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Exploring Weather Trends

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Overview

This project explores the trends in average global temperature and temperature of important cities of the world and how they have changed throughout the years.

Goals

1. **Extraction:** Extract data from the database and export as csv.
2. **Visualization:** Making a visualization of the average temperature of the nearest city and the global average temperature.
3. **Observation:** Compare the two line plots and make observations based on it.

Tools Used

- **SQL:** SQL was used to extract the required tables from the database schema provided.
- **Python:** Python libraries Pandas and Matplotlib were used for calculating the moving average and for the visualization.
 - **Pandas:** Used to calculate the moving average of the "avg_temp" column in both the tables.
 - **Matplotlib:** For plotting the graph.
- **Jupyter Notebook:** The Python code was run on a local Jupyter Notebook

Steps

- Extraction of data from database using SQL and exporting them as csv.

```
SELECT * FROM "city_data"
SELECT * FROM "global_data"
```

- The csv files were loaded into the Jupyter notebook using Pandas. The dataframes were named “city_data” and “global_data” respectively.
- The moving average was calculated for both the tables and then they were merged to form a single data table.

```
#Calculate moving average in city_data.
city_data['MA_city'] = city_data['avg_temp'].rolling(7).mean()

#Calculate moving average in global_data.
global_data ['MA_global'] = global_data['avg_temp'].rolling(7).mean()

#Merge the two tables based on year.
df = city_data.merge(global_data, on = 'year', how = 'outer')
```

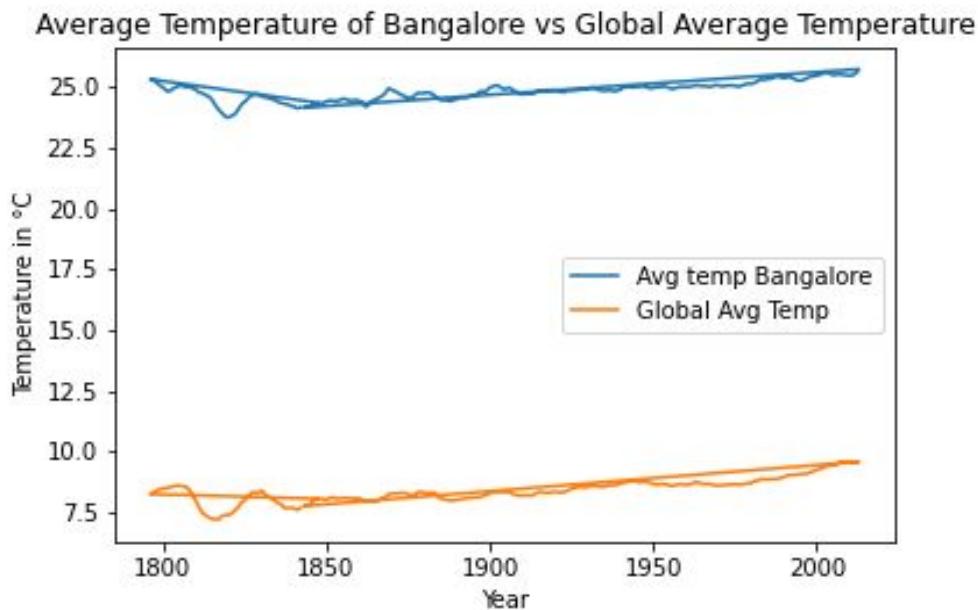
- The city Bangalore was selected for visualization. So, the rows containing “city” as Bangalore were extracted.

```
df_final = df.loc[df['city'] == 'Bangalore']
```

- The line plot of the moving averages were plotted.

```
df_final.plot(x = 'year', y = ['MA_city', 'MA_global'], label = ['Avg
temp Bangalore', 'Global Avg Temp'])
plt.title('Comparison of Average Temperature of Bangalore to Global
Average Temperature')
plt.xlabel('Year')
plt.ylabel('Temperature in °C')
plt.figsize = (20,20)
plt.savefig('foo.png')
plt.show()
```

Line Plot



Observations

1. Bangalore's temperature is hotter than that of the global average temperature.
2. The difference is expected because Bangalore lies between the Equator and the Tropic of Cancer, thus having an equatorial climate.
3. It can be seen from the graph that both the global temperature and Bangalore's temperature has been rising over the years.
4. It can be seen that since 1850, the temperatures have kept rising as each year passes.
5. The graph also proves to show the effects of global warming and how the temperatures have been rising by 0.1 °C each year.

References

- [Official Pandas Documentation](#)

