**Project Design Phase-II**

**Solution Requirements (Functional & Non-functional)**

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| Date | 21 JUNE 2025 |
| Team ID | LTVIP2025TMID33932 |
| Project Name | Revolutionizing Liver Care : Predicting Liver Cirrhosis using Advanced Machine Learning Techniques |
| Maximum Marks | 4 Marks |

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

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| **FR No.** | **Functional Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| FR-1 | Data Acquisition | |  | | --- | | - Collect liver patient data from open datasets (e.g., Kaggle, UCI)  - Gather clinical attributes like bilirubin, albumin, INR, etc. |  |  |  |  | | --- | --- | --- | |  |  |  | |
| FR-2 | Data Preprocessing | - Handle missing values and outliers  - Normalize and standardize features  - Encode categorical variables |
| FR-3 | Liver Cirrhosis Prediction Model | - Train ML model using historical liver patient data  - Apply cross-validation and hyperparameter tuning |
| FR-4 | Prediction API / Dashboard Interface | - Expose liver cirrhosis prediction via API  - Visualize patient risk levels on user-friendly dashboards |
| FR-5 | Clinical Decision Support System (CDSS) | - Generate insights and alerts for early diagnosis  - Assist healthcare professionals in treatment planning |
| FR-6 | System Monitoring and Model Retraining | - Track model performance with new patient data  - Enable scheduled retraining to maintain accuracy |

**Non-functional Requirements:**

Following are the non-functional requirements of the proposed solution.

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| **FR No.** | **Non-Functional Requirement** | **Description** |
| NFR-1 | **Usability** | Intuitive and accessible UI for doctors, healthcare staff, and researchers |
| NFR-2 | **Security** | Secure handling of patient data with encryption, authentication, and role-based access control |
| NFR-3 | **Reliability** | Consistent prediction accuracy and stable system performance in clinical settings |
| NFR-4 | **Performance** | Prediction results delivered within 2 seconds for uploaded patient data |
| NFR-5 | **Availability** | System operational 24/7 for continuous usage in healthcare facilities |
| NFR-6 | **Scalability** | Capable of managing growing patient data and supporting multiple hospitals/clinics simultaneously |