

Managing Data Using CSV and SQL

Michael Borck

Table of contents

Today	2
OpenWeatherMap API (Homework)	2
Project Overview	3
Setup Project	3
Breakout Room Activity	3
Managing Data with CSV Files	3
Read data	3
Processing data	4
Saving data	4
Managing Data with SQL	4
Create database	4
inserting into table	5
Querying form table	5
Combining CSV and SQL Data Management	5
Code snippet:	6
Verify	6

Homework	6
Summary	6
Next Session	6

***ELECTRONIC WARNING NOTICE FOR COPYRIGHT
STATUTORY LICENCES***

WARNING

This material has been reproduced and communicated to you by or on behalf of **Curtin University** in accordance with section 113P of the *Copyright Act 1968 (the Act)*

The material in this communication may be subject to copyright under the Act. Any further reproduction or communication of this material by you may be the subject of copyright protection under the Act.

Do not remove this notice.

Today

- Learn how to manage weather data using CSV files
- Understand how to use SQL to store and retrieve weather data
- Practice reading, writing, and processing data with pandas and SQLite

OpenWeatherMap API (Homework)

- Navigate OpenWeatherMap API endpoints.

- Customise requests with parameters.
- Understand API response formats.
- Handle common API errors.

Project Overview

- Web app displays weather trends.
- Uses OpenWeatherMap API data.
- Shows current and forecast weather.
- Location selection and unit switch.
- Handles API errors gracefully.

Setup Project

- Create GitHub repository.
- Clone repository locally.
- Structure project folders.
- Create Python environment.
- Install dependencies via requirements.txt.

Breakout Room Activity

- Setup Project Folder and Environment

Managing Data with CSV Files

- Reading data from a CSV file
- Processing data by converting temperature from Kelvin to Celsius
- Writing data to a new CSV file

Read data

```
import pandas as pd

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

Processing data

```
def convert_temp_kelvin_to_celsius(temp_k):
    return temp_k - 273.15

df['Temperature (C)'] = df['Temperature (K)'].apply(convert_temp_kelvin_to_celsius)
df.drop(columns=['Temperature (K)'], inplace=True)
df
```

Saving data

```
df.to_csv('data/processed/processed_weather_data.csv', index=False)
```

Managing Data with SQL

- Creating a SQLite database and table
- Inserting data into the table
- Querying data from the table

Create database

```
import sqlite3

conn = sqlite3.connect('data/weather_data.db')
cursor = conn.cursor()

cursor.execute('''
    CREATE TABLE IF NOT EXISTS weather (
```

```

        location TEXT,
        temperature_c REAL,
        humidity INTEGER,
        weather_description TEXT
    )
'''
conn.commit()

```

inserting into table

```

for index, row in df.iterrows():
    cursor.execute('''
        INSERT INTO weather (location, temperature_c, humidity, weather_description)
        VALUES (?, ?, ?, ?)
        ''', (row['Location'], row['Temperature (C)'], row['Humidity (%)'], row['Weather']))
conn.commit()

```

Querying form table

```

cursor.execute('SELECT * FROM weather')
rows = cursor.fetchall()
for row in rows:
    print(row)

df_sql = pd.DataFrame(rows, columns=['Location', 'Temperature (C)', 'Humidity (%)', 'Weather'])
df_sql

```

Combining CSV and SQL Data Management

- Reading additional weather data from a CSV file
- Inserting data into the SQLite table
- Querying combined data from the SQLite table

Code snippet:

```
additional_data = pd.read_csv('data/raw/additional_weather_data.csv')
for index, row in additional_data.iterrows():
    cursor.execute('''
        INSERT INTO weather (location, temperature_c, humidity, weather_description)
        VALUES (?, ?, ?, ?)
    ''', (row['Location'], row['Temperature (C)'], row['Humidity (%)'], row['Weather']))
conn.commit()
```

Verify

```
cursor.execute('SELECT * FROM weather')
combined_rows = cursor.fetchall()
df_combined = pd.DataFrame(combined_rows, columns=['Location', 'Temperature (C)', 'Humidity (%)', 'Weather'])
df_combined
```

Homework

- Complete Understanding the Weather Dashboard Project: WeatherVista worksheet
- Write `fetch_data.py` and `test_fetch_data.py`
- Practice reading and writing data to CSV files with different weather datasets
- Explore additional SQL queries to retrieve specific subsets of the weather data

Summary

- manage weather data using CSV files and SQL.
- practice reading, writing, and processing data with pandas and SQLite
- combined both techniques to manage our weather data effectively.

Next Session

- we will focus on basic data visualisation with Matplotlib.