Hotel Reservation Cancellation Prediction

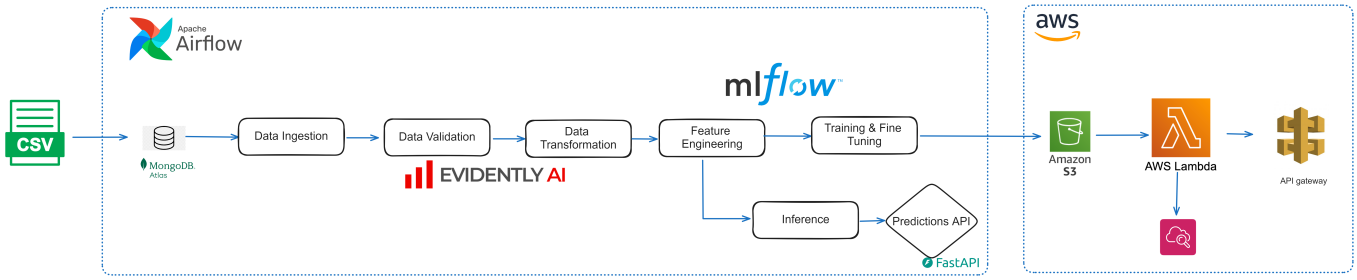
Project Overview

This project aims to design an end-to-end machine learning (ML) system for predicting hotel reservation cancellations. The objectives are twofold:

1. **End-to-End ML System**: Create a complete ML workflow from the data science project to deployment on AWS, utilizing CI/CD with GitHub Actions.
2. **Causal Machine Learning**: Utilize causal machine learning techniques to predict whether a customer will cancel their reservation.

Code Architecture

The project is divided into several components:



1. Data Ingestion

- Data will be ingested directly from MongoDB Atlas.

2. Data Validation

- This component validates the expected columns and returns `False` if any important columns for prediction are missing.

3. Data Transformation

- This component involves transforming the data, including:
  - Converting object features to numerical values.
  - Splitting the data into training and test sets.
  - Verifying data drift with Evidently AI.

4. Feature Engineering

- This part involves conducting analysis to add significant variables that provide more information about the customer while reducing the amount of data.

5. Training

- Train models using Random Forest and Gradient Boosting with hyperparameter tuning via Random Search. Although other models could be explored, the primary aim of this project is deployment.

- Monitor model performance using MLflow.

6. Inference

- This component is responsible for running the inference pipeline on new data.