Sales Performance Prediction Project Documentation

Overview

This project aims to predict employee and team sales performance using a machine learning model (XGBoost) integrated with Firebase and OpenAI. Firebase Firestore is used for data storage, while OpenAI provides natural language insights based on predictions. This project automates data analysis and allows real-time predictions via API endpoints.

Project Workflow

1. Upload Data: Data is uploaded to Firebase using upload_data.py.

2. Explore Data: Basic analysis is performed using explore_data.py.

3. Clean Data: Data cleaning is handled by clean_data.py.

4. Train Model: The model is trained using train_model.py with XGBoost.

5. Cloud Functions: API endpoints are created using index.js and deployed to Firebase.

6. API Integration: OpenAI is integrated for insights and tested via Postman.

Requirements and Installation

1. Python 3.x

2. Firebase CLI

3. Node.js

4. Required Libraries: joblib, numpy, pandas, xgboost, firebase-admin

Installation Commands:

- npm install

- npm install openai

- pip install joblib numpy pandas xgboost firebase-admin

Command List

1. Upload Data: python upload_data.py

2. Explore Data: python explore_data.py

3. Clean Data: python clean_data.py

4. Train Model: python train_model.py

5. Start Firebase Emulator: firebase emulators:start --only functions

6. Deploy Cloud Functions: firebase deploy --only functions

Detailed Steps

1. Uploading Data: Use upload_data.py to upload your dataset to Firebase.

2. Exploring Data: Use explore_data.py to download and perform basic analysis.

3. Cleaning Data: Use clean_data.py to handle missing values and outliers.

4. Training Model: Run train_model.py to create an XGBoost model.

   - XGBoost was chosen for its performance in regression tasks.

5. Creating Cloud Functions: Use index.js to create API endpoints.

6. Testing APIs: Use Postman to test your endpoints with different inputs.

OpenAI API Limitations

Be aware of the following limitations with OpenAI's API:

- Rate limits may apply depending on your subscription.

- Monitor usage to avoid exceeding your quota.

- Handle API errors gracefully in your application.

Conclusion

This project demonstrates how to integrate machine learning with Firebase and OpenAI to predict sales performance. The workflow ensures real-time data access, predictions, and automated insights through cloud functions and APIs.