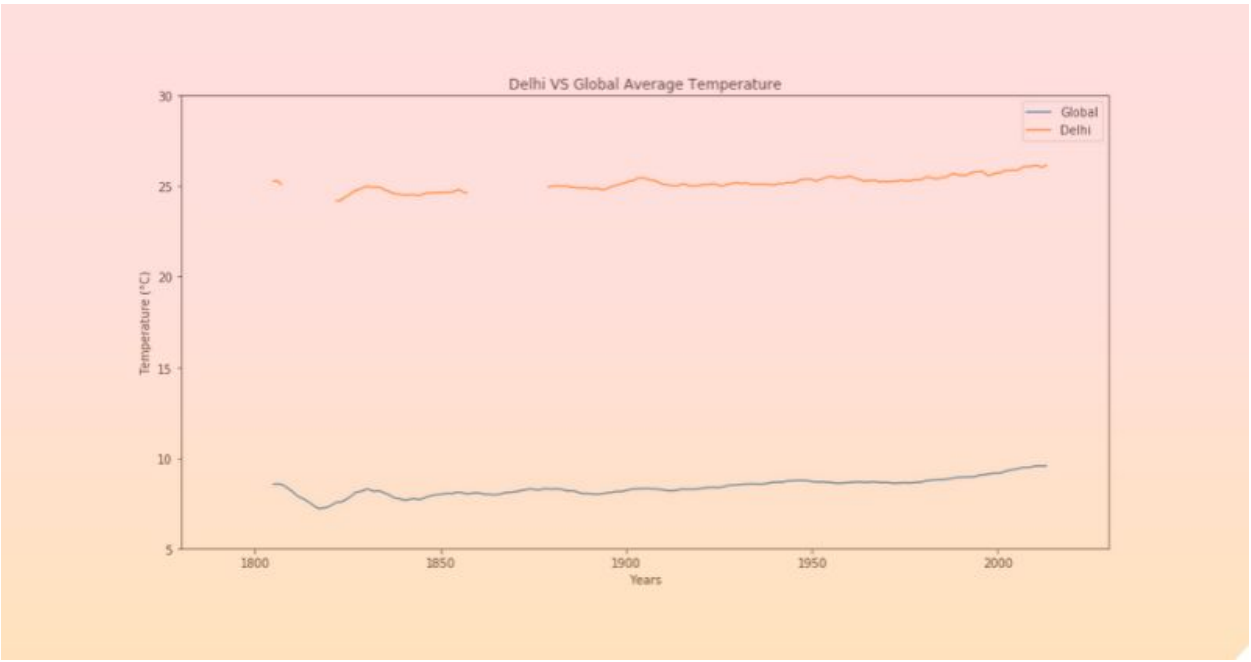

Explore Weather Trends

Project #1

Data Analyst Nanodegree

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Overview

In this project, I have analyzed the local temperature of Delhi, India and global temperature and compared the temperature trends of Delhi,India to overall global temperature trends.

Goals

1. Query the database and get the relevant data for visualization in csv format.
2. Making Line Chart based on the data in the csv.
3. Writing our observations based on the visualization.
   Specifications

1. Extract the data

We have to plot the line chart for local average temperature VS global average temperature. I live in Delhi. I've to check first if Delhi is available in the dataset.

1. List the cities of India, for which data is provided.

SQL Query:

```
select *
from city_list
where country = 'India'
```

2. I found that my city delhi exists in the data set. Afterwards, I run an inner join command to get all the data in a single csv file. In both the tables we have a temperature column with the same name as avg_temp, to overcome the problem I've used alias names.

SQL Query:

```
SELECT global_data.year as year, global_data.avg_temp as
global_avg, local_data.avg_temp as local_avg
from global_data
```

```
Inner Join ( select avg_temp, year from city_data where
city='Delhi') as Local_data
ON global_data.year = local_data.year
```

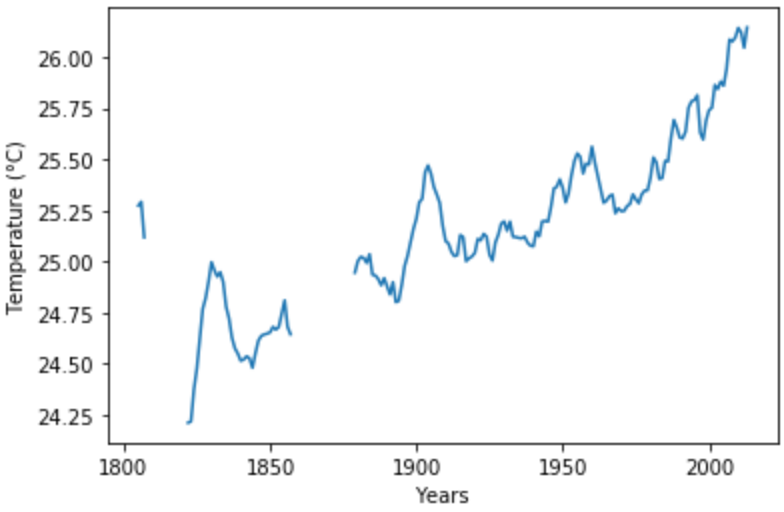
2. Visualizing the Data using Python

After performing the sql query I got the required data and downloaded it in a csv format. Now I've to plot the data in a line chart for which I've used pandas to get the data from csv and matplot for plotting the line chart.

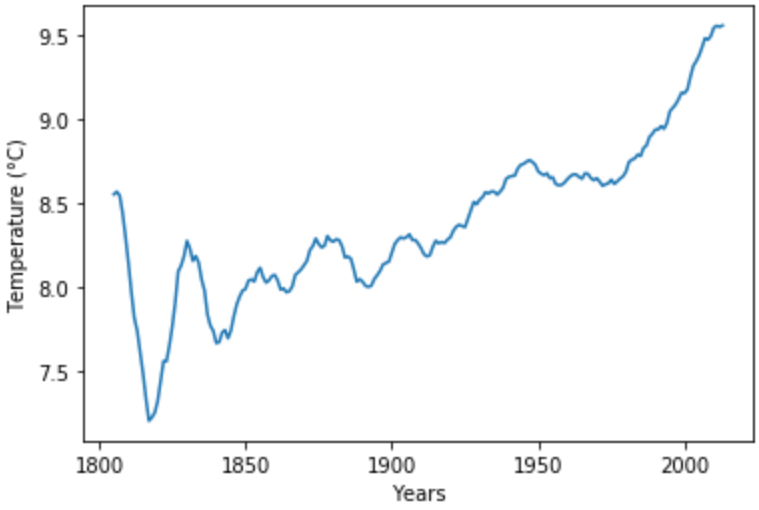
Python Code:

```
import pandas as pd            #for loading data from csv
import matplotlib.pyplot as plt    #data visualization library
data = pd.read_csv('global_vs_local.csv')


#for calculating moving averages I've used rolling function of
pandas library

ma_global_avg = data['global_avg'].rolling(10).mean()
ma_local_avg = data['local_avg'].rolling(10).mean()

#plotting the line graph for global avg and year using matplot
library

plt.plot(data['year'],ma_global_avg,label='Global')
plt.xlabel("Years")
plt.ylabel("Temperature (°C)")
plt.show()
```

```
#plotting the line graph for local avg (Delhi's avg temp) and
year using matplot library

plt.plot(data['year'],ma_local_avg,label='Global')
plt.xlabel("Years")
plt.ylabel("Temperature (°C)")
plt.show()
```



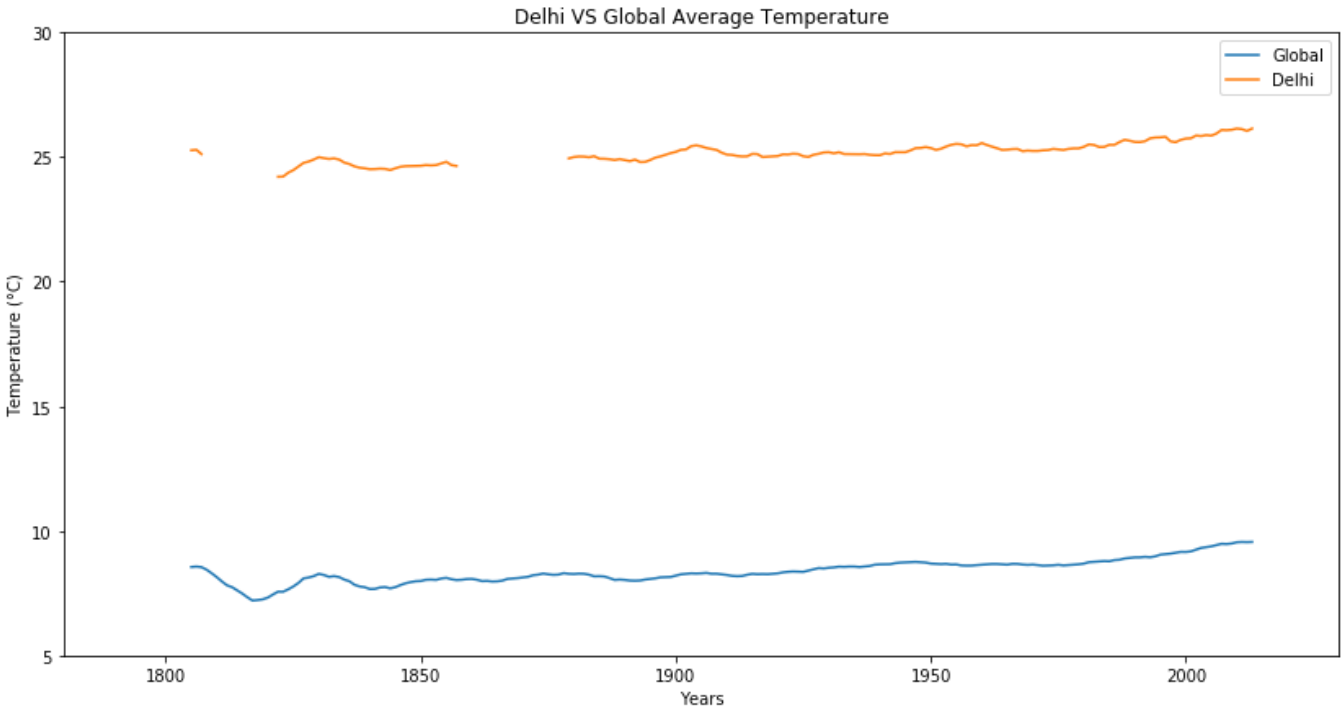
Delhi's Average Temperature



Global Average Temperature

```
#plotting the multi line graph for global avg, local avg and
year using matplot library
plt.plot(data['year'],ma_global_avg,label='Global')
plt.plot(data['year'],ma_local_avg,label='Delhi')
plt.xlim([1780, 2030])
```

```
plt.ylim([0, 30])
plt.legend()
plt.xlabel("Years")
plt.ylabel("Temperature (°C)")
plt.title("Delhi VS Global Average Temperature")
plt.gcf().set_size_inches((14,7))
plt.show()
```



I've used this code to find the difference between the local temperature and global temperature:

```
for i in range(len(data['year'])):
      print(ma_local_avg[i] - ma_global_avg[i] )
```

Observation

1. My city Delhi is hotter on average compared to the global average.

2. I found that the difference between Delhi's Temperature & Global Temperature is getting reduced by 0.1 degree celsius over centuries. Which means Global Average temperature is rising quicker than the Average temperature of delhi.
3. The overall trend shows that the global average and the local average both are increasing significantly. Which refers to that world getting a hotter place to live and this trend is consistent over the last few years.
4. I observe that temperature saw a rise in the beginning of the industrial revolution and temperature is at peak in the middle of the industrial revolution.

5. I observe an interesting thing that the global average saw a rise during the 1820 and later on. This is the time period when the 1st industrial revolution is near to end and the same pattern can be seen in the 1st decade of 20th century when Temperature gradually decreased in the 2nd decade of 20th century with the end of the 2nd industrial revolution. According to my understanding the reason for the rise in temperature is the Industrial revolution also.
6. I found that Delhi's temperature saw a rise around 1910-1915 same time when Delhi was made the capital of British Raj and activities in and around it increased.
7. Initially local and global average temperature saw increase and decrease but since the last few decades we saw a consistent increase in the temperature.

-end-