IMPACT OF POPULATION GROWTH AND CO2 EMISSIONS ON CLIMATE CHANGE

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MADE (Method of Advanced Data Engineering)

OVERVIEW

- Introduction
- Data Sources
- ETL Pipeline
- Results & Conclusion
- Key Findings & Limitations

INTRODUCTION

In recent years(this year 2024 also), problems like drought, severe heat waves, ever-increasing temperatures, heavy rainfall causing floods, seasonal cycle inconsistency, and hunger crises have been escalating, highlighting the urgent need to understand the main causes of environmental damage. With the global population continuing to rise at an unpredictable rate, the increase in CO2 emissions from forest fires, crop cultivation, pesticide manufacturing, and agrifood waste disposal presents a significant challenge to sustainable development and climate stability. To understand the impact of CO2 emissions from all possible sources and the causes of increasing temperatures, deep data analysis has been performed on existing data to draw conclusions.

DATASOURCE

Data Source: Kaggle

Data URL: https://www.kaggle.com/datasets/alessandrolobello/agri-food-co2-emission-dataset-forecasting-ml

Data Type: CSV

License: CC BY Creative Commons Attribution

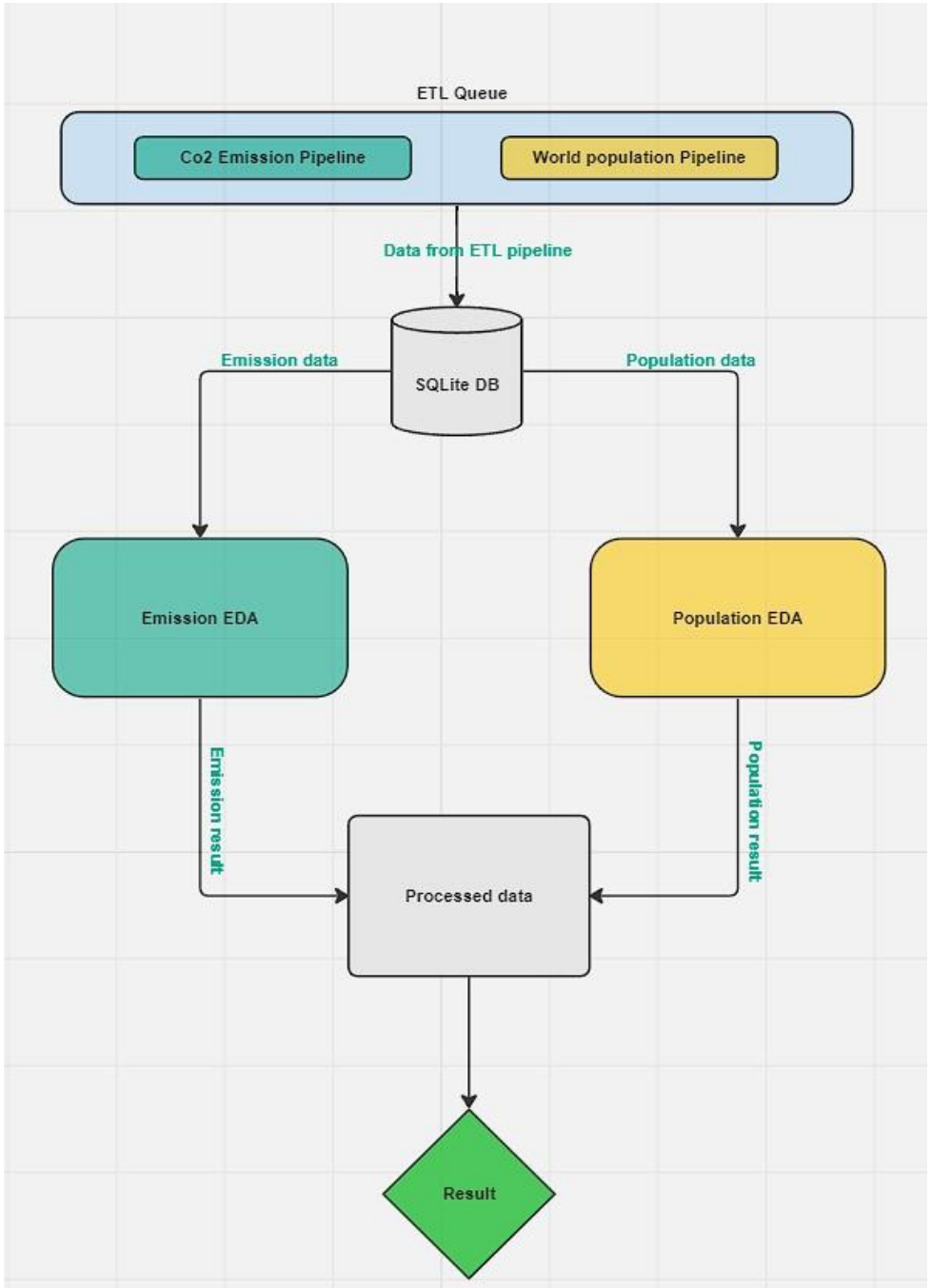
Data Source: Kaggle

Data URL: https://www.kaggle.com/datasets/rajkumarpandey02/2023-world-population-by-country

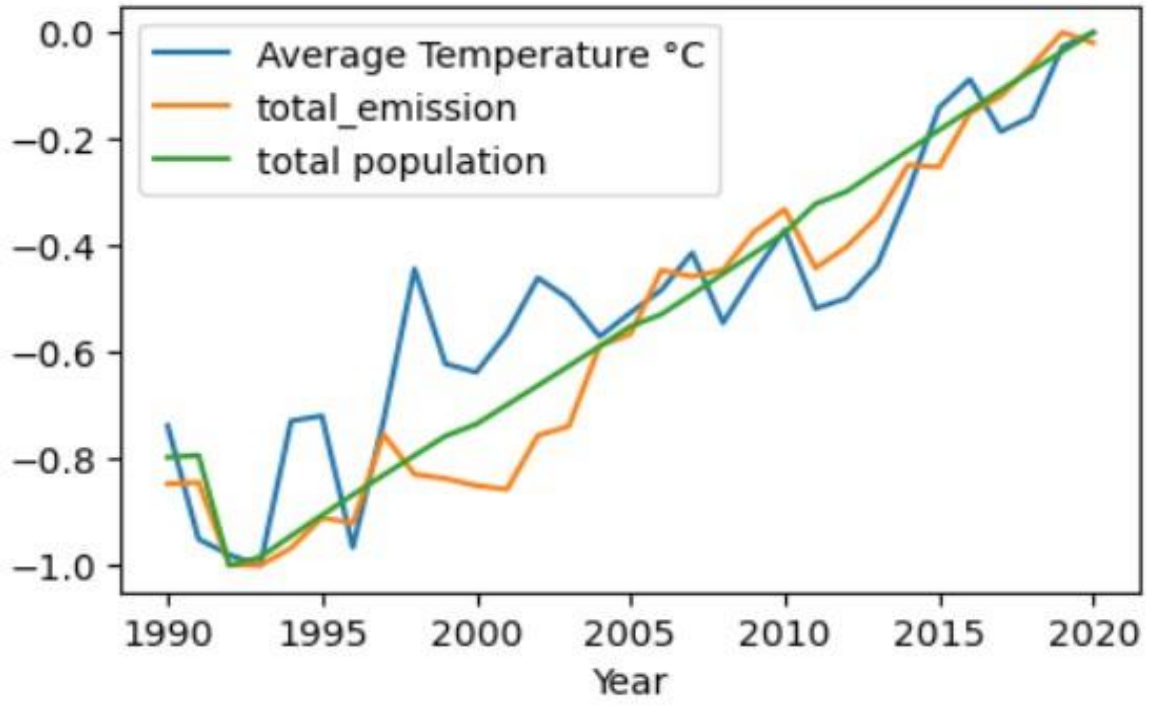
Data Type: CSV

License: CC0: Public Domain

ETL PIPELINE STRUCTURE

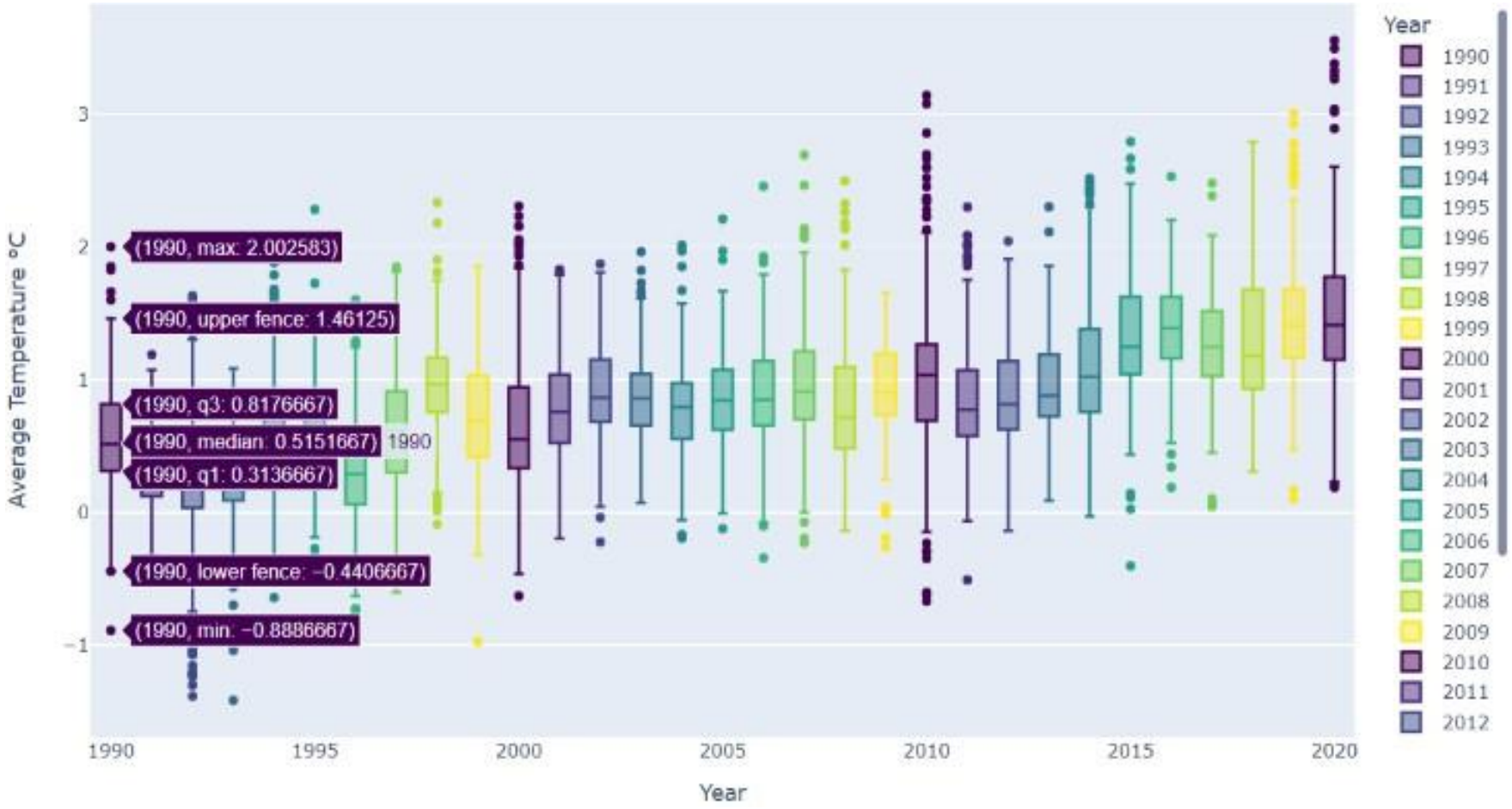


RESULTS & CONCLUSION



- This plot shows the trend of temperature, population, and emissions. The data is normalized on a yearly basis.
- From 1996 to 2004, there is an inverse relationship between emissions and temperature increase, but the reason cannot be determined from this dataset.
- It demonstrates that the increasing temperature is a combined effect of population growth and CO2emissions.

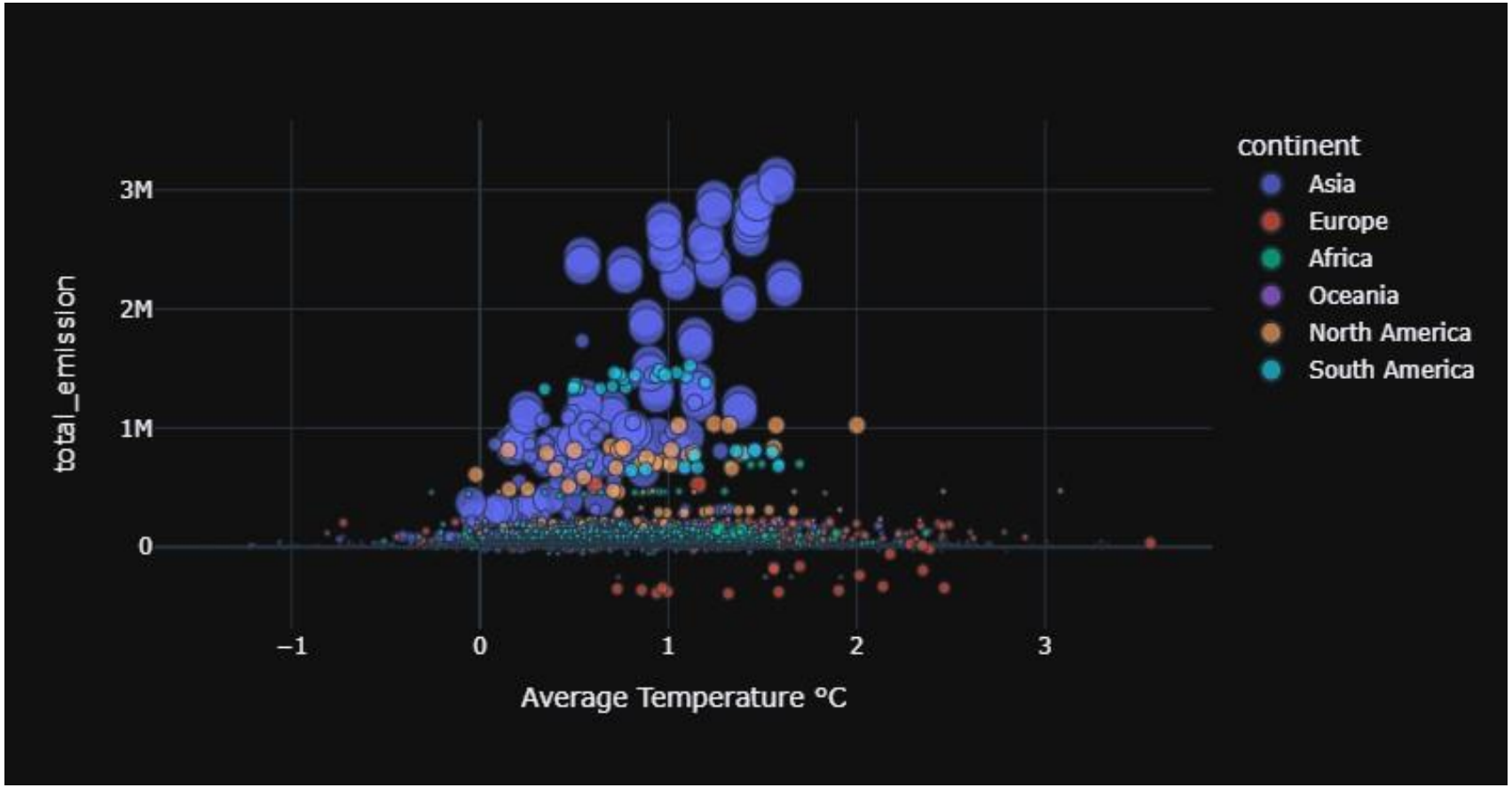
- In 1990, as can be seen in the whisker box plot, the maximum rise was around 2°C and the minimum was -0.88°C. This increased to 3.55°C (max) and 0.189°C (min) in 2020.
- Temperature Variability in Recent Years: The range between the maximum and minimum temperatures has increased in recent years.
- Temperature spikes: Particularly in the years around 2000, 2010, and 2020. These outliers indicate periods of extreme heat, which have become more frequent and pronounced in recent years.



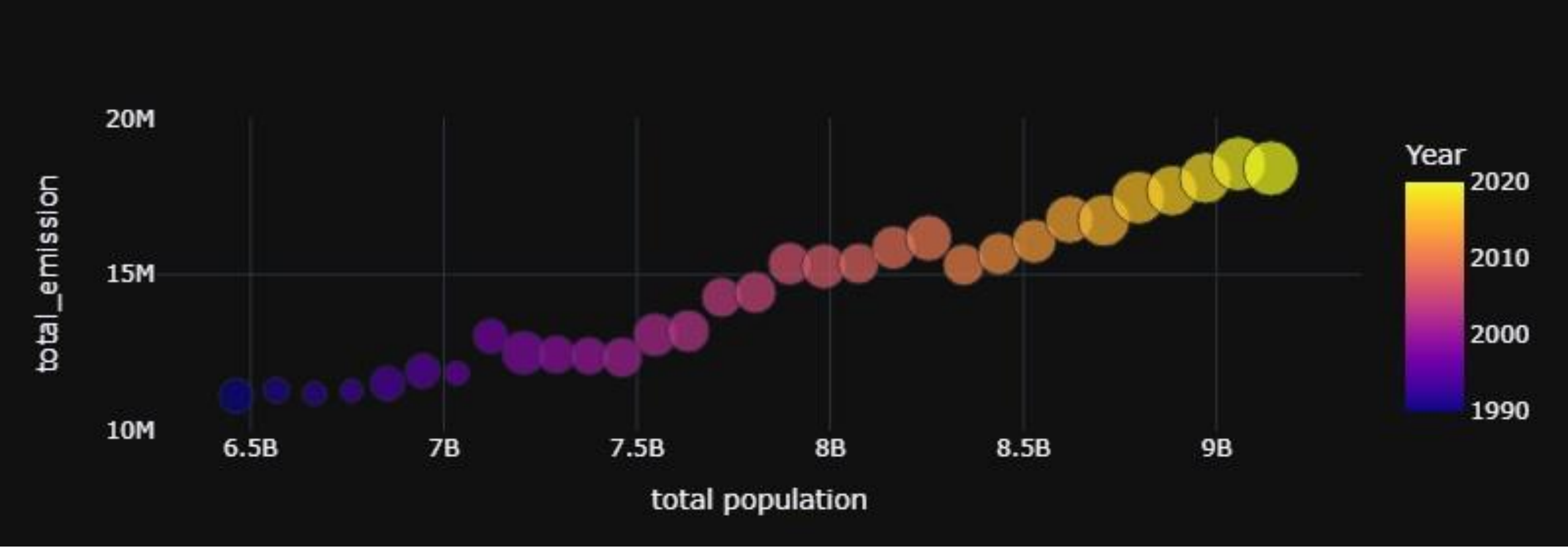
RESULTS & CONCLUSION

big blue circles are from Asia, indicating that this continent contributes significantly to global CO2 emissions. These data points also correspond to higher average temperatures. In the interactive notebook if you disable Asia then total emission drops at1.5M which is direct 50% drop.

•**Lower Emissions and Temperature in Africa and Oceania:** Smaller circles representing Africa and Oceania are generally clustered towards the lower end of the emission and temperature scales. This indicates that these continents have relatively lower CO2 emissions and average temperatures compared to other continents.



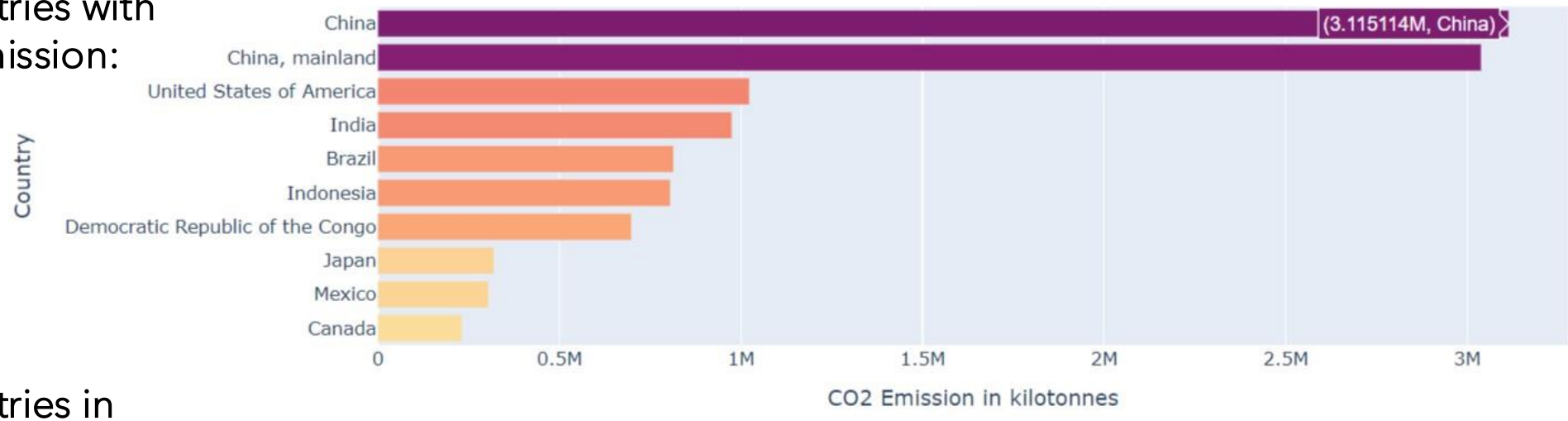
RESULTS & CONCLUSION



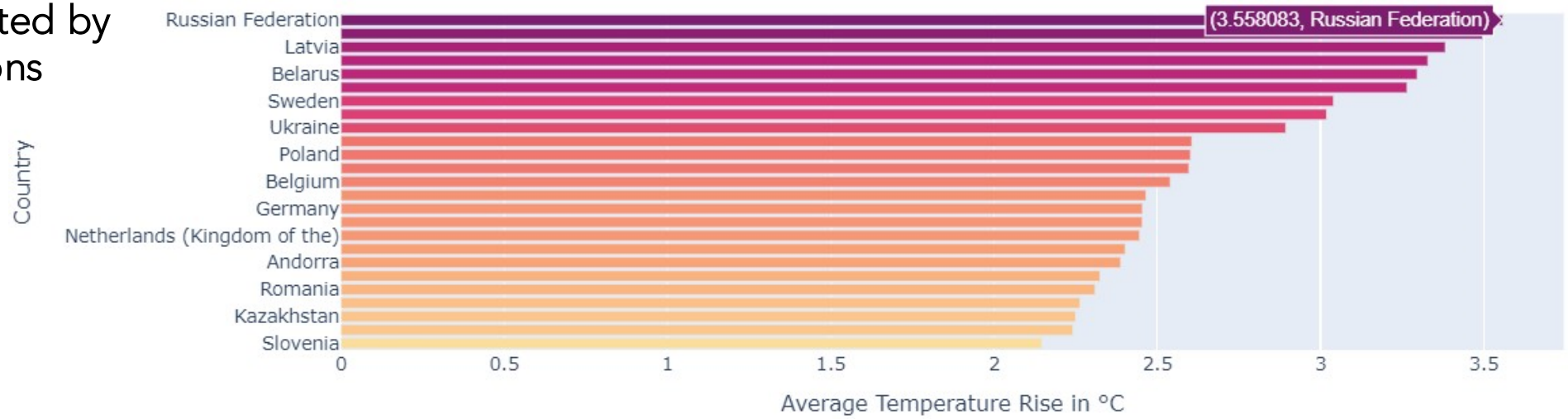
RESULTS & CONCLUSION

- can be easily observed that with increasing population Co2 emission is also increasing.
- at the very left bottom corner size of bubble was smaller compare to right top corner bubble (in yellow), shows temperature rise

Top 10 countries with high Co2 Emission:



Top 25 countries in 2020: Impacted by CO2 emissions



RESULTS & CONCLUSION

KEY FINDINGS & LIMITATIONS

Thorough Understanding

- Visualizations, analysis, and figures provided a comprehensive insight into CO2 emissions and the impact of population growth on climate.

Objective Question Addressed

- Analysis successfully answers the high-level objective question.

Support for Hypothesis

- Detailed analysis shows correlation among population, temperature, and emissions.

Noteworthy Findings

- Inverse relationship instances between temperature and emissions.
- Requires additional information or may indicate data flaws.

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Thank You!