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UDACITY DATA ANALYST NANODEGREE

PROJECT 1: EXPLORE WEATHER TRENDS

JACKSONVILLE, USA VS GLOBE

JUNE 26, 2022

SYNOPSIS

This project is to analyze the temperature trends of Jacksonville, USA in comparison to that of the globe within the timeframes of 1746 to 2013 and make informed decisions using the databases provided.

OBJECTIVES

1. Extract the data using SQL.
2. Manipulate the data and incorporate the necessary techniques to ensure the graphs plotted are accurately aligned.
3. Adjust the moving averages to ensure a primitive focus is incorporated to enhance the analysis.
4. Plot the graphs with trendlines using python in Jupyter Notebook and Excel for visualizations.
5. Make inferences from the Jacksonville temperature plots to the global temperatures.

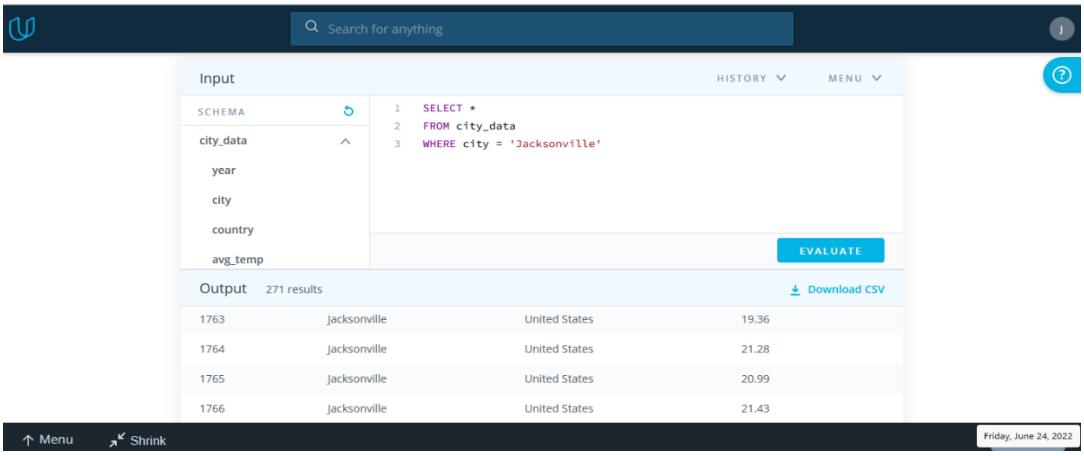
TOOLS INCORPORATED

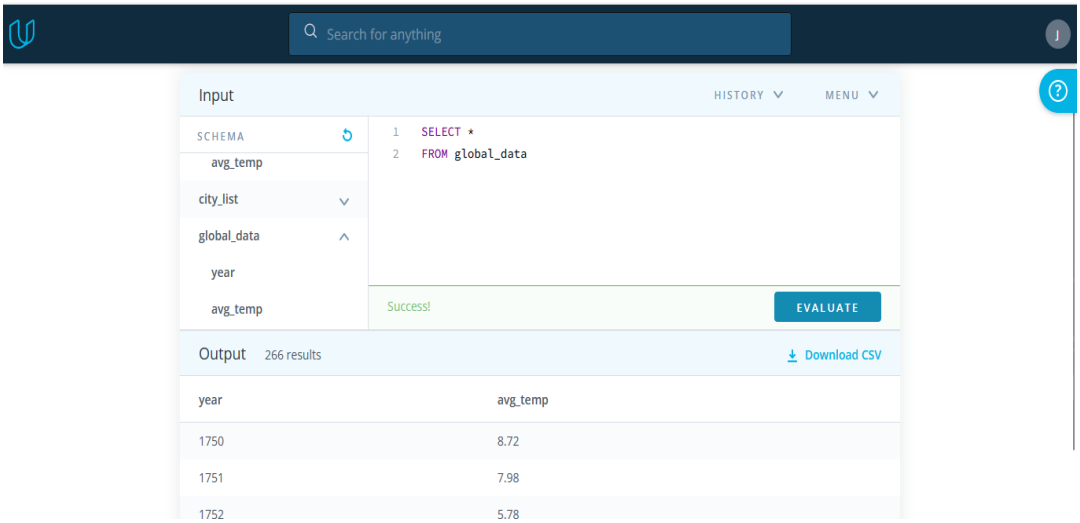
1. Excel
2. Python
3. SQL

PROCEDURE

1. EXTRACTION OF DATA:

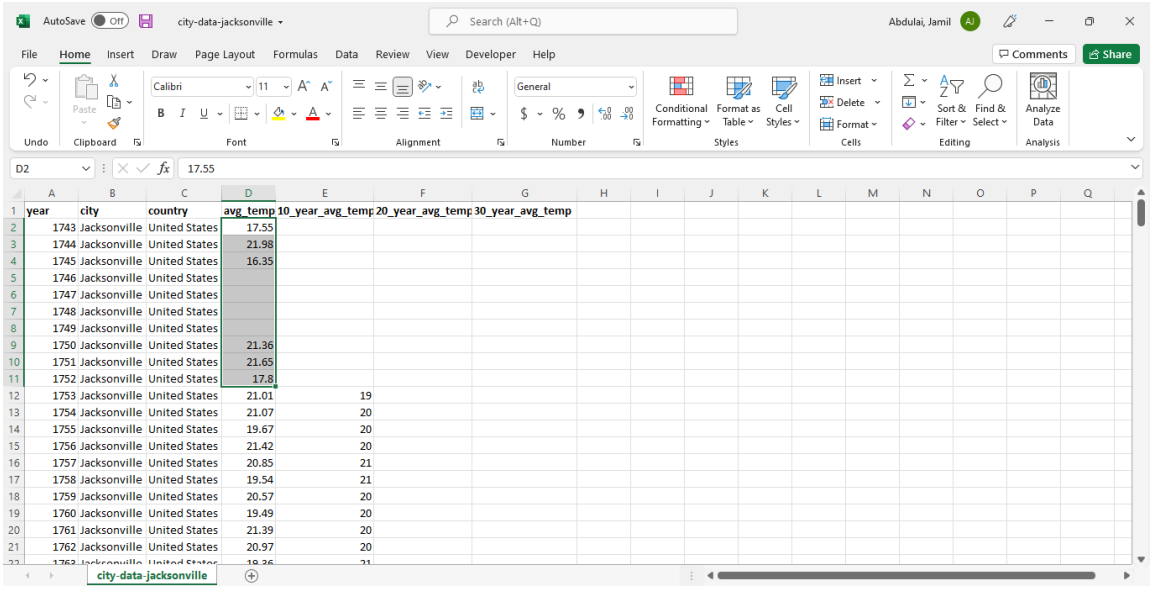
- The datasets were extracted using the above queries:



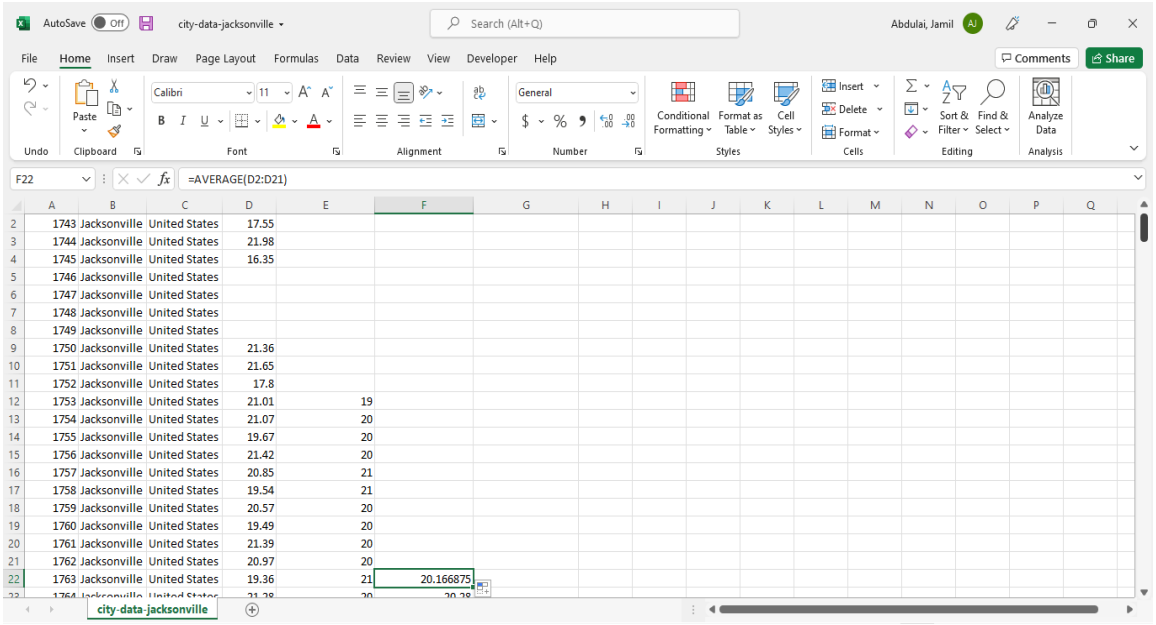


2. ADJUSTMENT OF MOVING AVERAGES:

- To achieve a more uniform data visualization, the implementation of moving averages was utilized. The years columned has 267 rows in comparison to 271 from the average rows for Jacksonville. A moving average of 10 and 20 years were used to achieve uniformity.
- For the moving average of 10 years, =AVERAGE(D2:D11) was used for the analysis.
- Also, =AVERAGE(D2:D21) was implemented for the 20-year moving average.



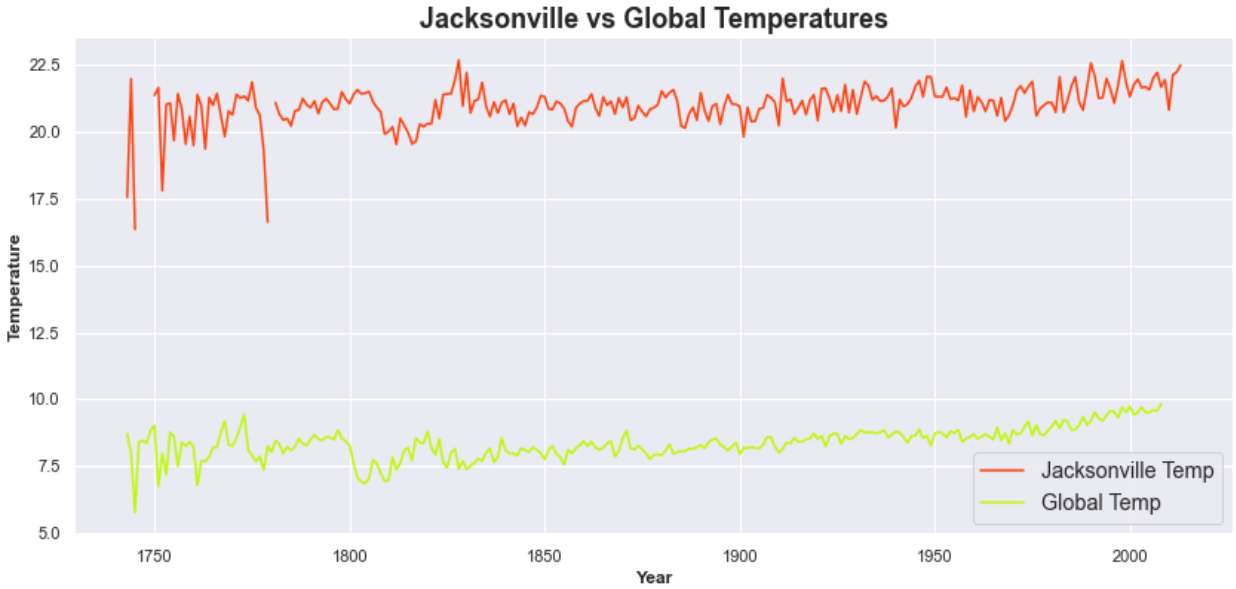
year	city	country	avg_temp	10_year_avg_temp	20_year_avg_temp	30_year_avg_temp
1743	Jacksonville	United States	17.55			
1744	Jacksonville	United States	21.98			
1745	Jacksonville	United States	16.35			
1746	Jacksonville	United States				
1747	Jacksonville	United States				
1748	Jacksonville	United States				
1749	Jacksonville	United States				
1750	Jacksonville	United States	21.36			
1751	Jacksonville	United States	21.65			
1752	Jacksonville	United States	17.8			
1753	Jacksonville	United States	21.01	19		
1754	Jacksonville	United States	21.07	20		
1755	Jacksonville	United States	19.67	20		
1756	Jacksonville	United States	21.42	20		
1757	Jacksonville	United States	20.85	21		
1758	Jacksonville	United States	19.54	21		
1759	Jacksonville	United States	20.57	20		
1760	Jacksonville	United States	19.49	20		
1761	Jacksonville	United States	21.39	20		
1762	Jacksonville	United States	20.97	20		

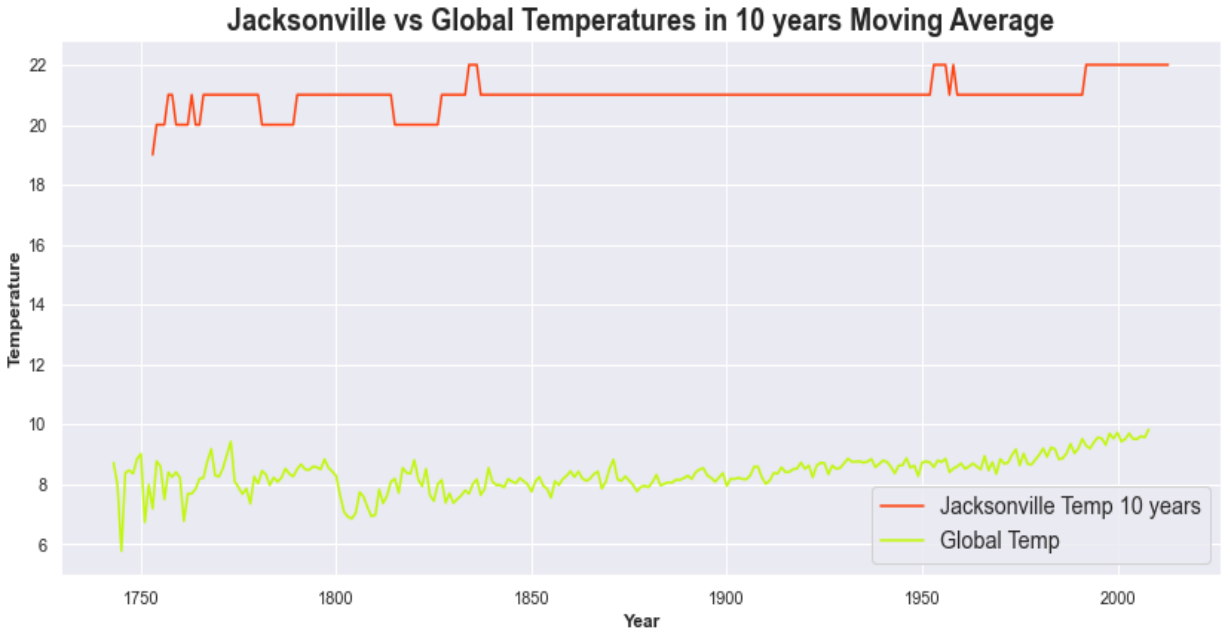


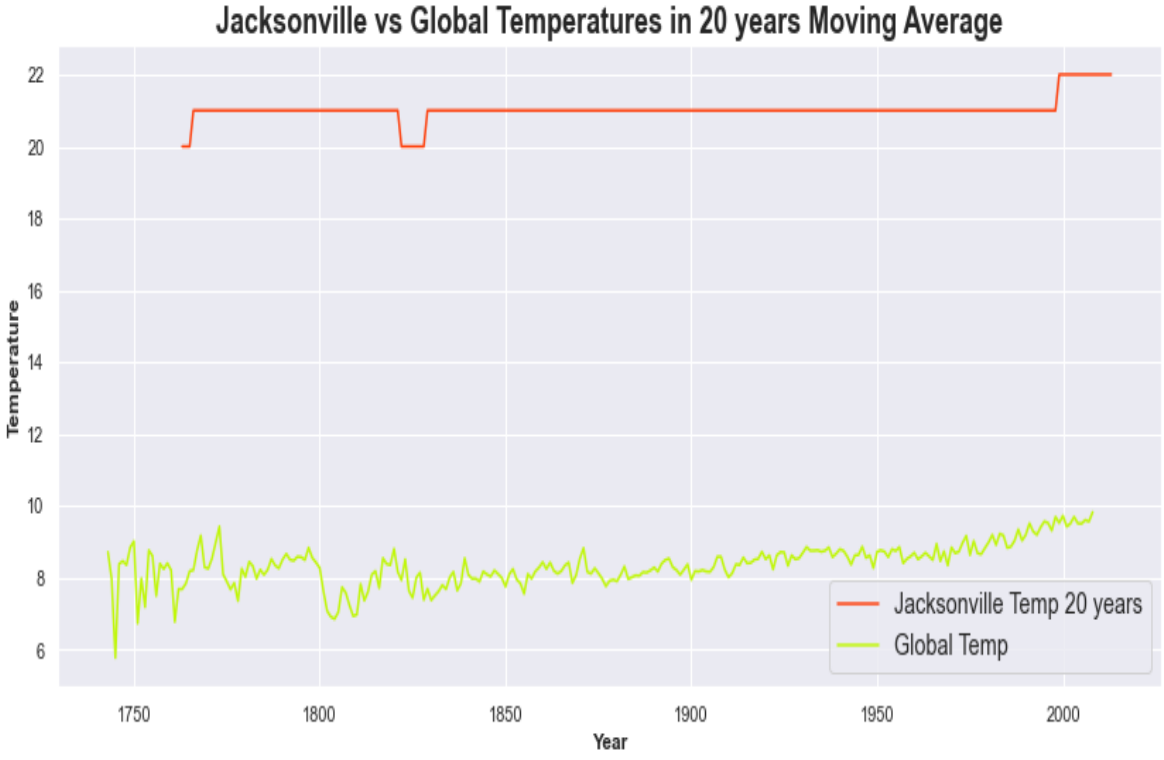
	A	B	C	D	E	F
2	1743	Jacksonville	United States	17.55		
3	1744	Jacksonville	United States	21.98		
4	1745	Jacksonville	United States	16.35		
5	1746	Jacksonville	United States			
6	1747	Jacksonville	United States			
7	1748	Jacksonville	United States			
8	1749	Jacksonville	United States			
9	1750	Jacksonville	United States	21.36		
10	1751	Jacksonville	United States	21.65		
11	1752	Jacksonville	United States	17.8		
12	1753	Jacksonville	United States	21.01	19	
13	1754	Jacksonville	United States	21.07	20	
14	1755	Jacksonville	United States	19.67	20	
15	1756	Jacksonville	United States	21.42	20	
16	1757	Jacksonville	United States	20.85	21	
17	1758	Jacksonville	United States	19.54	21	
18	1759	Jacksonville	United States	20.57	20	
19	1760	Jacksonville	United States	19.49	20	
20	1761	Jacksonville	United States	21.39	20	
21	1762	Jacksonville	United States	20.97	20	
22	1763	Jacksonville	United States	19.36	21	20.166875

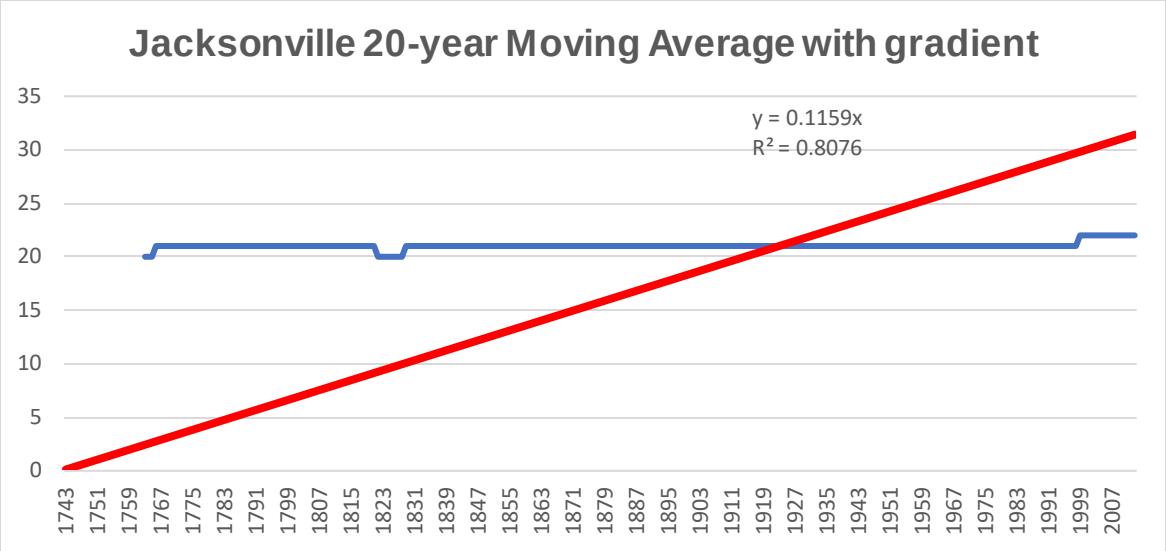
3. VISUALIZATION:

- Python programming tools, Jupyter Notebook, and Excel were used to visualize the data in conjunction with matplotlib and seaborn packages.
- A plot of the Jacksonville average temperature in comparison to the global temperature followed by 10 and 20-year moving averages was first plotted, followed by a plot with emphasis on the 20-year moving average of Jacksonville with a trendline respectively.




Jacksonville vs Global Temperatures in 10 years Moving Average
Temperature
Year
Jacksonville Temp 10 years
Global Temp


Jacksonville vs Global Temperatures in 20 years Moving Average
Temperature
Year
Jacksonville Temp 20 years
Global Temp



4. OBSERVATION:

- For the Jacksonville vs Global Temperatures graph, the line charts for both categories show an influx of both maximums and minimums due to the congestion of multiple graph points hence the need for a moving average to make a better analysis.
- The Jacksonville vs Global Temperatures in 10-year Moving Average graph provided a clearer analysis of the graph. The maximum and minimum temperatures for the Jacksonville plot are 22℃ and 17℃ respectively whereas the global temperatures were between 9℃ and 5℃.
- Also, the Jacksonville vs Global Temperatures in 20-year Moving Average graph envisioned an even better detail of the analysis hence proving that the temperature of Jacksonville, USA is hotter than that of the globe.
- Lastly, for the Jacksonville 20-year Moving Average with gradient, the slope(gradient) line shows the rate of change in temperature per unit of change in time. As the years progressed, there were multiple influxes in temperatures of slop of 0.1159 ($y = 0.1159x$ and $R^2 = 0.8076$) which isn't very steep at all. The coefficient of determination, R^2, has a value of 0.81 or 81% which infers the value of change in the dependent variable's movement, temperature, with that of the independent variable, years.