Project: Explore Weather Trends

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COUNTRY : INDIA

OUTLINE :

STEP 1 : Data Extraction

- For Data Extraction I used SQL , below is code attached .
- From city_data file I extract the data of my City i.e Delhi ,India .

STEP 2 : Open the data set

- I used Python to access the data and visualize the data (data frame) .
- load dataset into jupyter notebook using Python Library Pandas Command : .read_csv

STEP 3 : Calculating Moving Average

- for this calculation I used Python Command .
- Using Python Command .rolling() and .mean()
- Series.rolling(self, window, min_periods=None, center=False, win_type=None, on=None, axis=0, closed=None)
- In Rolling method : Parameters which I have taken is :
- window : Size of the moving window. This is the number of observations used for calculating the statistic. Each window will be a fixed size.
- win_type : Provide a window type .

STEP 4 : Line Chart

- for creating line chart I used Python Library Matplotlib .
- for line chart I used plt.plot() method .
- This step has to be done to visualize the trend of the data for both Local and Global .

- For visualize the trends using Line Chart , the best method which according to me PLOT Method of MATPLOTLIB Library . this shows the Linear Relationship of the variations of data .

STEP 5 : Observation

- At the end of the code I mentioned my 4 observations .
- My observations has been made on the basis on Average Temperature Graph , and the comparision between both the Trends .

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1. Extract the data :

SQL CODE :

SELECT * from global_data;

SELECT * from city_list;

SELECT * from city_data

where country = 'India' and city = 'Delhi' ;

---

2. Open up the CSV :

Importing neccessary libraries

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
% matplotlib inline
```

```
UsageError: Line magic function `%` not found.
```

Importing the data

```
In [3]: glob = pd.read_csv('global_data.csv')
        local = pd.read_csv('delhi_data.csv')
```

```
In [4]: glob
```

Out[4]:

	year	avg_temp
0	1808.0	7.63
1	1809.0	7.08
2	1810.0	6.92
3	1811.0	6.86
4	1812.0	7.05
...	...	...
261	NaN	NaN
262	NaN	NaN
263	NaN	NaN
264	2014.0	9.57
265	2015.0	9.83

266 rows × 2 columns

```
In [5]: local
```

Out[5]:

	year	city	country	avg_temp
0	1796	Delhi	India	25.03
1	1797	Delhi	India	26.71
2	1798	Delhi	India	24.29
3	1799	Delhi	India	25.28
4	1800	Delhi	India	25.21
...	...	...	...	...
213	2009	Delhi	India	26.55
214	2010	Delhi	India	26.52
215	2011	Delhi	India	25.63
216	2012	Delhi	India	25.89
217	2013	Delhi	India	26.71

218 rows × 4 columns

Copying the Original Data for further operations :

```
In [9]: df1 = glob.copy()
```

```
In [10]: df2=local.copy()
```

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3. Calculating Moving Average for the Global data and Local data :

Using Python Command .rolling() and .mean()

Series.rolling(self, window, min_periods=None, center=False, win_type=None, on=None, axis=0, closed=None)

In [15]:
```
df1['mov_avg_temp'] = df1['avg_temp'].rolling(10, win_type ='triang').mean()
```

In [16]:
```
df2['mov_avg_temp'] = df2['avg_temp'].rolling(10, win_type ='triang').mean()
```

In [17]:
```
df1
```

Out[17]:

	year	avg_temp	mov_avg_temp
0	1808.0	7.63	NaN
1	1809.0	7.08	NaN
2	1810.0	6.92	NaN
3	1811.0	6.86	NaN
4	1812.0	7.05	NaN
...	...	...	...
261	NaN	NaN	NaN
262	NaN	NaN	NaN
263	NaN	NaN	NaN
264	2014.0	9.57	NaN
265	2015.0	9.83	NaN

266 rows × 3 columns

In [18]:
```
df2
```

Out[18]:

	year	city	country	avg_temp	mov_avg_temp
0	1796	Delhi	India	25.03	NaN
1	1797	Delhi	India	26.71	NaN
2	1798	Delhi	India	24.29	NaN
3	1799	Delhi	India	25.28	NaN
4	1800	Delhi	India	25.21	NaN
...	...	...	...	...	...
213	2009	Delhi	India	26.55	26.0678
214	2010	Delhi	India	26.52	26.0892
215	2011	Delhi	India	25.63	26.1082
216	2012	Delhi	India	25.89	26.1066
217	2013	Delhi	India	26.71	26.1308

218 rows × 5 columns

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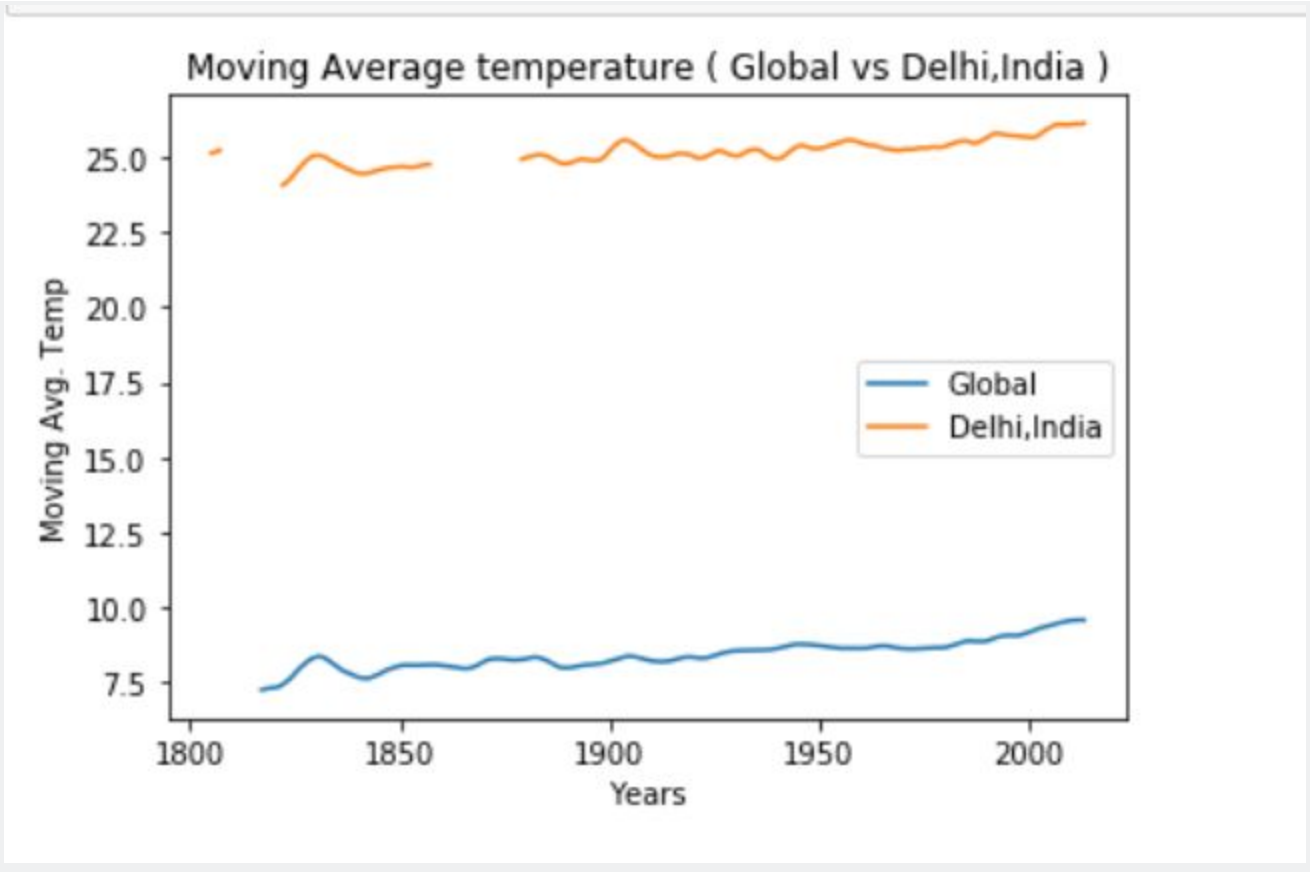
4. Creating a line chart :

In [20]:
```
plt.plot(df1['year'],df1['mov_avg_temp'] , label ='Global')
plt.plot(df2['year'],df2['mov_avg_temp'] , label = 'Delhi,India')
plt.title('Moving Average temperature ( Global vs Delhi,India )')
plt.xlabel('Years')
plt.ylabel('Moving Avg. Temp')
plt.legend()
plt.show()
```



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5 .Observations :

Similarities between Local(Delhi , India) Temperature Data and Global Temperature Data :

- In both the data Temperature is increasing with year .
- In both the data Year with Highest Temperature is approximately 2010-1015
- In both the data in between 1830 - 1840 the temperature increased abruptly .
- Rate of Global Warming has increased . Global warming is the ongoing rise of the average temperature of the Earth's climate system. It is a major aspect of climate change which, in addition to rising global surface temperatures, also includes its effects, such as changes in precipitation

Differences between Local(Delhi , India) Temperature Data and Global Temperature Data:

- The average of Moving Average Temperature of LOCAL(Delhi,India) Data is approximately 25.5 wheras the average of Moving Average Temperature of GLOBAL Data is approximately 8.5
- The average difference between the temperature of Global and Delhi Climate is very large approximately 16 degree.
- Compare to Global Temperature , Delhi,India is one of the Hottest Region .

- Global Temperature is increasing without any stop since approx 1970 , whereas In Delhi,India temperature is fluctuating but increasing.

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QUESTION :

Can you estimate the average temperature in your city based on the average global temperature?

- No we can't estimate the average temperature of out city (in my case Delhi) based on the average global temperature , as I found a great difference between the average temperature of Global and Local Data .