MaternAI: Predicting Pregnancy Risks with Machine Learning

Project Statement:

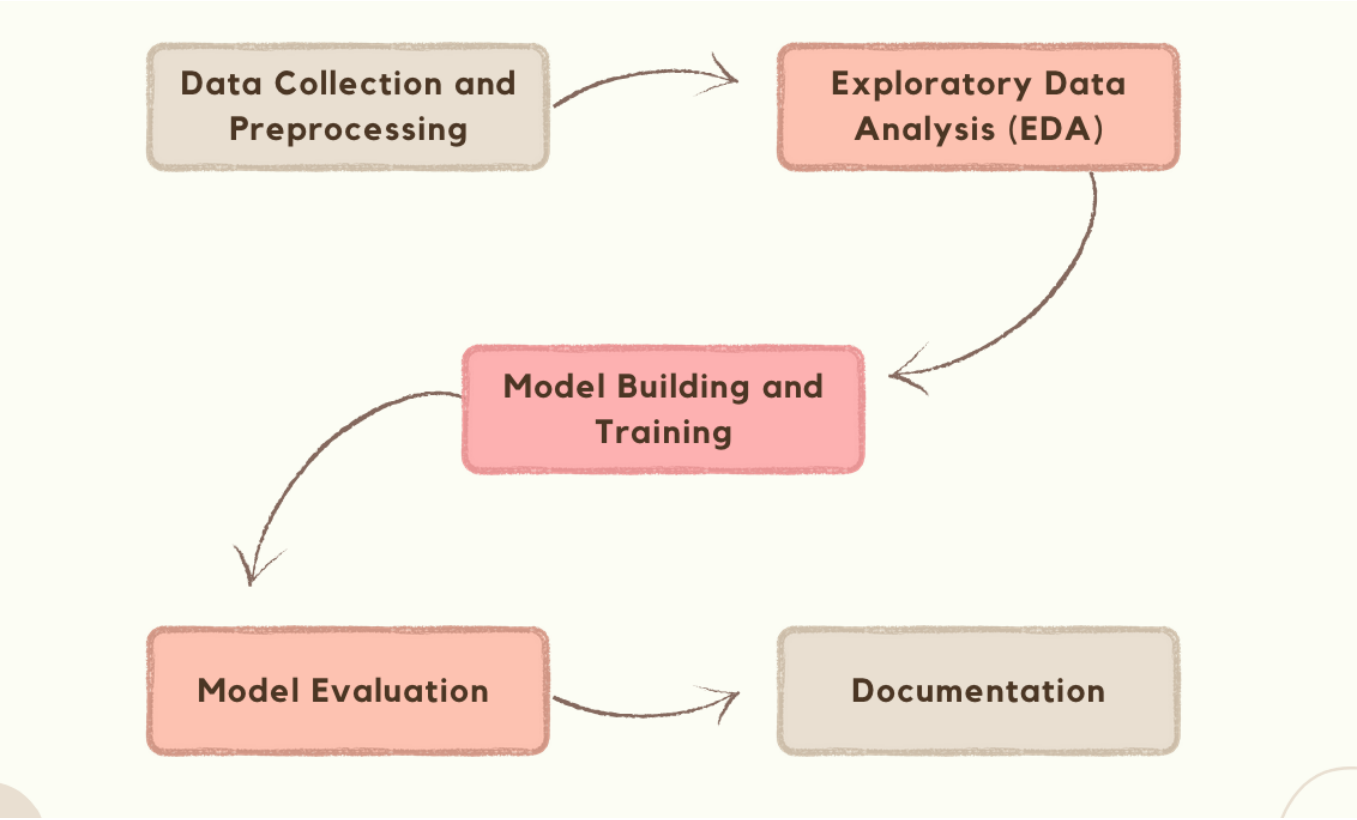
This project aims to develop a predictive model to assess pregnancy risk based on various factors such as age, blood pressure, blood sugar levels, and other relevant parameters.

Outcomes:

- Develop a predictive model to classify pregnancy risk levels.
- Achieve high accuracy, precision, recall, and F1-score in model evaluation.
- Identify key factors influencing pregnancy risk.
- Provide actionable insights for healthcare providers.

Modules to be Implemented:

- Data Collection and Preprocessing
- Exploratory Data Analysis (EDA)
- Model Building and Training
- Model Evaluation and Refinement
- Deployment and Documentation



Week-wise Module Implementation

Milestone 1: Weeks 1-2

Week 1: Data Collection and Preprocessing

- Gather relevant data from various sources (e.g., hospitals, clinics).
- Ensure data quality and handle missing values.
- Create a data dictionary documenting data sources, variables, and definitions.

Week 2: Exploratory Data Analysis (EDA)

- Conduct initial exploratory data analysis (EDA) to understand data distribution.
- Identify potential outliers and anomalies.
- Create visualizations to explore relationships between variables.
- Generate summary statistics.

Milestone 2: Weeks 3-4

Week 3: Data Preprocessing and Feature Engineering

- Perform data cleaning and preprocessing (e.g., normalization, scaling).
- Create new features or transform existing ones if necessary.
- Split data into training, validation, and testing sets.

Week 4: Model Selection and Implementation

- Select appropriate machine learning algorithms (e.g., Random Forest, Gradient Boosting, SVM).
- Create baseline models for comparison.
- Implement initial model training and evaluation.

Milestone 3: Weeks 5-6

Week 5: Hyperparameter Tuning and Model Optimization

- Fine-tune model hyperparameters using techniques like grid search or random search.
- Evaluate model performance using cross-validation.
- Identify and address overfitting or underfitting issues.

Week 6: Model Evaluation and Refinement

- Conduct comprehensive model evaluation using relevant metrics (accuracy, precision, recall, F1-score).
- Create a confusion matrix to assess model performance.
- Select the best-performing model based on evaluation results.
- Analyze feature importance to identify key factors influencing pregnancy risk.

Milestone 4: Weeks 7-8

Week 7: Model Interpretation and Deployment Planning

- Create visualizations to explain model predictions.
- Prepare a deployment

Week 8: Final Report and Documentation

- Prepare a comprehensive project report summarizing findings and recommendations.
- Create a presentation to communicate results effectively.
- Finalize documentation, including code, data, and methodology.

Grading Criteria for Each Module

- **Module 1:** Data quality, completeness, and documentation.
- **Module 2:** Depth of EDA, insights generated, and data visualization quality.
- **Module 3:** Model selection, training, and initial evaluation.
- **Module 4:** Model optimization, performance improvement, and final report.