

# Explore Weather Trends



**DATA ANALYST NANODEGREE**



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## Overview

I have analyzed, in this project, local temperature of Cairo, Egypt in accordance with the global temperature data and compared. I had been provided with a database on Udacity portal.

## Goals

- ☐ Selecting city and country from the database “ city\_list ”.
- ☐ Extracting the City level data from the database “ city\_data ” and export to CSVfile.
- ☐ Extracting the global temperature from the database “ global\_data ” and export to CSV file.

## Tools

- ☐ Python : For calculating moving average and plotting line chart
- ☐ SQL : To extract the data from the database
- ☐ Google Sheet : To calculate Moving Averages of global and city temperatures

## Step 1 : Data Extraction

- check available countries and cities

```
SELECT *  
FROM city_list  
WHERE Country LIKE 'Egypt' ;
```

- I observed from the SCHEMA that both city\_data and global\_data contain the same column named 'avg\_temp'. So I have changed the names of the columns respectively in order to have distinct columns.

```
ALTER TABLE city_data  
RENAME COLUMN avg_temp to city_avg_temp;  
ALTER TABLE global_data  
RENAME COLUMN avg_temp to global_avg_temp;
```

- I have joined the two tables using JOIN also called as INNER JOIN as avg\_temp is the same in both the tables.

```
SELECT global_data.year, global_data.global_avg_temp, city_data.city_avg_temp  
FROM global_data  
JOIN city_data ON global_data.year = city_data.year  
WHERE city LIKE 'Cairo';
```

I downloaded the file as “results.csv”.

## Step 2 : Plot Line Chart

### Codes

#### # Libraries

```
import numpy as np
import pandas as pd
from matplotlib import pyplot as plt
```

#### #Read Data Set

```
data = pd.read_csv("results.csv")
```

#### # function that calculates the MOVING AVERAGE

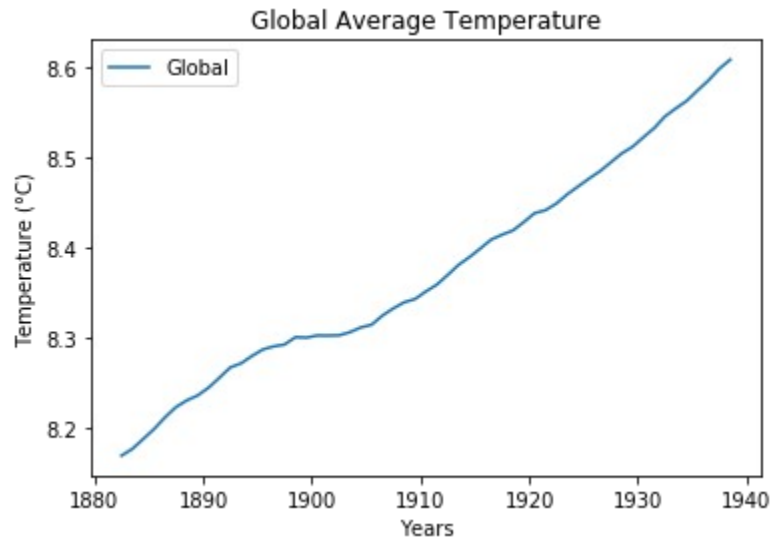
```
def moving_avg(mA_range, data_input):
    output = data_input.rolling(window = mA_range, on="cat").mean().dropna()
    return output
```

#### # Function Calling with the range of Moving Average

```
mA_value = 150
chart_moving_avg = moving_avg(mA_value, data)
```

#### # Drawing the graph: Global Temperature

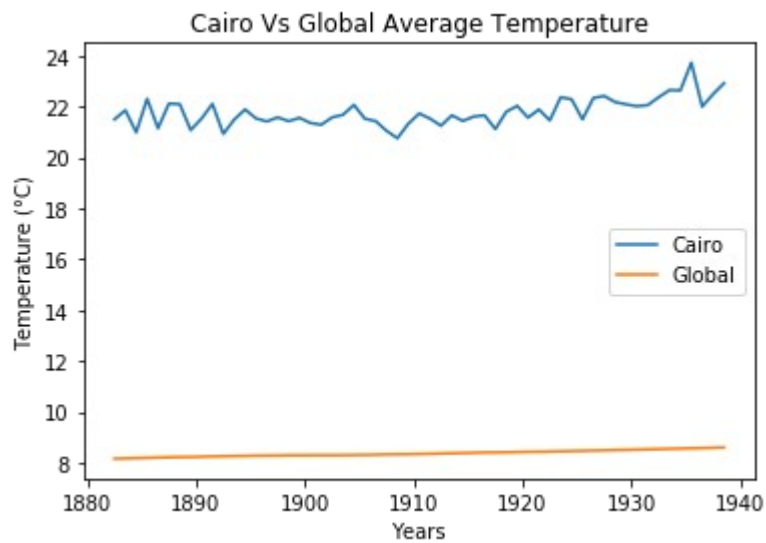
```
plt.plot(chart_moving_avg['year'],chart_moving_avg['global_avg_tem'],label='Global')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature (°C)")
plt.title("Global Average Temperature")
plt.show()
```



Now combined with Cairo data,

### # Drawing the graph: Cairo and Global Temperature

```
plt.plot(chart_moving_avg['year'], chart_moving_avg['city_avg_temp'], label='Cairo')
plt.plot(chart_moving_avg['year'], chart_moving_avg['global_avg_temp'], label='Global')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature (°C)")
plt.title("Cairo Vs Global Average Temperature")
plt.show()
```



## Observations:

- ❖ Global Average Temperature for 10 yr MA varies between 8.5°C to 9.5°C
- ❖ The Chart of Cairo Vs Global has a very big difference in the temperatures.
- ❖ Cairo Average Temperatures is hotter than global average temperature.
- ❖ From the first Graph, I observed global temperature is increasing smoothly from about 8 to 8.5 over the provided period.
- ❖ Cairo average temperatures are ups and downs during the early years, later during
- ❖ Both the temperatures increased due to increase in temperature.

## References:

<https://www.statisticshowto.com/moving-average/>

<https://pandas.pydata.org/pandas-docs/stable/generated/pandas.DataFrame.rolling.html>