FETALAI:USING MACHINE LAERNING TO PREDICT AND MONITOR FETAL HEALTH

Milestone 1: Project Initialization and Planning Phase

The "Project Initialization and Planning Phase" for the "Fetal AI: Using Machine Learning to Predict and Monitor Fetal Health" project defines goals, scope, and stakeholders, establishing project parameters and allocating resources. This phase includes risk assessment and mitigation planning, ensuring a clear, aligned, and proactive approach. Successful initiation sets the foundation for a well-organized and efficient project in prenatal care and fetal health monitoring.

Activity 1: Define Problem Statement
Problem Statement: "FetalAI: Utilizing machine learning to predict and monitor fetal health, aiming to enhance prenatal care by providing early detection of potential complications and real-time health monitoring for expectant mothers.

Ref. template: Click Here
Fetal AI Problem Statement Report: Click Here

Activity 2: Project Proposal (Proposed Solution)
The "Fetal AI" project leverages machine learning to predict and monitor fetal health using a comprehensive dataset including maternal health indicators and real-time monitoring data. This initiative aims to enhance prenatal care, reduce risks, and improve outcomes for mothers and babies. By providing precise and early detection of potential issues, it aims to improve healthcare delivery and patient satisfaction.

Ref. template: Click Here
Fetal AI Project Proposal Report: Click Here

Activity 3: Initial Project Planning
Initial Project Planning for the "Fetal AI: Using Machine Learning to Predict and Monitor Fetal Health" project involves outlining key objectives, defining scope, and identifying stakeholders. It encompasses setting timelines, allocating resources, and determining the overall project strategy. During this phase, the team establishes a clear understanding of the dataset, formulates goals for analysis, and plans the workflow for data processing. Effective initial planning lays the foundation for a systematic and well-executed project, ensuring successful outcomes in prenatal care and fetal health monitoring.

Ref. template: Click Here

Fetal AI Project Planning Report: [Click Here](#)

Milestone 2: Data Collection and Preprocessing Phase

The Data Collection and Preprocessing Phase for the "Fetal AI" project involves gathering relevant fetal health data from medical records and sensors, ensuring data quality through verification and addressing missing values. Preprocessing tasks include cleaning, encoding, and organizing the dataset for subsequent exploratory analysis and machine learning model development. This phase ensures a reliable foundation for accurate fetal health predictions.

Activity 1: Data Collection Plan, Raw Data Sources Identified, Data Quality Report

The dataset for "Fetal AI: Predicting and Monitoring Fetal Health" is sourced from medical records and sensor data. It includes maternal health indicators and fetal monitoring metrics. Data quality is ensured through thorough verification, addressing missing values, and adhering to ethical guidelines, establishing a reliable foundation for predictive modeling.

Ref. template: [Click Here](#)
Fetal AI Data Collection Report:[Click Here](#)

Activity 2: Data Quality Report

The dataset for "Fetal AI: Using Machine Learning to Predict and Monitor Fetal Health" is sourced from medical records and sensor data, encompassing maternal health indicators and fetal monitoring metrics. Data quality is ensured through thorough verification, addressing missing values, and adhering to ethical guidelines, establishing a reliable foundation for predictive modeling in prenatal care.

Ref. template: [Click Here](#)

Fetal AI Data Quality Report: [Click Here](#)

Activity 3: Data Exploration and Preprocessing

Data Exploration in "Fetal AI: Using Machine Learning to Predict and Monitor Fetal Health" involves analyzing medical records and sensor data to understand patterns, distributions, and anomalies. Preprocessing includes handling missing data, scaling features, and encoding relevant health indicators. These steps are critical for ensuring data quality and reliability in predicting and monitoring fetal health outcomes.
Ref. template: [Click Here](#)
Fetal AI Data Exploration and Preprocessing Report: [Click Here](#)

Milestone 3: Model Development Phase

The Model Development Phase in "Fetal AI: Using Machine Learning to Predict and Monitor Fetal Health" involves crafting predictive models using algorithms like Random Forest, Decision Tree, KNN, and Logistic regression. This phase includes strategic feature selection from maternal health indicators and fetal monitoring metrics, rigorous training, and validation to assess model performance for accurate predictions in fetal health monitoring and care.

Activity 1: Feature Selection Report

The Feature Selection Report in "Fetal AI" outlines the rationale for selecting maternal health indicators and fetal monitoring metrics (e.g., maternal age, medical history). It evaluates their relevance and importance for accurate predictive modeling in fetal health monitoring and care.

Ref. template: [Click Here](#)
Fetal AI Feature Selection Report: [Click Here](#)

Activity 2: Model Selection Report

The Model Selection Report for "Fetal AI" details the rationale for choosing machine learning models like Random Forest, Decision Tree, KNN, and Logistic Regression based on their capabilities in handling complex fetal health data, interpretability, and predictive performance, ensuring alignment with project objectives.

Ref. template: [Click Here](#)
Fetal AI Model Selection Report: [Click Here](#)

Activity 3: Initial Model Training Code, Model Validation and Evaluation Report

The Initial Model Training Code applies selected algorithms to fetal health data, establishing the foundation for predictive modeling. The subsequent Model Validation and Evaluation Report rigorously assesses model performance using metrics like sensitivity and specificity to ensure reliability in predicting fetal health outcomes.

Ref. template: [Click Here](#)
Fetal AI Model Development Phase Template: [Click Here](#)

Milestone 4: Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining machine learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Activity 1: Hyperparameter Tuning Documentation
-

Activity 2: Performance Metrics Comparison Report
The Performance Metrics Comparison Report contrasts the baseline and optimized metrics for various models, specifically highlighting the enhanced performance of the Random Forest model. This assessment provides a clear understanding of the refined predictive capabilities achieved through hyperparameter tuning.

Activity 3: Final Model Selection Justification
The Final Model Selection Justification articulates the rationale for choosing Random Forest model as the ultimate model. Its exceptional accuracy, ability to handle complexity, and successful hyperparameter tuning align with project objectives, ensuring optimal loan approval predictions.

Ref. template: [Click Here](#)
Fetal AI Model Optimization and Tuning Phase Report: [Click Here](#)

Milestone 5: Project Files Submission and Documentation
For project file submission in Github, Kindly click the link and refer to the flow. [Click Here](#)

For the documentation, Kindly refer to the link. [Click Here](#)

Milestone 6: Project Demonstration
In the upcoming module called Project Demonstration, individuals will be required to record a video by sharing their screens. They will need to explain their project and demonstrate its execution during the presentation. [Click Here](#)