Project Initialization and Planning Phase

Date	15th June 2024
Team ID	SWTID1720080161
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.

	• **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

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		

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