**Instructions for Running the Code and API**

**1. Introduction**

This document provides detailed, step-by-step instructions for setting up, running, and testing the machine learning code and the Flask API developed for the Airbnb Market Analysis and Real Estate Sales Data project. The project includes a trained model saved as best\_model.pkl and the API code in app.py. Following these instructions will allow you to install the necessary dependencies, run the Flask server, and test the API using your web browser or cURL commands.

**2. Prerequisites**

Before proceeding, ensure you have the following:

* **Python 3.x** installed on your system.
* Required Python packages:
  + flask
  + scikit-learn
  + numpy
  + pandas
* The files app.py and best\_model.pkl are located in the same directory. For example, you might have them saved in:

C:\Users\HP\Desktop\Quarter 5\EAI6020 AI Systems Technology\Week 3\Assignment

**3. Setup**

**Step 1:** Download or clone the project repository, ensuring that app.py and best\_model.pkl are in the designated folder.

**Step 2:** Open Command Prompt or PowerShell.

**Step 3:** Navigate to the project directory by entering the following command:

cd "C:\Users\HP\Desktop\Quarter 5\EAI6020 AI Systems Technology\Week 3\Assignment"

**4. Installation of Dependencies**

Install the necessary packages using pip. Run the following command in your terminal:

pip install flask scikit-learn numpy pandas

This command installs all required libraries to run both the machine learning code and the Flask API.

**5. Running the Flask API**

**Step 1:** Start the Flask server. In your terminal, within the project directory, run:

python app.py

Upon execution, you should see output similar to:

\* Serving Flask app 'app'

\* Debug mode: on

WARNING: This is a development server. Do not use it in a production deployment.

\* Running on http://127.0.0.1:5000

Press CTRL+C to quit

**Step 2:** Access the API by opening your web browser and navigating to:

http://127.0.0.1:5000/

The home route is configured to return a JSON response with a default prediction along with a descriptive message. The response might look like this:

{

"message": "Prediction of property revenue based on the input values. The input includes normalized features for bedrooms, bathrooms, guests, openness, occupancy, nightly rate, lead time, and length stay, plus one-hot encoded categorical features.",

"prediction": [ -0.05461 ]

}

**Note:** The prediction value is normalized. To convert it back to the original revenue units, apply the inverse transformation using the scaler utilized during preprocessing.

**6. Testing the API Using cURL in PowerShell**

Below are two examples of cURL commands you can use in PowerShell:

**6.1. GET Request (Default Home Route):**

Run the following command in PowerShell to test the default home route:

curl.exe http://127.0.0.1:5000/

This command sends a GET request to the home route and displays the JSON response with the default prediction.

**6.2. POST Request (Predict Endpoint):**

If your API also defines a POST endpoint (e.g., /predict), use this command to send a sample input:

curl.exe -X POST -H "Content-Type: application/json" -d "{\"input\": [-0.5, -0.3, 0.2, 0.1, 0.0, 0.05, -0.1, 0.0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]}" http://127.0.0.1:5000/predict

This command sends a POST request with a JSON payload containing an array of 51 features (8 normalized numeric values followed by 43 zeros representing one-hot encoded categorical features). Adjust these values if your model expects different input.

The API should return a JSON response containing the predicted value.

**7. Code Structure Overview**

* **app.py:** Contains the Flask API code. This file:
  + Loads the pre-trained model from best\_model.pkl.
  + Defines a default home route (/) that returns a default prediction using a sample input.
  + Optionally defines a /predict endpoint to accept POST requests with custom input data.
* **best\_model.pkl:** The serialized machine learning model file.

**8. Troubleshooting**

* **404 Not Found Errors:**  
  If you receive a 404 error when navigating to http://127.0.0.1:5000/, verify that your app.py includes a route for / and that the file is saved and running correctly.
* **Module Not Found Errors:**  
  Ensure that all required packages are installed. If errors occur, re-run the pip install command.
* **File Not Found:**  
  Confirm that best\_model.pkl is in the same directory as app.py or update the file path in app.py accordingly.
* **Browser Cache Issues:**  
  If the expected output is not displayed, perform a hard refresh (Ctrl+F5) or use an incognito window.

**9. Summary**

By following these instructions, you will be able to:

* Install the necessary dependencies.
* Run the Flask API server locally.
* Access and test the API using a web browser and cURL commands in PowerShell.

This document provides clear and concise guidance for setting up and interacting with the machine learning model and its associated API. If you encounter any issues, please refer to the troubleshooting section for assistance.