Exploring Weather Trends

Project Name	Exploring Weather Trends
Version	1.0
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A. Project Description

Analysis and observations established from the temperatures database which contains the average temperature of cities and countries and the global average temperature. Also, list the similarities and differences of the local and global average and the overall trends.

B. Scope

The analysis is only from the data provided by the temperature database. The local city is selected as the closest big city (Kansas City, United States). The temperatures of cities are not considered where there is no value available.

C. Tools

1. SQL :
    - To extract the data required for analysis from the temperature database.

2. Google Sheets :
    - To review the data obtained from the temperature database.
    - Create temperature trends to compare the local versus global data points.

D. Data Extraction

SQL queries were used to extract data from the temperature database. The below table provides the SQL queries used to extract data for analysis.

1.	SELECT * FROM city_list;	To refer to the list of cities provided and identify the closest city for further analysis.E.g., “Kansas City” was identified as the closest city.
2.	SELECT * FROM city_data;	Data retrieved consists of the year and respective average temperatures of the cities & country.
3.	SELECT * FROM city_data WHERE city = 'Kansas City';	Data retrieved consists of the year and average temperatures specific to “Kansas City”
4.	SELECT * FROM global_data;	To refer to the list of year and global average temperatures.

5.	SELECT g.year, c.city, c.country,c.avg_temp, g.avg_temp g_avg_temp FROM city_data c JOIN global_data g ON c.year = g.year WHERE city = 'Kansas City';	SQL used to retrieve year-wise local temperature specific to “Kansas City, United States” and global temperature. This data was exported to a csv file for further analysis.

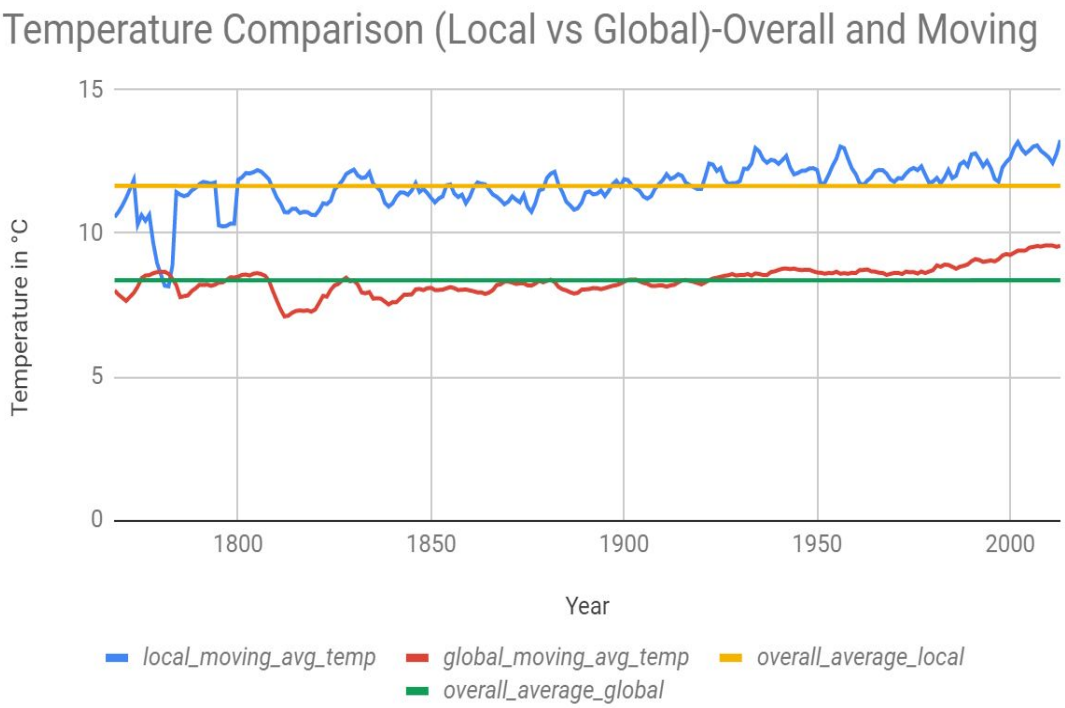
E. Approach

The following steps are performed for data extraction and analysis.

i. The data extracted from the temperature database is downloaded to a csv file.
ii. The csv file generated for query 5 (refer section D) is opened using Google sheets for further analysis.
iii. The moving averages (of five years) are calculated for both the local and global temperatures.
iv. Average local and global temperatures are computed.
v. A line graph is created for the moving average temperatures and the average temperature for both local and global.
vi. Calculate the variance/standard deviation of the local and global temperature to study the temperature variations.

F. Graphical Representation

The below graph illustrates the overall trends of local (Kansas City) versus global temperatures.



G. Observations

The data has been extracted and following observations are been made :

i. The local and global temperatures have been increasing gradually.
ii. The local and global temperatures have been below their averages till the 1920's. Then the temperature(both global and local) has seldom gone below the average temperature.
iii. There is a sharp drop in the local temperature in the 1780's, where the local temperatures were below the global average. There has never been a sharp increase or decrease in the global temperatures.
iv. The local temperature is always higher than the global temperature.
v. The difference between the local and global temperatures vary between 2-4 °C. The difference is gradually rising to 2-5 °C from the 1920's.
vi. This concludes that there is a gradual rise in both local and global temperatures.
vii. The variance in global temperature is 0.31 whereas local temperature has a variance of 2.84.