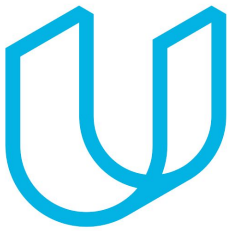


UDACITY

A Data Analysis Project
On
Exploring
Weather Trends

Rounak Arya

initial_steps:

The first step in this research process is to see the *city_list* table and look for the desired city to research. For that to communicate with the database, SQL(Structured Query Language) is used. Firstly, to view the *city_list* table:

```
SELECT *
FROM city_list;
```

Once the desired city*(Ranchi & Sydney)* is spotted in the table, the next step would be to filter the weather data from the *city_data* table. For that, the following code is executed in the SQL Workspace:

```
SELECT *
FROM city_data
WHERE city LIKE ‘RANCHI’;
```

The data which shows up is then downloaded in a *.csv(comma-separated values)* format for further processing.

Lastly, to gather up the global weather data, *global_data* table is used as:

```
SELECT *
FROM global_data;
```

Calculating moving averages:

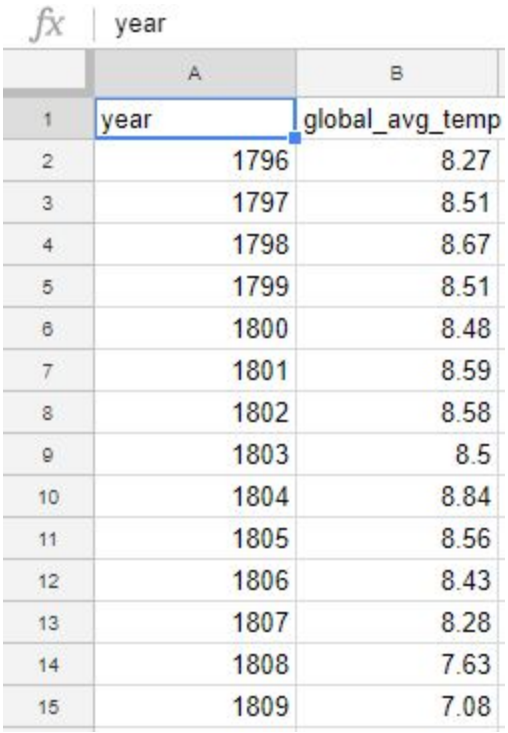
One of the main objectives of this project/research is to understand the concept of moving averages(MA) and its advantages over the normal average data. Moving Average provides with a much more refined data which is comparatively more easy to process and also to create an easily interpreted visualisation of the data.

HOW DO YOU DO THAT??

Answer:

*Too pleased to use Google Sheets

First, put the raw weather data available in the sheet.



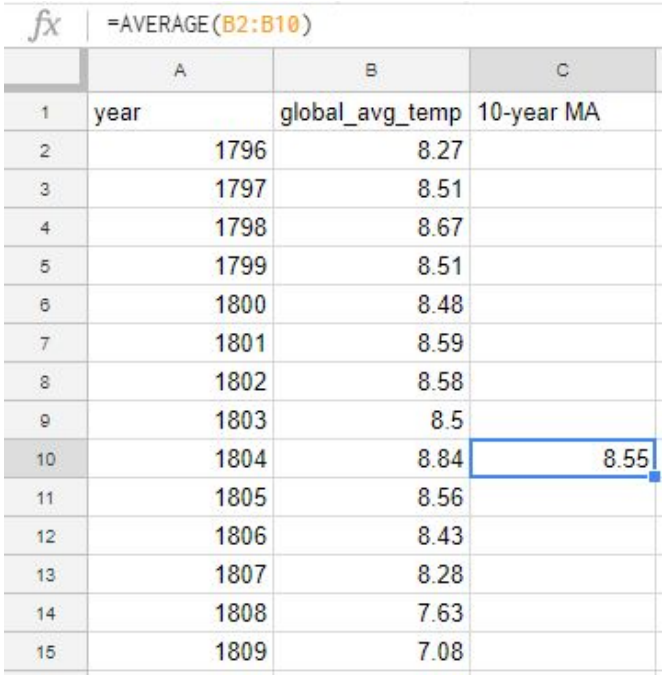
fx | year

	A	B
1	year	global_avg_temp
2	1796	8.27
3	1797	8.51
4	1798	8.67
5	1799	8.51
6	1800	8.48
7	1801	8.59
8	1802	8.58
9	1803	8.5
10	1804	8.84
11	1805	8.56
12	1806	8.43
13	1807	8.28
14	1808	7.63
15	1809	7.08

Second, make a new row, and taking a 10-year MA, we use the formula:

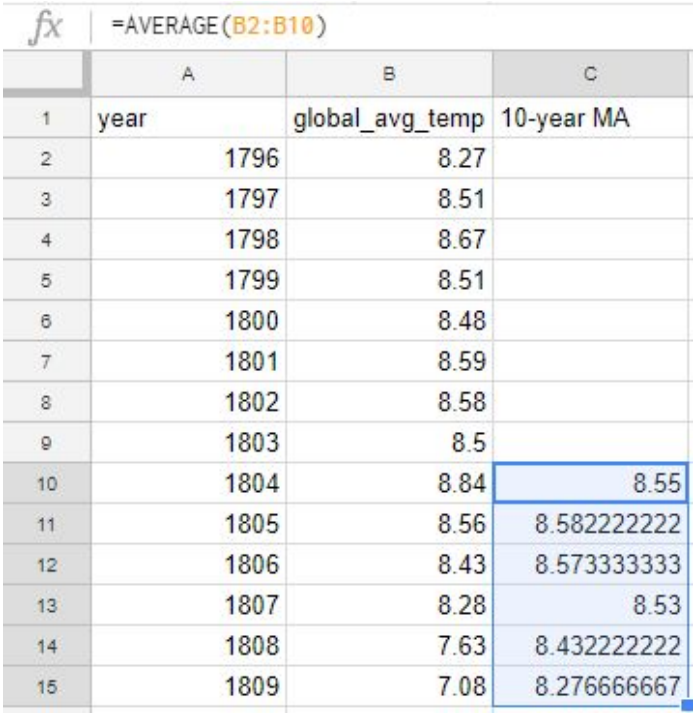
`=AVERAGE(B2:B10)`

which averages the first 10 values if *global_avg_temp* row.



	A	B	C
1	year	global_avg_temp	10-year MA
2	1796	8.27	
3	1797	8.51	
4	1798	8.67	
5	1799	8.51	
6	1800	8.48	
7	1801	8.59	
8	1802	8.58	
9	1803	8.5	
10	1804	8.84	8.55
11	1805	8.56	
12	1806	8.43	
13	1807	8.28	
14	1808	7.63	
15	1809	7.08	

Finally to get the MA of the whole data, right click near the edge(right) of the initial cell of MA and slide down upto the extent and the formula is directly applied to all of the rows.



	A	B	C
1	year	global_avg_temp	10-year MA
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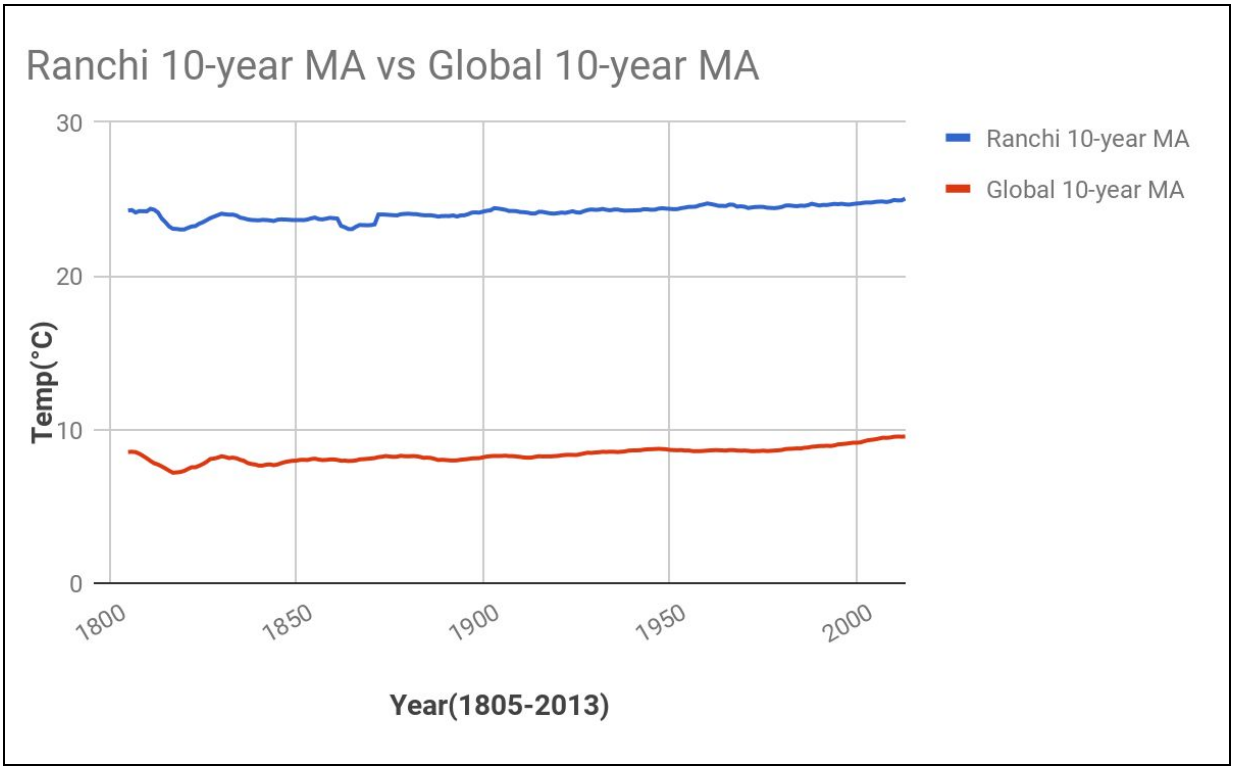
5	1799	8.51	
6	1800	8.48	
7	1801	8.59	
8	1802	8.58	
9	1803	8.5	
10	1804	8.84	8.55
11	1805	8.56	8.582222222
12	1806	8.43	8.573333333
13	1807	8.28	8.53
14	1808	7.63	8.432222222
15	1809	7.08	8.276666667

line_chart:

#ranchi_india



Observations:

- Global Average Temperature has increased from 8.27℃ in the year 1796 to 9.61℃ in the year 2013. Similarly, Ranchi's Average Temperature has also increased from 24.01℃ in the year 1796 to 25.98℃ in the year 2013. So, an average 1-2℃ increase in average temperature is seen.

- Comparing Global and Ranchi's average temperature, Ranchi is much hotter than the Global average, being near to the Tropic of Cancer.

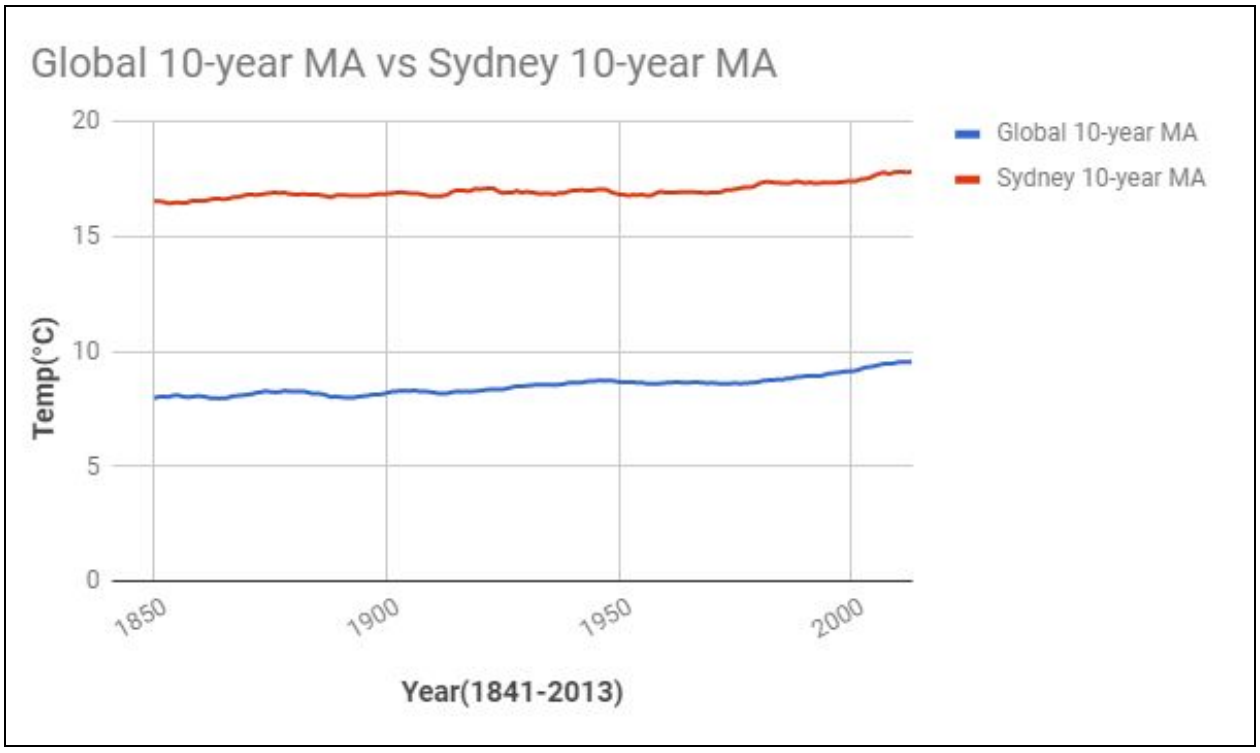
- Trends in the changing temperatures:
  - ★ Global Average and Ranchi's Average temperature sees an increase during the years 1796 to 1806.
  - ★ Global and Ranchi's Average Temperatures steadily decrease during the years 1813 to 1820 and then a sudden increase from 1821 to 1833. Hence marking the peak of Industrial Revolution around the world and fluctuating greenhouse gases.

- Ranchi became the capital city of Jharkhand in November of 2000. After that, it experienced a population boom which lead to increased pollution and greenhouse gases in the atmosphere thus raising the average temperature in the city to around 25℃.

- Through all the above observations and the line chart, Ranchi's temperature is rising directly proportionate to the Global temperature.

line_chart:

#sydney_australia



sydney_observations:

To further prove the point of Global Warming or the rapid increase in global temperatures over centuries of data, above is the line chart of the temperature trends of sydney's temperature with the global temperature data.

- Global Average Temperature has increased from 7.69℃ in the year 1796 to 9.61℃ in the year 2013. Similarly, Sydney's Average Temperature has also increased from 16.56℃ in the year 1796 to 18.09℃ in the year 2013. So, an average 1-2℃ increase in average temperature is also seen here similar to the Ranchi data.

- Comparing Global and Sydney's average temperature, Sydney has a higher temperature than the Global average, being near the ocean.

- Reading the line graph, we notice a steady rise in the curve of both the Sydney's and Global's lines. Thus, it clearly represents the rising temperature in other part of the world which ultimately indicates an increase in temperature on a global level.

- Through all the above observations and the line chart, Sydney's temperature is rising directly proportionate to the Global temperature.

conclusion:

The world is getting **hotter**, and we humans are responsible for the present condition and should work in unison for the betterment of our environment and nature.