Fetching Data Using OpenWeatherMap API

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Today

- Emphasize the importance of understanding APIs and data fetching in Python.
- Highlight the skills that will be learned in this session:
  - Fetching data using the OpenWeatherMap API.
  - Parsing JSON data.
  - Handling errors.

Review Homework

- Review the provided notebook on basics of Python

Introduction to OpenWeatherMap API

- The OpenWeatherMap API provides weather data for various locations. You need to sign up and get an API key to access the data.
- Steps to Get API Key:
  1. Go to OpenWeatherMap and sign up for an account.
  2. After signing up, navigate to the API keys section and generate a new API key.
  3. Keep this API key safe, as you will need it to make API requests.

Fetching Data

- Demonstrate how to use the `requests` library to fetch data from the OpenWeatherMap API.
- Introduce the concept of HTTP requests and responses.
- Show how to handle errors and exceptions in Python.

Example - Create Function

```
import requests

def fetch_weather_data(api_key, location):
    url = f"http://api.openweathermap.org/data/2.5/weather?q={location}&appid={api_key}"
    response = requests.get(url)
    if response.status_code == 200:
        data = response.json()
        return data
    else:
        print(f"Failed to fetch data: {response.status_code}")
        return None
```

Example - Use function

```
api_key = 'your_api_key_here'
location = 'London'
data = fetch_weather_data(api_key, location)
data
```

What is JSON

- JavaScript Object Notation,
- JSON is a text-based format
- JSON is easy to read and write
- JSON is widely used for data exchange

Parsing JSON Data

- JSON used to represent data.
- `import json` to serialise list, dict etc to JSON
- response.json() convert JSON to Python dict.
- Highlight the importance of data parsing and how it is used in the weather dashboard project.

Example - parse_weather_data

```
def parse_weather_data(data):
    if data:
        weather = {
            "Location": data["name"],
            "Temperature (K)": data["main"]["temp"],
            "Humidity (%)": data["main"]["humidity"],
            "Weather": data["weather"][0]["description"]
        }
        return weather
    else:
        return None

parsed_data = parse_weather_data(data)
parsed_data
```

Saving Data to a CSV File

- CSV another format for sharing data
- We'll save the fetched data to a CSV file using pandas.
- pandas open-source library for data manipulation and analysis

Example

```
import pandas as pd

def save_to_csv(data, filename):
    df = pd.DataFrame([data]). # convert dict to df
    df.to_csv(filename, index=False)

save_to_csv(parsed_data, 'data/raw/weather_data.csv')
```

```
df = pd.read_csv('data/raw/weather_data.csv')
df
```

Error Handling

- Introduce the concept of error handling in Python and its importance.
- Demonstrate how to use try-except blocks to handle errors in Python.
- Highlight the importance of error handling in the weather dashboard project.

Error Handling - Example

```
invalid_location = 'InvalidCity'
invalid_data = fetch_weather_data(api_key, invalid_location)
invalid_data
```

Breakout Room Activity

- Emphasise the importance of teamwork and collaboration in the project.
- Encourage students to work together to fetch and parse data for different cities.
- Encourage students to share their findings and discuss challenges.

Q&A and Wrap-Up

- In this session, we learned how to fetch weather data from the OpenWeatherMap API, parse the JSON response, and save the data to a CSV file. We also covered basic error handling to manage failed API requests.
- Any questions"
- The importance of practising and experimenting with the concepts learned in the session.
- Next session, we will focus on managing data with CSV and SQL.

Homework

- Experiment with fetching weather data for different cities.
- Explore the OpenWeatherMap API documentation to see what other data you can fetch.