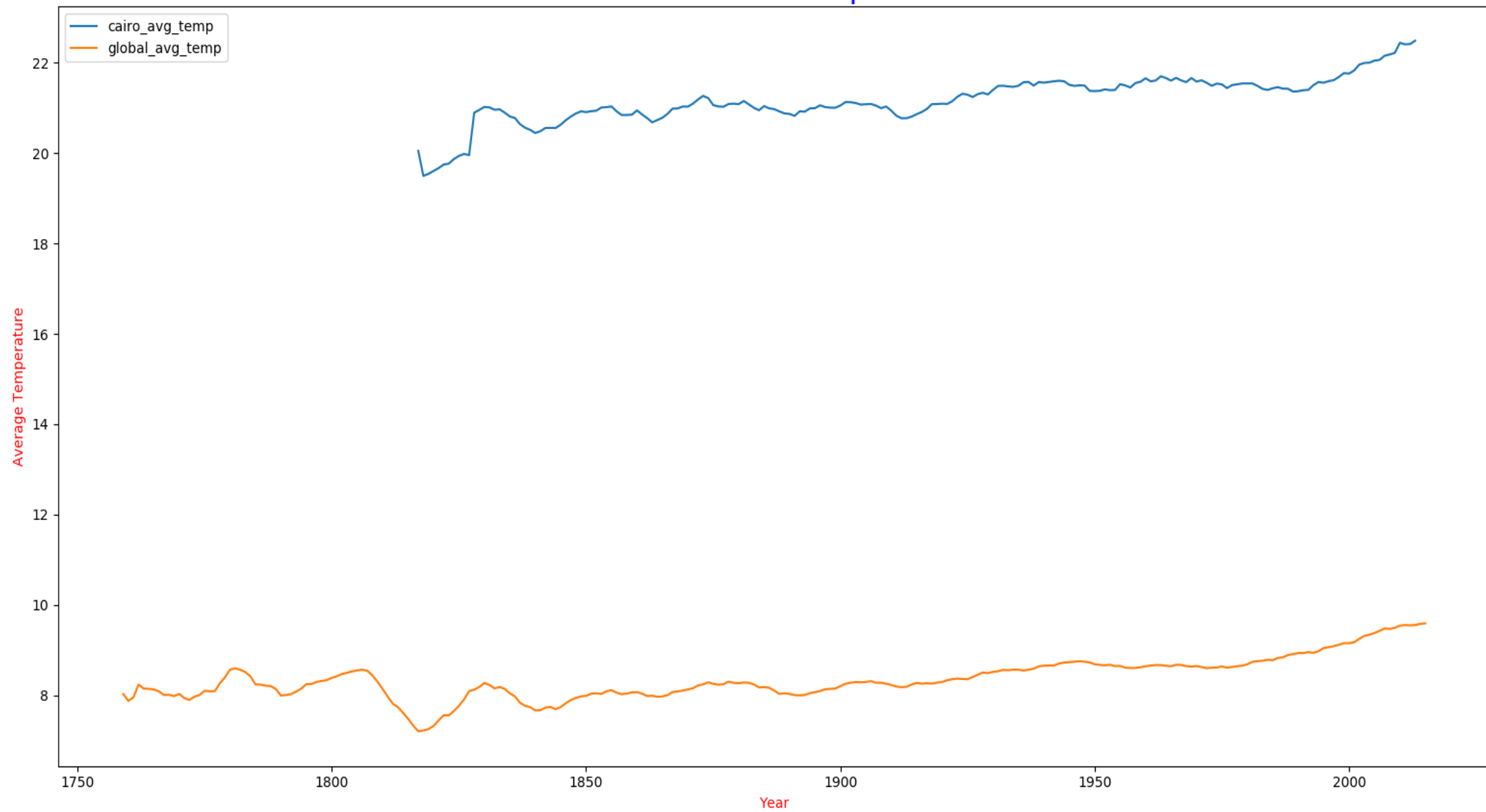# Explore weather trends project
(Data analyst ND project)

Local & Globa Temperature

In this project, I analyzed Cairo and global temperature data and compared the temperature to overall global temperature trends.

1- Extracting the data from the database:

(I wrote 2 SQL queries to extract the temperature data from the data base and extract it to CSV files, one for Cairo level data and the other for global level data)

- Extracting Cairo temperature data ordered by the year then saving it as CSV file of directory '/data/cairo_data.csv'

- Extracting global temperature data ordered by the year then saving it as CSV file of directory '/data/global_data.csv'

2- Accessing CSV files, calculating and draw moving averages by python:

(I used python packages (IPython, Pandas and Matplotlib) to open CSV file, calculate moving averages and plot moving average as a line chart)

- Lunching IPython from cmd:

- Import pandas and matplotlib.pyplot:

```
In [1]: import pandas as pd

In [2]: import matplotlib.pyplot as plt

In [3]:
```

- Read CSV files:

```
In [3]: cairo_data = pd.read_csv('/data/cairo_data.csv', sep=',')

In [4]: global_data = pd.read_csv('/data/global_data.csv', sep=',')

In [5]:
```

- Calculate average temperature moving average:

```
In [5]: cairo_ma = cairo_data.rolling(10).mean()

In [6]: global_ma = global_data.rolling(10).mean()

In [7]:
```

Note: here we used 'rolling(10)' function to calculate the simple moving average (sma) for 10 years.

- Draw line chart of the tow moving averages by matplotlib.pyplot function:

```
In [7]: fig, ax = plt.subplots()
   ...: ax.plot(cairo_data['year'], cairo_ma)
   ...: ax.plot(global_data['year'], global_ma)
   ...: plt.title('Local & Globa Temperature', color='b', fontsize='22')
   ...: ax.set_xlabel('Year', color='r')
   ...: ax.set_ylabel('Average Temperature', color='r')
   ...: ax.legend()
   ...: plt.show()
```

SQL Code:

```sql
SELECT avg_temp as cairo_avg_temp, year
FROM city_data
WHERE city = 'Cairo' AND country = 'Egypt'
ORDER By 2
```

```sql
SELECT avg_temp as global_avg_temp, year
FROM global_data
ORDER By 2
```

Python code:

```python
import pandas as pd
import matplotlib.pyplot as plt

cairo_data = pd.read_table('/data/Cairo_data.csv', sep=',')
global_data = pd.read_table('/data/global_data.csv', sep=',')
cairo_ma = cairo_data['cairo_avg_temp'].rolling(10).mean()
global_ma = global_data['global_avg_temp'].rolling(10).mean()
fig, ax = plt.subplots()
ax.plot(cairo_data['year'], cairo_ma)
ax.plot(global_data['year'], global_ma)
plt.title('Local & Globa Temperature', color='b', fontsize='22')
ax.set_xlabel('Year', color='r')
ax.set_ylabel('Average Temperature', color='r')
ax.legend()
plt.show()
```

Local & Globa Temperature
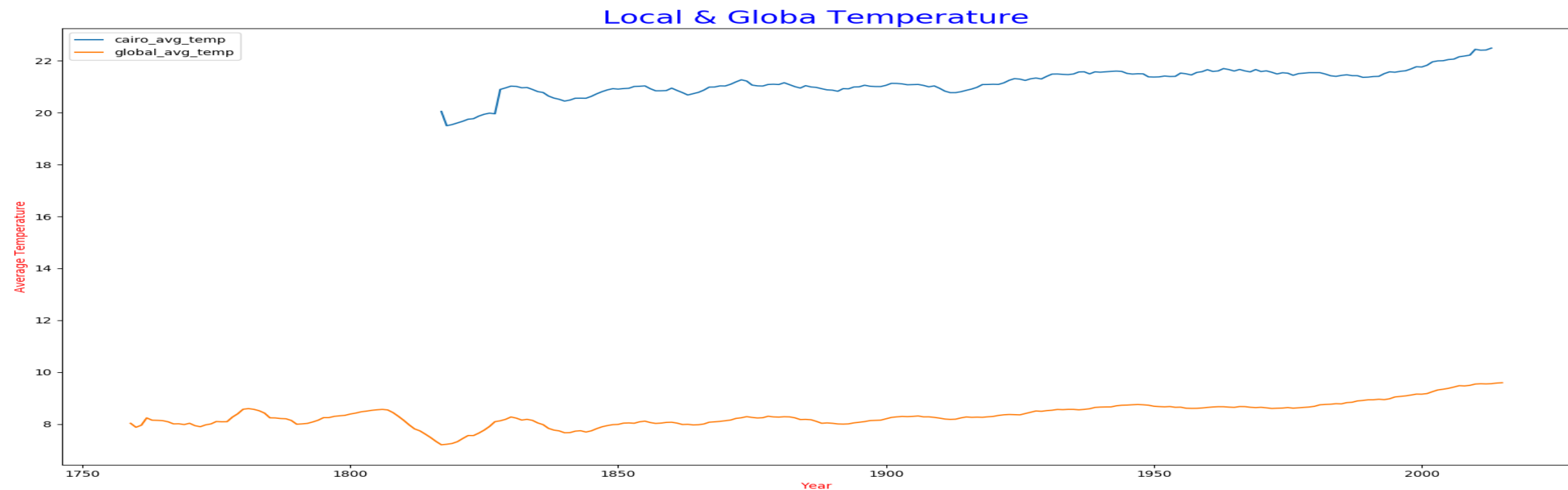
We can easily observe from the chart that the Cairo weather is hotter as the average temp. is always higher than the global temp., another point is the deference of temp. between Cairo and the global almost not changing
and also, the both Cairo and global temp. trends is keeping increasing steady over the last two centuries and the world overall temp. trend getting hotter as it is an uptrend and the world coolest decade was 1820's.

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