**Project Initialization and Planning Phase**

|  |  |
| --- | --- |
| Date | 12th June 2024 |
| Team ID | LTVIP2025TMID44055 |
| Project Title | **Revolutionizing Liver Care : Predicting**  **Liver Cirrhosis Using Advanced Machine**  **Learning Techniques** |
| Maximum Marks | 3 Marks |

**Project Proposal (Proposed Solution)**

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

|  |  |
| --- | --- |
| **Project Overview** |  |
| Objective | To develop an advanced machine learning model that predicts the onset or progression of liver cirrhosis, facilitating early detection and intervention, and improving patient outcomes. |
| Scope | * **Data Sources**: Integrate patient data such as medical history, lab results, and lifestyle factors. * **Model Development**: Utilize state-of-the-art machine learning techniques to create a predictive model. * **Deployment**: Implement the model in healthcare settings to support patient screening, treatment planning, and resource allocation. |
| **Problem Statement** |  |
| Description | This project aims to revolutionize liver care by creating a machine learning model to predict liver cirrhosis. Liver cirrhosis, characterized by the scarring of liver tissue, results from long-term liver damage. The model will analyze comprehensive patient data to predict the likelihood of cirrhosis, assisting healthcare professionals in making informed decisions about patient care. |
| Impact | • **Early Detection**: Enables early intervention, potentially improving patient outcomes and preventing complications. |

|  |  |  |
| --- | --- | --- |
| **Resource Type** | **Description** | **Specification/Allocation** |
| **Hardware** |  |  |
| Computing Resources | CPU/GPU specifications, number of cores | 2 x NVIDIA V100 GPUs |
| Memory | RAM specifications | 8 GB |
| Storage | Disk space for data, models, and logs | 1 TB SSD |
| **Software** |  |  |

**Software**

|  |  |
| --- | --- |
|  | * **Improved Treatment**: Assists in creating personalized treatment plans for patients at risk of or already suffering from liver diseases. * **Optimized Resource Allocation**: Helps healthcare facilities prioritize high-risk patients, ensuring efficient use of resources and timely care. |
| **Proposed Solution** |  |
| Approach | * **Data Collection**: Gather and preprocess patient data, including medical history, lab results and lifestyle factors. * **Model Training**: Develop and train machine learning models using advanced techniques. * **Validation and Testing**: Validate the model using existing patient data and test its predictive accuracy. * **Deployment**: Integrate the model into healthcare systems such as EHR for real-time use. * **Monitoring and Iteration**: Continuously monitor model performance and update as needed based on new data and outcomes. |
| Key Features | * **Predictive Analytics**: Provides early warning signals for liver cirrhosis onset and progression. * **Resource Optimization**: Enhances the allocation of healthcare resources by identifying high-risk patients who need immediate attention. * **Continuous Learning**: Adapts and improves over time with new data inputs and outcomes. * **User Interface**: Develop a user-friendly interface for healthcare providers. |

**Resource Requirements**

|  |  |  |
| --- | --- | --- |
| Frameworks | Python frameworks | Flask |
| Libraries | Additional libraries | scikit-learn, pandas, numpy, matplotlib, seaborn. |
| Development Environment | IDE, version control | Jupyter Notebook, Git |
| **Data** |  |  |
| Data | Source, size, format | Kaggle dataset, 950 rows X 42 columns, EXCEL |