Impact on SDGs
Our visualization directly addresses the Sustainable Development Goal (SDG) of Climate Action. By illustrating the correlation between rising CO2 levels and changes in temperature and precipitation across 77 countries, we provide a global perspective on the effects of climate change. This visual evidence can inform policy decisions and encourage actions that mitigate climate change, thereby furthering the key competition SDGs.

Our Approach

We used Python for data processing and visualization, utilizing packages such as pandas for data manipulation and matplotlib for creating visuals. Our dataset contained country and year-wise data of CO2 emissions, temperature, and precipitation for 77 countries, varying from 1981 to 2022. We processed this data by cleaning and structuring it to suit our visualization needs.

Insights from Our Data visualization

The line graph titled "Combined Data for Countries" provides a comprehensive view of the relationship between precipitation, temperature, and annual CO2 emissions from 1981 to 2022.

- **Precipitation (Green Line)**: The green line represents precipitation data. It fluctuates over the years, indicating variability in rainfall patterns. Positive values indicate an increase in precipitation, while negative values signify a decrease.
- **Temperature (Blue Line)**: The blue line represents temperature data. It shows a general trend of increasing temperatures over the years, which could be indicative of global warming. Positive values indicate a rise in temperature, while negative values signify a drop.
- **Annual CO2 Emissions (Red Line)**: The red line represents annual CO2 emissions. It also fluctuates over the years, suggesting changes in industrial activities or environmental policies. Positive values indicate a rise in CO2 emissions, while negative values signify a reduction.

This graph is part of a larger project in which similar graphs have been plotted for 77 countries. Collectively, these graphs provide a global perspective on the impact of CO2 emissions on temperature and precipitation. The data can be further visualized on a globe to show the average increase in precipitation and temperature rise in each country due to CO2 emissions. **This comprehensive data visualization aids in understanding the global impact of CO2 on climate change. Moreover, it demonstrates that CO2 alone isn't responsible for changes in precipitation across the globe.** Negative and positive values in these graphs represent decreases and increases in the respective parameters, thereby providing a clear picture of the trends over time.

Line graphs have been constructed for each country, illustrating the changes in CO2 levels, temperature, and precipitation. Please refer to the provided link for these graphs. **This data is crucial for our report, this illustration of the graph changes every three seconds.**

Our Motivation

Climate change is one of the most pressing issues of our time. We chose this topic to raise awareness about the impact of CO2 emissions on global warming and climate change. We believe that effective data visualization can play a crucial role in conveying this message and driving action.

Our Learnings

We conducted research to understand the broader context of climate change. This included reading articles, historical data, and studying factors influencing climate change. This comprehensive approach enriched our understanding and influenced our data visualization strategy.

Ethical Considerations We made sure to use reliable data and present it honestly. We also tried to make our data easy to understand for everyone. We think being open and inclusive with data is key to tackling climate change.

Interactive visualization

We have created an interactive visualization to enhance user engagement and understanding. Link to our 3D visualization showing average precipitation, temperature and CO2 rise across the globe
3D Globe

Our References

- **https://power.larc.nasa.gov/data-access-viewer/**
- **https://disc.gsfc.nasa.gov/information/glossary?keywords=giovanni%20measurements&title=Giovanni%20Measurement%20Definitions%3A%20Precipitation**
- **https://www.worldeconomics.com/Indicator-Data/ESG/Environment/Temperatures/**
- **https://ourworldindata.org/co2-emissions#how-do-we-measure-or-estimate-co2-emissions**
- **https://disc.gsfc.nasa.gov/datasets/LANDMET_ANC_ST_1/summary?keywords=Land%20use**
- **https://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions#Maps_and_charts**
- **https://www.kaggle.com/search?q=temperature+of+all+countries+in%3Adatasets**