Project Report: Easy Labor Prediction with Machine Learning

Project Title : Easy Labor Prediction with Machine Learning using FastAPI

Project Overview

This project focuses on building a machine learning application that predicts the likelihood of labor onset using physiological data and deploying it via a FastAPI-powered web API. It aims to support healthcare professionals and pregnant individuals by providing early insights based on predictive modeling.

Objectives

- Build a supervised ML model to predict the likelihood of labor.
- Serve the prediction model through a clean RESTful API using FastAPI.
- Containerize the application using Docker for easy deployment.
- Deploy the application for public access via a cloud service or CI/CD pipeline.

Tools & Technologies

Language: Python
Tracking the Experiment: MLfow
Framework: FastAPI
API Testing: Swagger UI
Containerization: Docker
Deployment Options: Render
Version Control: Git & GitHub

ML Pipeline Summary

1. Data Ingestion
2. EDA process
3. Feature Engineering
4. Model Training and Evaluation
5. Hyperparameter Tuning

API Details

- **Endpoint:** `/predict`
- **Method:** POST
- **Input:** JSON with features
- **Output:** JSON with prediction

Dockerization Steps

Dockerfile defines Python environment and app startup.
App is containerized and tested via Docker CLI.

Easily deployable across cloud environments.

Deployment

- Image built with Docker.
- Deployment tested locally.
- CI/CD (GitHub Actions) can be configured.
- Hosted using Render

Current Status

- ML model trained and evaluated
- Experiment Tracked
- FastAPI application built
- Dockerized and tested locally
- Deployment done
- CI/CD integrated