Project Initialization and Planning Phase

Date	10 July 2024
Team ID	SWTID1720078683
Project Title	Anemia Sense: Leveraging Machine Learning for Precise Anemia Recognitions
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	The objective of Anemia sense is to develop a machine learning-based system for the accurate detection and management of anemia. By leveraging advanced algorithms and comprehensive blood parameter data, Anemia sense aims to provide precise recognition of anemia condition. This system will enhance early diagnosis, improve patient outcomes.
Scope	The Anemia sense project will focus on developing a machine learning system for accurate anemia detection and management. This includes collecting and preprocessing relevant blood parameter data, training and validating machine learning models, and creating a user-friendly interface for healthcare providers. The project will also cover system integration with existing medical records and ensure rigorous testing and maintenance. However, it will not involve direct patient treatment, hardware development, or extensive longitudinal studies.
Problem Statement	
Description	Anemia, marked by a deficiency of red blood cells or hemoglobin, often goes undetected or is diagnosed late due to traditional, time-consuming methods. This delay can lead to severe health complications. Anemia sense aims to solve this by using machine learning algorithms to improve the accuracy and efficiency of anemia detection, enhancing early diagnosis, and supporting better patient outcomes.

Impact	Solving the problem of timely and accurate anemia detection with Anemia sense will enable early diagnosis and prompt treatment, reducing health complications. Healthcare providers will benefit from a reliable tool that improves efficiency and accuracy, leading to better patient outcomes and lower healthcare costs.
Proposed Solution	
Approach	To detect the presence of anemia using patient data, we will develop a Gradient Boosting model utilizing features such as Gender, Hemoglobin levels, MCH, MCHC, and MCV. The process includes data preprocessing to handle missing values, encoding categorical variables, and standardizing numerical features. After preprocessing, we will train the Gradient Boosting model and evaluate its performance using metrics like accuracy, precision, recall, and the confusion matrix.
Key Features	Our approach includes thorough data preprocessing, emphasizing under sampling to handle class imbalance effectively. Critical features such as Gender, Hemoglobin, MCH, MCHC, and MCV are pivotal for anemia detection. Leveraging a Gradient Boosting model for its robust classification capabilities, we ensure accuracy, precision, recall, and confusion matrix metrics are rigorously evaluated to ensure dependable predictions.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	Integrated GPUs
Memory	RAM specifications	8 GB
Storage	Disk space for data, models, and logs	512 GB SSD
Software		
Frameworks	Python frameworks	Flask
Libraries	Additional libraries	Matplotlib, Seaborn, Scikit-learn, pandas, NumPy

Development Environment	IDE, version control	Jupyter Notebook, Git
Data		
Data	Source, size, format	Smart Wallet Platform, 1421 rows of data, CSV file