Project Initialization and Planning Phase

Date	24 August 2025
Member ID	Aditya Pol
Project Title	Fetal AI Health Application
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 a machine learning-based web application that accurately classifies fetal health into Normal, Suspect, or Pathological categories using cardiotocog raphy (CTG) data, enhancing prenatal care accessibility and reliability
Scope	Theprojectfocusesonprocessingthefetal_health.csvdataset(2126records, 21 features) to train an XGBoost model, integrated into a Flask web application. It includes data preprocessing, model training, hyperparameter tuning, and deployment with a user interface (index.html, result.html) and API support. Thesystemislimited to the three health categories and assumes valid CTGinput data.
Problem Statement	
Description	Accurate fetal health assessment via CTG is complex and time-consuming, re quiring expert analysis. This project addresses the need for an automated, ac cessible tool to support healthcare providers and expectant parents in timely decision-making
Proposed Solution	
Approach	The solution employs an XGBoost model trained on preprocessed CTG data, de ployed via a Flask web application. The approach includes: • Data preprocessing with StandardScaler and stratified sampling. • Model training and optimization using GridSearchCV. • Webinterface for inputting 21 CTG metrics and displaying predictions
Key Features	• Classification of fetal health (Normal, Suspect, Pathological). • User-friendly web form and result display. • API for medical system integration. • Robust handling of class imbalance with class weights.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	8-core CPUs and optional GPU	2 x NVIDIA V100 GPUs
Memory	RAM	Minimum 8 GB RAM
Storage	SSD	256 GBSSD
Software		
Frameworks	Python frameworks	Python, Flask
Libraries	Additional libraries	scikit-learn, xgboost, flask, pandas, numpy
Development Environment	IDE, version control	Jupyter Notebook
Data		
Data	Size: - Approx. **2126 records** records initially; Format: - CSV for tabular datasets, Text/HTML for scraped reviews	**fetal_health.csv, 2126 records, CSV**