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Exploring Weather Trends

Overview

As we all know that global temperature is getting warmer as ever. In this project,the data set w given to me as part of the Udacity (https://classroom.udacity.com/nanodegrees/nd002/parts/93426fc7-0e68-4957-b16b-9fde38776c26/modules/e8455c07-092a-4b76-ba12-018cb53d0526/lessons/d551938c-d004-4801-a269-4b8dd784cc3b/concepts/530f21c0-2f37-4390-aaab-3ce440e56d80) program. The average temperature of global weather trends file is to be extracted from the `SQL` database. extract the data and export its into two files `global weather.csv` and `local weather` The global weather.csv consists of 2 columns, `year` and `avg_temp` which recorded the av temperage each years in Celsius. The local weather.csv contain 4 columns, `year` , `city` , `country` , `avg_temp` , which also recorded the average temperature in Celsius of San Jose which also known as `Silicon Valley` .

Objective Overview

- Exacting data from the dataset by using SQL
- Using pandas for data manipulation
- Using matplotlib for data visualization
- Making observation by analyzing the visualization

SQL query used to extract the data from

Query for extracting data from local weather trend dataframe.

SELECT * FROM city_data WHERE city='San Jose'

Query for extracting data from global weather trend dataframe.

SELECT * FROM global_data

In [1]:
```
# Importing pandas libary for data manipulation
# and matplotlib as for data visualization
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
```

Global weather

In [2]:
```
# Import global temperature yearly average dataset
global_= pd.read_csv('project weather.csv')
global_.head()
```

Out[2]:

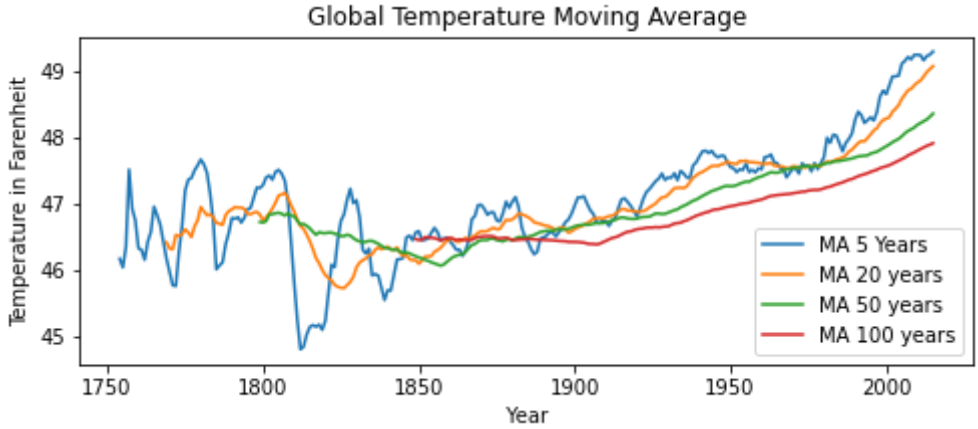
	year	avg_temp
0	1750	8.72
1	1751	7.98
2	1752	5.78
3	1753	8.39
4	1754	8.47

In [3]:
```
# Function to convert average temperature from Celcius to farenhei
def Fconverter(x):
    """Converting function formulor from Celcius to Farenheit"""
    return (x * 1.8) +32
```

In [4]:
```
# Set year as index and convert average temperature from celcius t
new_global = global_.set_index('year')
new_global['avg_temp'] = new_global['avg_temp'].apply(Fconverter)
```

In [5]:
```
# Global Temperature moving average plot
plt.figure(figsize= [8,3])
plt.plot(new_global['avg_temp'].rolling(5).mean(), label='MA 5 Yea
plt.plot(new_global['avg_temp'].rolling(20).mean(), label= 'MA 20
plt.plot(new_global['avg_temp'].rolling(50).mean(), label= 'MA 50
plt.plot(new_global['avg_temp'].rolling(100).mean(), label= 'MA 10

plt.legend(loc='best')
plt.title('Global Temperature Moving Average')
plt.xlabel(' Year ')
plt.ylabel('Temperature in Farenheit');
```



Graph interpretaion

According to the graph, the average shift in temperature isn't visually appear to be significant from the graph, we can see that the global temperature is steadily inclining. This can really sho the insight of global warming, the earth is getting warmer. And to truly have real investigate fur in the glimate changing, we must shift our focus onto the more relevant perspective. The avera temperature in global weather still consider to be cooler from a personal perspective for a lot o For the next step, we'll analyze the weather average in my home town, Silicon Valley.

Local weather

In [6]:
```
# Import the local temperature average dataset
local_ = pd.read_csv('san_jose.csv')
local_.head()
```

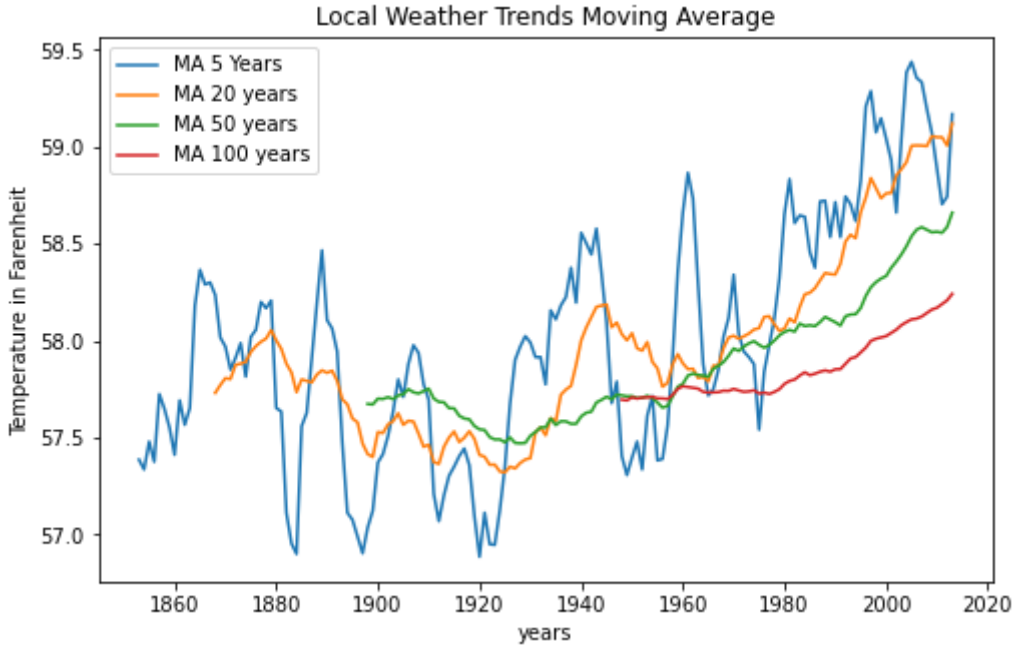
Out[6]:

	year	city	country	avg_temp
0	1849	San Jose	United States	14.12
1	1850	San Jose	United States	13.80
2	1851	San Jose	United States	14.39
3	1852	San Jose	United States	13.81
4	1853	San Jose	United States	14.40

In [7]:
```
# Setting year as index and apply converter
local_ = local_[['year', 'avg_temp']].set_index('year')
local_['avg_temp'] = local_['avg_temp'].apply(Fconverter)

# plotting the global weather trends moving average
plt.figure(figsize=[8,5])
plt.plot(local_['avg_temp'].rolling(5).mean(), label='MA 5 Years')
plt.plot(local_['avg_temp'].rolling(20).mean(), label= 'MA 20 year
plt.plot(local_['avg_temp'].rolling(50).mean(), label= 'MA 50 year
plt.plot(local_['avg_temp'].rolling(100).mean(), label= 'MA 100 ye

plt.title('Local Weather Trends Moving Average')
plt.xlabel('years')
plt.ylabel('Temperature in Farenheit')
plt.legend(loc='best');
```



Correlation coefficient of average temperature between global and lo weather trend

The correlation coefficient of average weather trends between global and Silicon Valley local weather is `0.54`. Yet the correlation coefficient value is significant enough between two varia but to truly measure how much one variable influences another is to square the R values whic us `0.29`. In term of prediction, we can determines that by observing the average local weath trends, we can make `29%` prediction the relationship from average global weather trends. We is not too promising but predicting weather is another field of study that is way out of this proj scope of study.

In [8]:
```
# Use pandas built in method to find correlation
R = new_global['avg_temp'].corr(local_['avg_temp'])
R, R**2
```

Out[8]: (0.5360381430194767, 0.287336890771769)

Visualization chart of global and Silicon Valley local weather trends average temperature

To truly satisfy our understanding of the average weather temperature between our two variab will be conducting a plot that visualize the steady trends. The plot will contain global and local average weather trends of moving average by 10. In term of compatibility, the local weather re of average temperature didn't recorded until the year 1849.

In [12]:
```
# First to check for the Dataset's shape
local_.shape, global_.shape
```

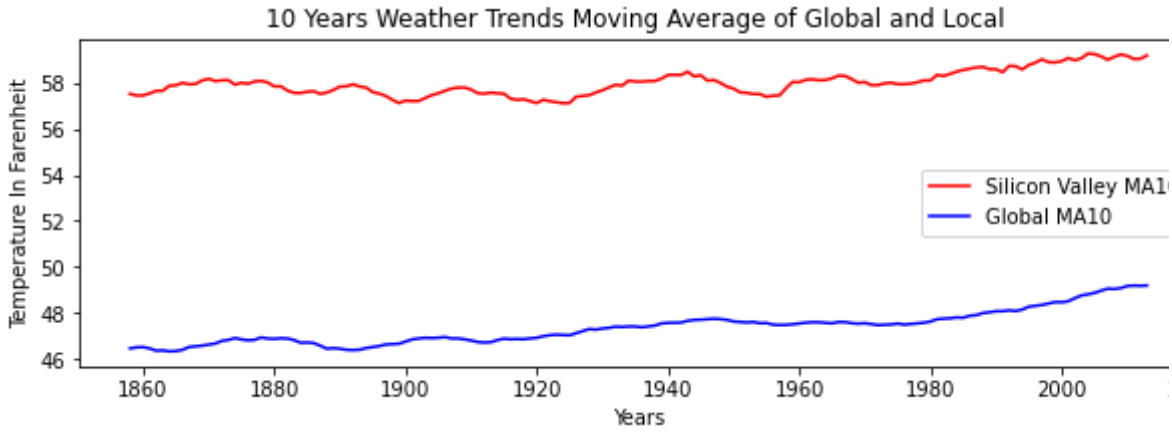
Out[12]:
```
((165, 1), (266, 2))
```

In [13]:
```
# look like the local weather tracking system started in later anc
# We will modify this Dataset to fit into the other
edit_global = new_global.query('year >=1849 & 2013 >= year')
# Quick view comparison of the finalize glocal and local weather t
edit_global.head(), local_.head()
```

Out[13]:
```
(      avg_temp
 year
 1849    46.364
 1850    46.220
 1851    46.724
 1852    46.580
 1853    46.472,
       avg_temp
 year
 1849    57.416
 1850    56.840
 1851    57.902
 1852    56.858
 1853    57.920)
```

In [14]:
```
plt.figure(figsize=[10,3])
plt.plot(local_['avg_temp'].rolling(10).mean(), label='Silicon Val
plt.plot(edit_global['avg_temp'].rolling(10).mean(), label='Global
plt.legend(loc='best')

plt.title('10 Years Weather Trends Moving Average of Global and Lo
plt.xlabel('Years')
plt.ylabel('Temperature In Farenheit');
```



Conclusion

1. According to the graphs in this project shown that the steadily upward trends from both g and local weather temperatures.
2. There is correlation in the weather trends between Silicon valley and global temperature
3. The local average temperature is higher than global average temperature
4. GLOBAL WARMING IS HAPPENING