Exploring Web Trends

Objective:

To analyze local and global temperature data and compare temperature trends between where we live to overall global temperature trends.

Procedure:

There are four steps for this project.
1. Extract the data from the database
2. Open up the CSV and compute moving average
3. Create a line chart for the moving average
4. Make observations about the similarities and differences.

Tools used:

For this project, I used
SQL: To extract data from the database
Excel: To open the CSV and compute moving average.
Tableau: To create the line chart visualization for the moving averages.

Methodology:

(*Step 1*) To extract data from Udacity's database we used SQL. We extracted year and average temperature from the city_data and global_data tables. From the city_list table we saw that the closest major city was New York. It was found that the tables had different date ranges so we adjusted for the missing date ranges. The code used to extract the data is given below.

```
/*Global Average Temperature*/

SELECT year AS "Year", avg_temp AS "Global average data"
FROM global_data
WHERE year BETWEEN 1750 AND 2013;

/*City (NY) Average Temperature */

SELECT year AS "Year", avg_temp AS "NY average data"
FROM city_data
WHERE city = 'New York' AND year BETWEEN 1750 AND 2013;
```

(Step 2) After extracting the data in a csv format. We opened the csv file using MS Excel. Here we also computed a 10 year moving average for both the global and city average temperature to smooth out the line and make trends more observable. We computed the 10 year moving average by computing the average for the top 10 rows and dragged the formula down to find the 10 year moving average. The formula can be seen below.

10 Year Moving Average (Global vs. City)

Year	Average Global Temperature	NY average temperature	Moving Average (Global)	Moving Average (City)
1750	8.72	10.07		
1751	7.98	10.79		
1752	5.78	2.81		
1753	8.39	9.52		
1754	8.47	9.88		
1755	8.36	6.61		
1756	8.85	9.94		
1757	9.02	8.89		
1758	6.74	8.15		
1759	7.99	9.01	=AVERAGE(B4:B13)	8.567
1760	7.19	7.73	7.877	8.333
1761	8.77	10.18	7.956	8.272
1762	8.61	9.55	8.239	8.946
1763	7.5	7.23	8.15	8.717
1764	8.4	9.55	8.143	8.684
1765	8.25	8.96	8.132	8.919
1766	8.41	10.09	8.088	8.934
1767	8.22	8.52	8.008	8.897
1768	6.78	8.67	8.012	8.949
1769	7.69	9.1	7.982	8.958

(Step 3) We then pulled the csv file in Tableau to create a line chart between global moving average and local moving average to observe trends over time. We can see the chart below.

Global vs. NY Average Temperature
(10 Year Moving Average)
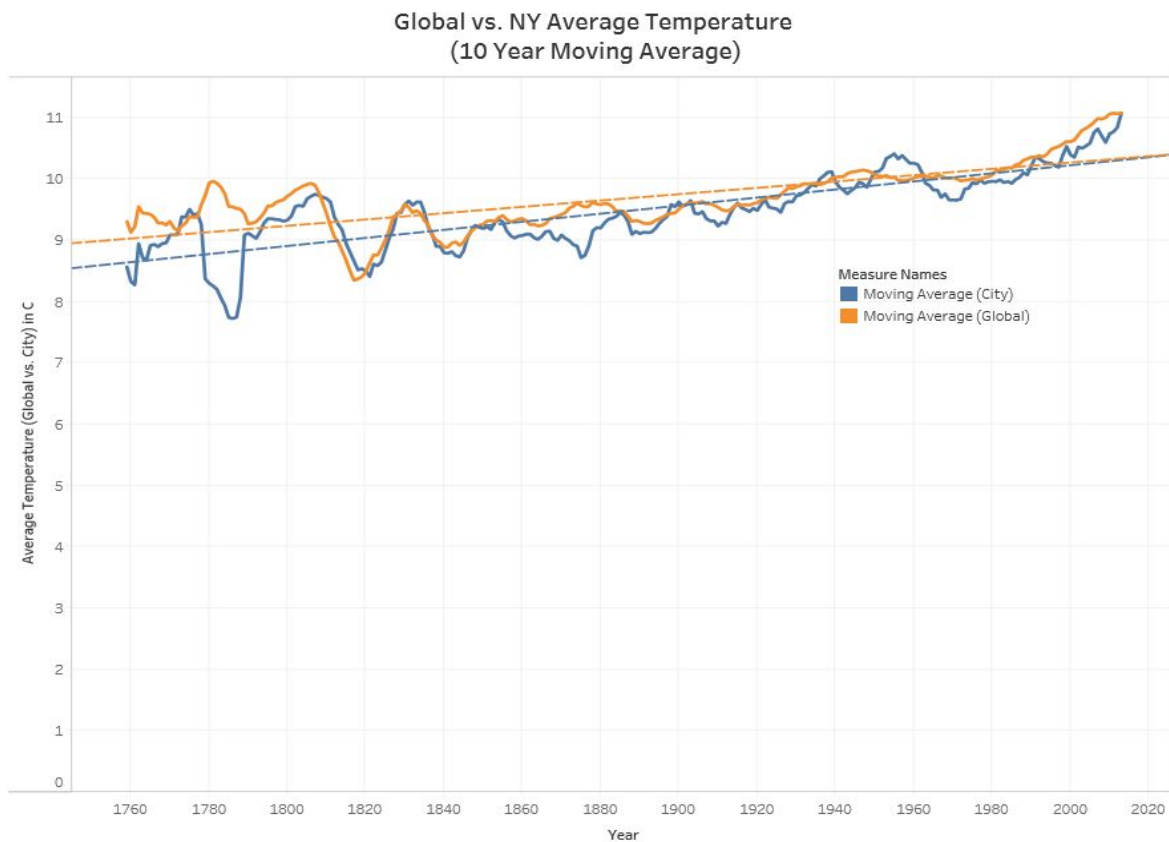
(Step 4) The following observations can be made about the visualization above.

1. New York is cooler on average compared to the global average. This has been consistent over time except for a few years(such as 1775, 1810 to 1819, 1939 and 1951 to 1962).

2. It can be seen that there is some positive correlation between the global average temperature and New York's temperature. The correlation coefficient between New York's average temperature and global average temperature was 0.79

3. It can be seen that both the global average temperature as well as New York's average temperature has been increasing over time.

4. The lowest average temperature for New York was during 1786 when the average temperature was 7.7^0C and the lowest global average temperature was during 1817 when the average temperature was 7.2^0C.