompensated).

**Scenario 2: Monitoring Disease Progression**

Patients previously diagnosed with early cirrhosis use the platform periodically to update lab values. The system tracks progression trends and provides alerts or insights into potential deterioration.

**Scenario 3: Treatment Support for High-Risk Patients**

When a high-risk prediction is made, the platform provides recommended clinical pathways based on standard guidelines, helping healthcare providers determine next steps such as further testing, imaging, or referrals.

**Scenario 4: Medical Insight Through Patient Chat**

Patients can ask LiverAI questions about their liver function results, symptoms, or medications. The AI provides factual, empathetic responses while indicating when specialist consultation is needed.

**References:**

1. [Problem-Solution Fit Canvas – IdeaHackers Network](https://www.ideahackers.network/problem-solution-fit-canvas/)
2. [Problem-Solution Fit – Medium Article by Epicantus](https://medium.com/@epicantus/problem-solution-fit-canvas-aa3dd59cb4fe)