Manal Almehmadi
Saudi Arabia, Jeddah
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Udacity Data Analysis Nanodegree Project 01:

Explore Weather Trends

Overview:

In this project, I analyzed local and global temperature data and compare the temperature trends between Mecca which is the closest city to Jeddah where I live and overall global temperature trends.

The goal is to create a visualization and write up my observation about the similarities and differences between global temperature trends and my city temperature trends.

Tool Used:

1. SQL: to extract data from database.
2. Excel: for calculating moving average and plotting line chart.

The steps that I did are

Step 1: Extract data from a database using a SQL query

The database contains three tables

- city_list table - This contains a list of cities and countries in the database.
- city_data table - This contains the average temperatures for each city by year (ºC).
- global_data table - This contains the average global temperatures by year (ºC).

I have explored the data in city_list table and the query that I applied on it is

```
SELECT *
FROM city_list
WHERE  country like '%Saudi%';
```

I did not find my city, but I found Mecca City which is the closest city to Jeddah. I also explored city_data, I found average temperature of Mecca city is mostly about 25. I think, this is right because the temperature at Jeddah in Winter is less than 25 degree Celsius and in the summer, the temperature reaches to 40 degree Celsius.
This is query that I applied on city_data table to extract average temperature of Mecca city

```
SELECT *
FROM city_data
WHERE city = 'Mecca';
```

To extract average temperature of global cities, I used this query

```
SELECT *
FROM global_data;
```

Step 2: Cleaning data

I found empty cells in avg-temp field. That is will make a problem when I calculate moving average, because it will be considered zero, that will lead to inaccurate result. So, I saw the appropriate action with these rows is removing them. they are two rows in Riyadh sheet for 1846 and 1847 years, and 15 rows in Mecca sheet for 1846 to 1860 years.

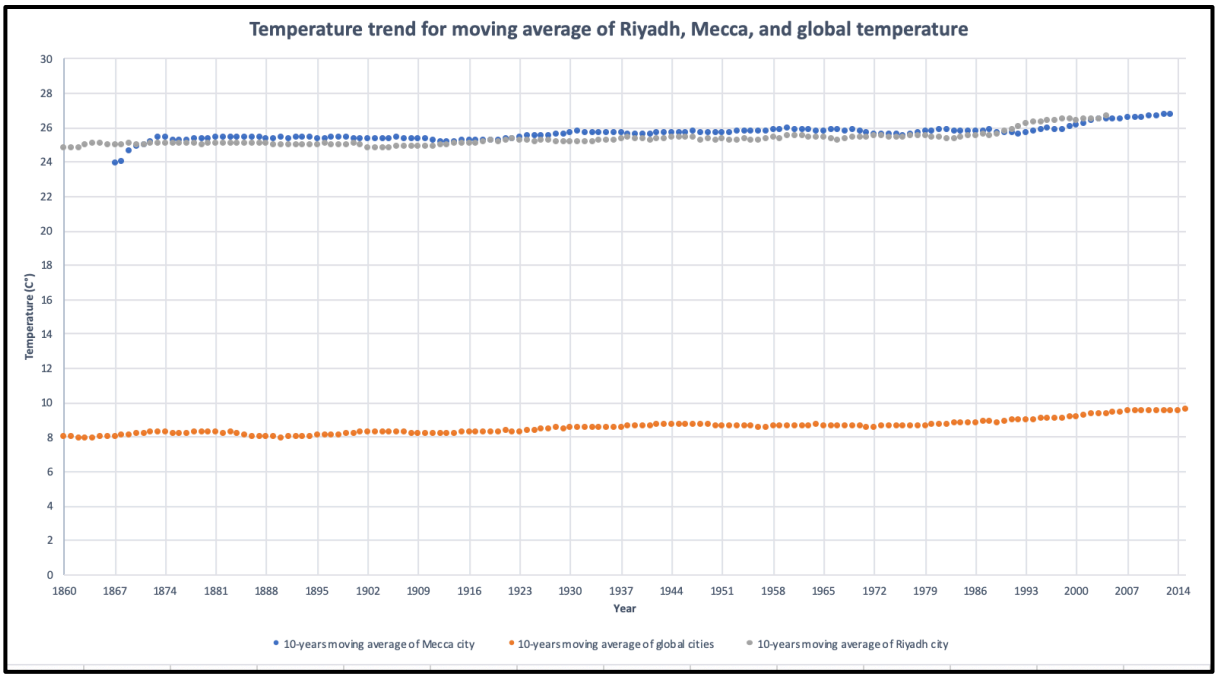
Step 3: calculate a moving average in a spreadsheet

Moving averages are used to smooth out data to make it easier to observe long term trends and not get lost in daily fluctuations.

I calculated moving average for 10 years of yearly average temperature for Riyadh, Makkah, and global cities. I used Average () built in function in Excel.

Step 4: Visualize the data using Excel.

I used **line chart** that compares my city's temperatures with the global temperatures. I plot the moving average rather than the yearly averages in order to smooth out the lines.



Result: Observations

- It's clear that temperature average in Saudi Arabia is hotter than global temp about 14 degree Celsius.
- Moving average of Mecca and Riyadh cities are very similar that sounds make sense because both cities are close each other.
- Global average temperature varies between 7 to 9 degree Celsius but Mecca city average temperature varies between 24 to 27 degree Celsius.
- The temperature is increasing since 1990 year in all the cities of the world, Mecca, and Riyadh cities.
- The temperature is getting hotter over years in all cities of the world that is evidence for Global Warming.

Conclusion:

The temperature is rising through years either in Saudi Arabia or in global cites, Is that related with Global Warming ?

I observed changes in climate system of most global cities since the mid-20th century have been much greater than those seen in 18 th-19th century.
Two charts for average global temperatures in 18^{th}-19^{th} and 21^{th} century separately.