# Project Proposal: Climate Change Temperature Analysis

### 1. Project Overview

Climate change is one of the most critical issues facing the world today. Our project aims to investigate global temperature changes over the past several decades, focusing on the impact of industrial activities and greenhouse gas emissions. By analyzing temperature changes across various regions and time periods, we will uncover patterns and trends that highlight the most affected countries, seasonal variations, and differences between Annex I (developed) and non-Annex I (developing) countries.

Our goal is to use data visualization techniques to provide a clear and comprehensive view of these temperature changes, helping to inform the public and policymakers about the regions most vulnerable to climate change. The project will use interactive maps and time-series analyses to demonstrate the critical areas affected and forecast potential future trends based on historical data.

## . 2. Content

➔ ***Data Source Introduction:***

Climate change refers to long-term shifts in average weather patterns that characterize Earth's local, regional, and global climates. Since the early 20th century, these changes have been predominantly driven by human activities, especially the burning of fossil fuels. This process has led to an increase in heat-trapping greenhouse gas levels in the atmosphere, raising the planet's average surface temperature, a phenomenon commonly known as global warming.

Source: https://www.kaggle.com/code/sevgisarac/climate-change

· ***Guiding questions*:**

1. Which ten countries have experienced the greatest temperature increase in the last ten years, and how does this compare to the ten countries with the least change?
2. Is there a noticeable trend in temperature change over the years?
3. How does temperature change vary by season, and is there a significant difference between the seasonal trends across the world?
4. Is there any remarkable trend between the years according to World, annex I countries and non-annex I countries? If there is, can we split these as periods?

➔ ***Metadata Information***

***Table 1.***

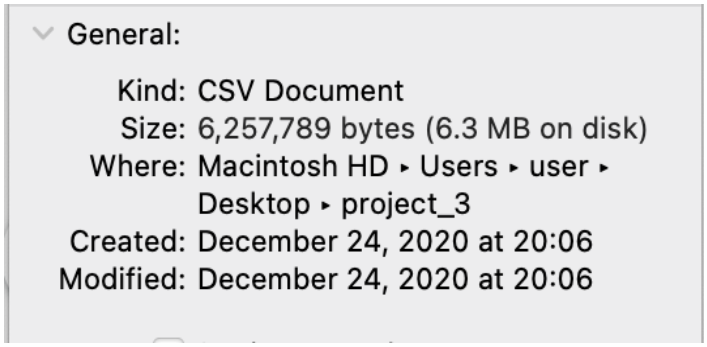
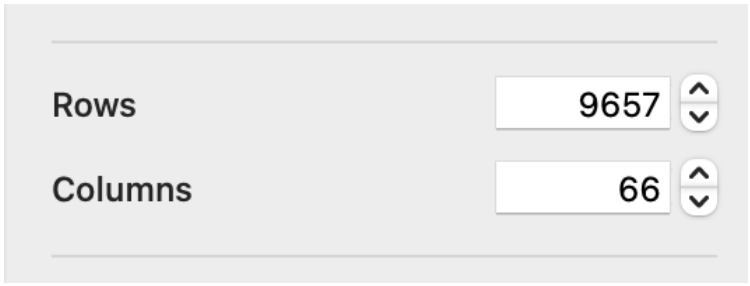



***Table 2.***




➔ ***Gathering Data and Data Cleaning:*** we'll use Python libraries within the Jupyter notebook environment for investigating these questions.

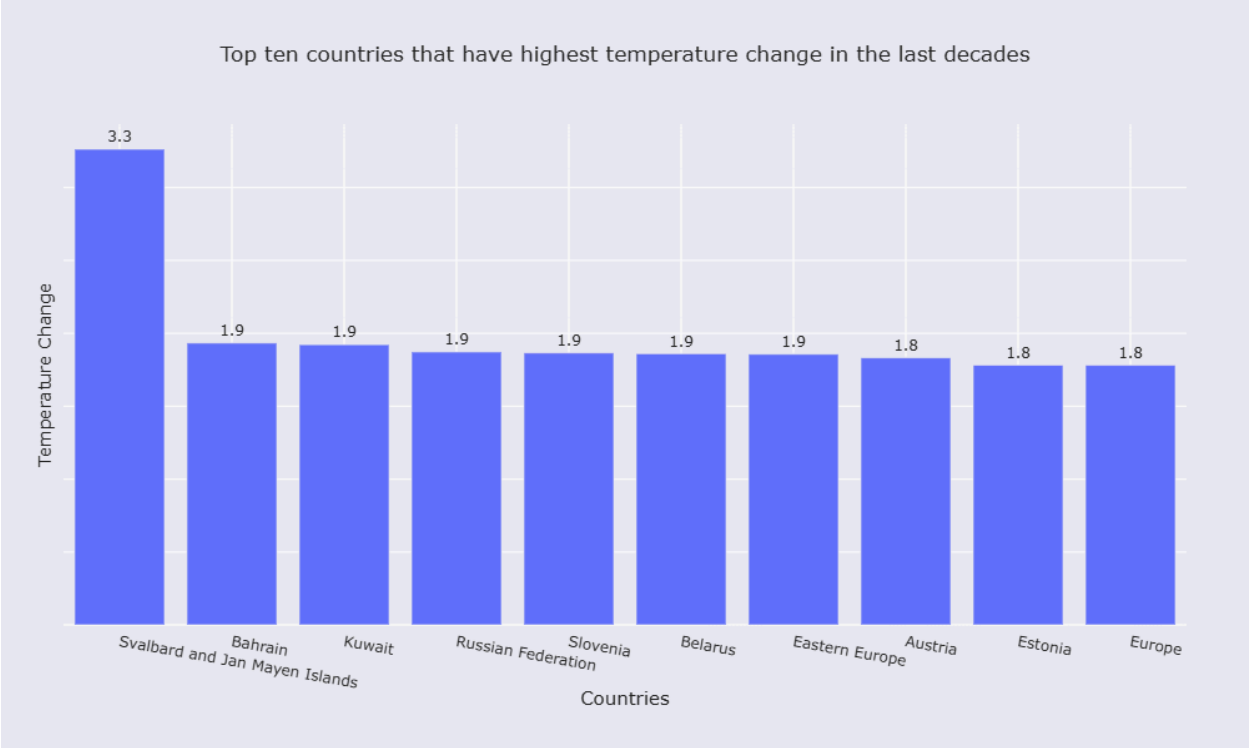
➔ ***Data analysis and data visualization:***

For backend libraries we are going to use Pandas, Numpy, matplotlib, Plotly for data visualization and for frontend for mapping and interactive visualization you'll be using HTML, CSS and JavaScript based libraries like D3, Leaflet. We'll use Flask and PostgresSQL for storing the dataset.

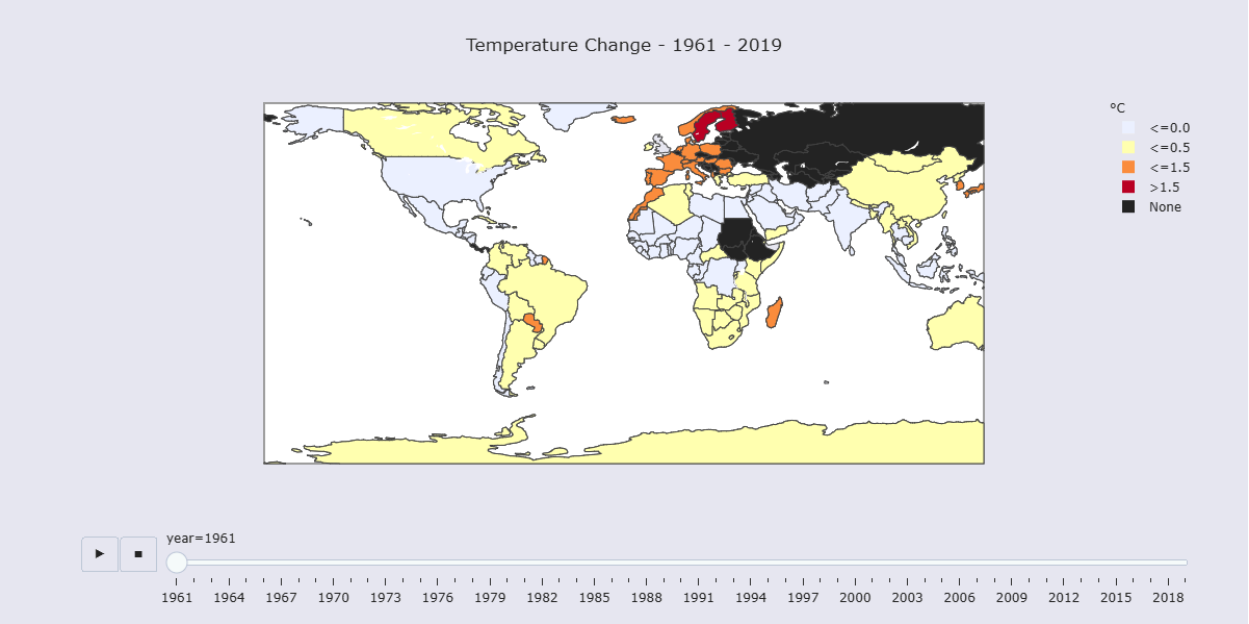
### 3.Screenshots of Relevant Visualizations

For inspiration and to showcase creative visualization ideas, we have selected following examples:

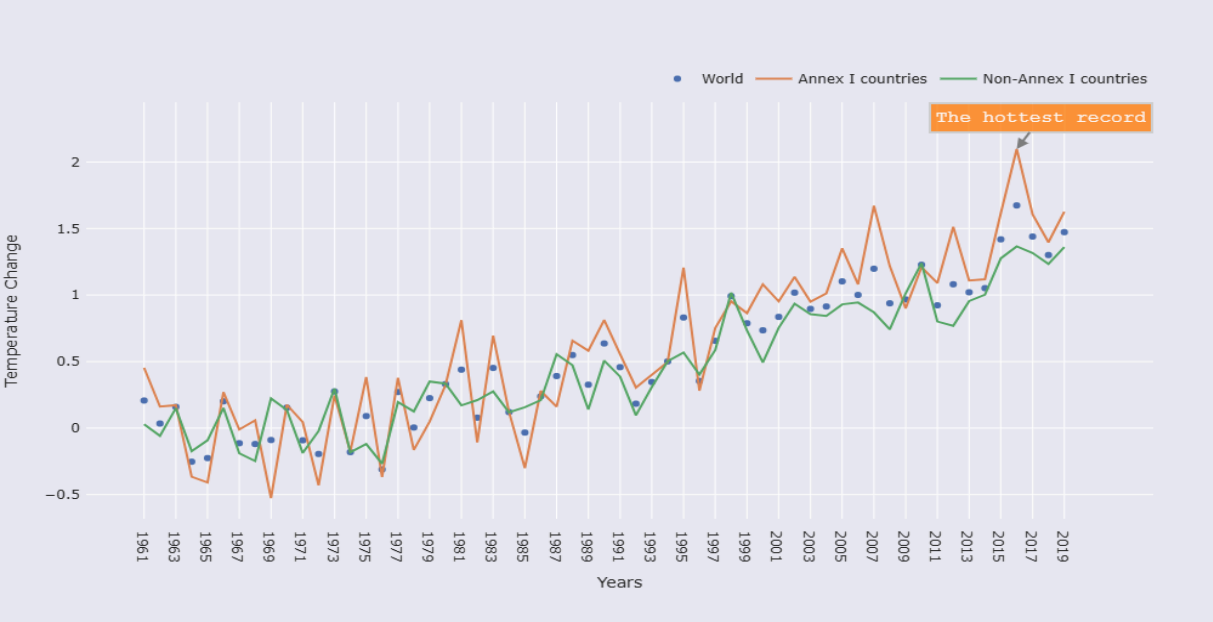
➔ **Line Chart :** This bar chart illustrates the top ten countries that have experienced the highest temperature changes in the last decades.



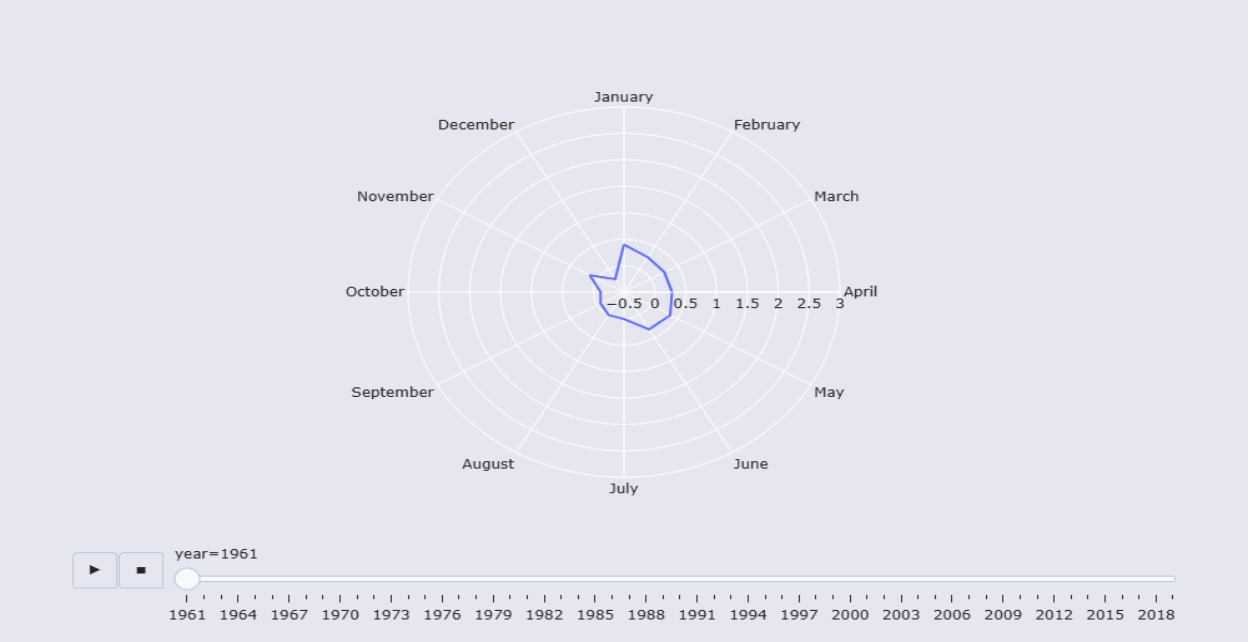
➔ **Global Heatmaps:** These maps illustrate how temperatures vary across different regions, with color intensities indicating the degree of change.



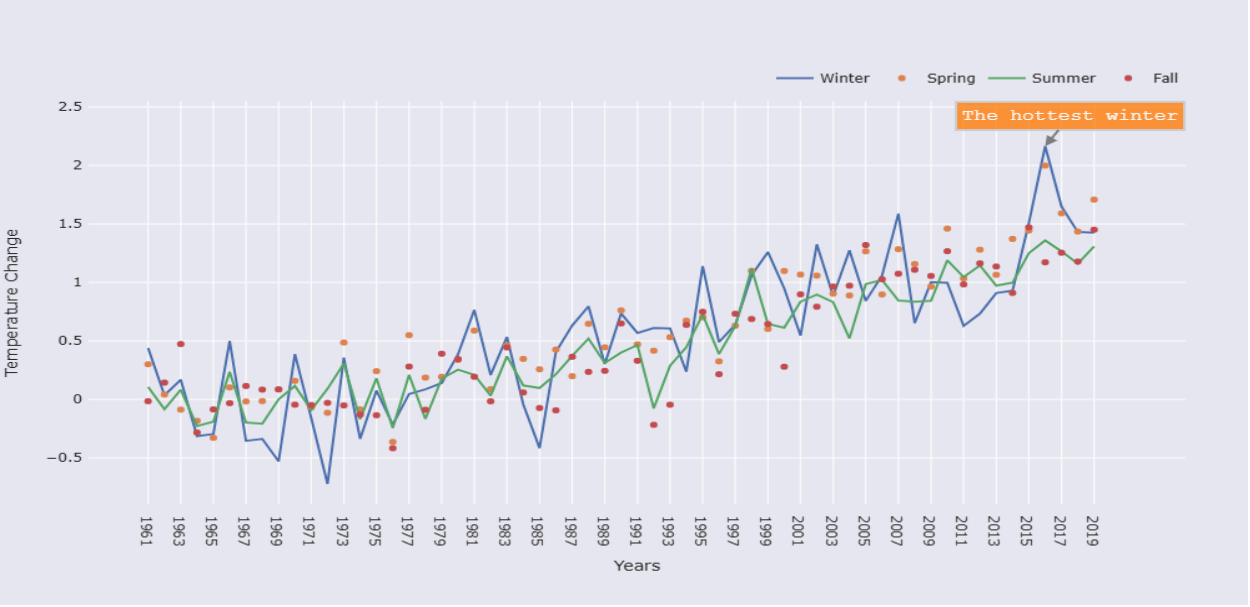

➔ **Time-Series Line Graphs:**These show the trend of temperature change over the decades for different countries or regions.




➔ **Interactive Geospatial Maps:** Leaflet.js based maps that allow users to filter temperature changes by country, religion, and time period, providing an interactive user experience.




➔ **Seasonal Temperature Comparison:** This visualization compares temperature variations across different seasons for multiple countries, offering insights into which seasons are most impacted by climate change.



**3. Github link**: https://github.com/Hannah-61/Project3

***Conclusion:*** Summarizing global surface temperature change between 1961 and 2019. As a visualization of the summary results, we will add a map which shows how climate change is getting serious over the years.

**References**


https://www.ipcc.ch/sr15/chapter/chapter-1/

https://www.fao.org/faostat/en/#data/ET

https://www.fao.org/faostat/en/#definitions

https://science.nasa.gov/climate-change/what-is-climate-change/

https://science.nasa.gov/climate-change/effects/

https://www.scientificamerican.com/article/in-just-10-years-warming-has-increased-the-odds-of-disasters

https://www.deepdyve.com/lp/wiley/climate-change-impacts-on-wildlife-in-a-high-arctic-archipelago-zKjAbf0Y5t


***Note: The graphics and screenshots presented serve solely as illustrative example to provide inspiration and conceptual guidance for the project; they are not original work produced by our team.***