**Project Development Phase**

**Model Performance Test**

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| Date | 10 February 2025 |
| Team ID | LTVIP2025TMID54121 |
| Project Name | revolutionizing liver care |
| Maximum Marks |  |

📊 **Model Performance Testing – Liver Care**

| **Component** | **Details** |
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| **Objective** | To assess the accuracy, reliability, and clinical utility of AI/ML models in liver care applications |
| **Application Area** | - Liver disease diagnosis (e.g., NAFLD, cirrhosis) - Risk prediction - Diet/treatment planning |
| **Input Data** | - Liver enzyme levels (ALT, AST, Bilirubin) - Demographic data - Imaging (MRI, Ultrasound) - Lifestyle and medication history |
| **Output/Goal** | - Disease classification (Yes/No) - Risk level prediction - Clinical decision support |
| **Performance Metrics** | - **Accuracy** – Overall correctness of predictions - **Precision** – Correct positive predictions - **Recall (Sensitivity)** – Detection rate for actual cases - **F1 Score** – Balance between precision and recall - **AUROC** – Ability to distinguish disease vs non-disease - **MSE/MAE** – For regression tasks like predicting liver scores |
| **Testing Methods** | - Train/Test/Validation split - K-fold Cross-Validation - External Validation with unseen data |
| **Bias & Fairness Testing** | - Check for performance gaps across gender, age, ethnicity |
| **Interpretability Tools** | - SHAP / LIME for feature importance and transparency |
| **Performance Thresholds** | - Minimum acceptable AUROC (e.g., >0.85) - F1 Score (e.g., >0.80 for high-risk detection) |
| **Tools/Platforms Used** | - Python (scikit-learn, TensorFlow, PyTorch) - R (caret, mlr) - Jupyter, Colab |
| **Documentation Output** | - Model performance report - Confusion matrix - Interpretability & bias audit |
| **Next Step Decision** | - Proceed to deployment - Retrain with more data - Review with clinical experts |