EXPLORING THE WEATHER TRENDS

Udacity – Data Analyst Nanodegree

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Project 1: Exploring the Weather Trends

Austin, United States of America.

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SCOPE:

The goal of the project is to analyse temperature of a city and compare that temperature to global temperature. The data for both the city and global temperature datum was made available in through the “Data Analyst Nanodegree” program on Udacity.

GOALS:

1. Extract data
2. Visualization of data
3. Observations based on data collected.

TOOLS AND TECHNOLOGY:

1. SQL: Retrieve data from the database.
2. Python/ Jupyter: Calculating moving average and for visualisation
3. Excel: Data Storage and Observations

RETRIVING DATA FROM THE DATABASE:

To retrieve data from the database, the following queries were used:

JOIN TABLES:

```
SELECT Global_Data.year,
Global_Data.GTEMP,City_Data.CTEMP
FROM Global_Data JOIN City_Data
ON Global_Data.year = City_Data.year
WHERE city LIKE 'Austin';
```

ALTER THE NAME OF THE TABLE:

```
ALTER TABLE city_data RENAME COLUMN avg_temp to
CTEMP;
-- CTEMP = City Average Temp.
ALTER TABLE global_data RENAME COLUMN avg_temp to
GTEMP;
-- GTEMP = Global Avg. Temp.
```

RETRIVE CITY INFORMATION ASSOCIATED WITH THE COUNTRY:

```
SELECT *
    FROM city_list
    WHERE country LIKE 'United States'
```

The resultant files have been saved as City_Data, Global_Data and Results respectively, which will later be called in the program for reading data.

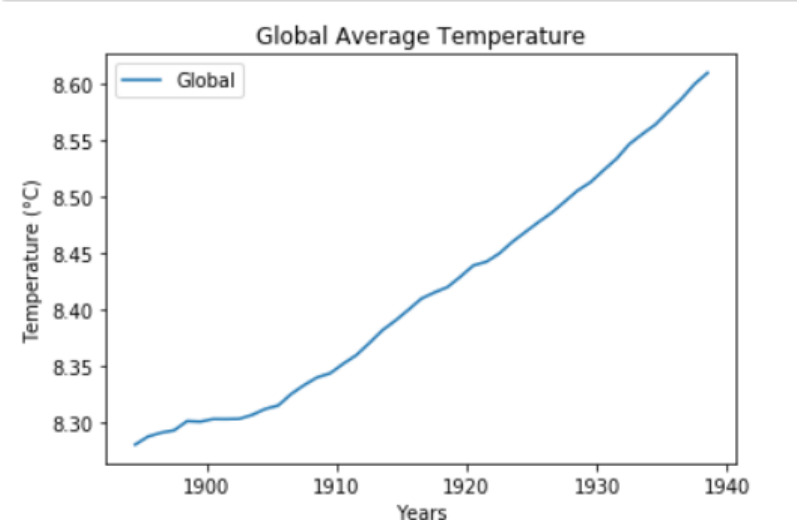
VISUALIZATIONS:

Global Temperature:

Code:

```
## Moving Averages:

def moving_avg(mA_range, data_input):   # with local variables
    output = data_input.rolling(window = mA_range, center = False, on = "ctemp").mean().dropna()
    return output

## Function Calling with the range of Moving Average:
mA_value = 150

chart_moving_avg = moving_avg(mA_value, data)     # with global variables

##Drawing the graph: Global Temperature
plt.plot(chart_moving_avg['year'], chart_moving_avg['gtemp'], label='Global')
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature (°C)")
plt.title("Global Average Temperature")
plt.show()
```

Graph:

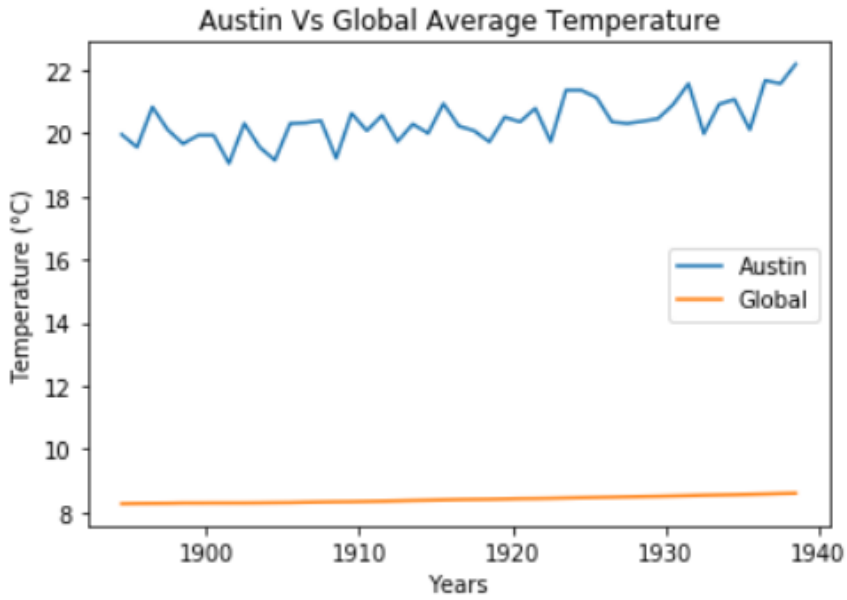


Austin vs Global Temperature:

Code:

```
## Drawing the graph:Austin and Global Temperature:

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

Graph:



OBSERVATIONS:

1. There seems to be a significant difference between the average temperature of Austin and the global average temperature.
2. There seems to be a consistently mild increase in the global temperature.
3. This increase is verified with the data.tail(10) and data. head(10) commands which will display the first 10 and the last 10 temperatures in the data frame.

The results are as follows:

```
In [19]: data.tail(10)
```

Out[19]:

	year	gtemp	ctemp
184	2004	9.32	20.45
185	2005	9.70	20.90
186	2006	9.53	21.56
187	2007	9.73	19.98
188	2008	9.43	20.91
189	2009	9.51	21.06
190	2010	9.70	20.10
191	2011	9.52	21.66
192	2012	9.51	21.56
193	2013	9.61	22.18

```
In [20]: data.head(10)
```

Out[20]:

	year	gtemp	ctemp
0	1820	7.62	18.83
1	1821	8.09	20.75
2	1822	8.19	25.48
3	1823	7.72	19.34
4	1824	8.55	19.90
5	1825	8.39	20.15
6	1826	8.36	19.87
7	1827	8.81	20.52
8	1828	8.17	20.02
9	1829	7.94	19.71

4. From data.head we can observe that from the year 1822 there have been ups and downs in the global temperature. This variations in the temperature although not very significant can be attributed to various factors including global warming that was affecting the temperatures across various parts of the world at a slightly greater scale.
5. The city of Austin, has a greater average temperature in comparison to the global temperature. We can determine that Austin is certainly hotter than most of the cooler places in the world, it's definitely not the hottest. The data displayed from data.tail(10) confirms this.
6. In conducting micro macro studies, I observe that Austin has a humid subtropical type of climate (Köppen climate classification Cfa) with long, hot summers and short, mild winters. Austin, the capital of Texas, lies in Travis County of Central Texas, on the Colorado River. Austin is at the

junction of four major natural environments, and its climate, therefore, combines tropical desert and wet weather characteristics.

7. On analysing a few other cities in the United States, it has been concluded that the cities that have the same geography as Austin present with similar increase in their average temperatures.

In conclusion, the Global Average Temperature is most definitely much lesser than that of Austin.

Key Considerations:

1. Unit of temperature: Centigrade, on Y – axis.
2. Years shown on X – axis.
3. Different colour of lines for city and global average
4. Use Matplotlib library visualization
5. Link to source code: https://github.com/AnnapoorniRavi/Udacity_Nanodegree

REFERNCES:

1. https://www.weather-us.com/en/texas-usa/austin-climate#climate_text_1
2. https://www.geeksforgeeks.org/sql-alter-rename/
3. https://towardsdatascience.com/implementing-moving-averages-in-python-1ad28e636f9d