

Project 3

Climate Change Visualization Proposal

Overview

The world is divided on the reality of climate change. There is a growing number of climate change deniers. This project intends to find whether the climate change is real or not. If the climate change is real, its impact on our lives will be devastating. Thus, we can't ignore it. By providing interactive and visually compelling representations of the climate change data, we hope to reach out to news media to help them raise awareness of climate change. We also leave an inspiration for future studies to explore more on human causes for climate change and the human impacts of climate change with these visualizations.

This project intends to find answers for the following questions:

- Is the temperature rising worldwide through the years? Or in other words, is global warming real?
- Is there a change in precipitation over the years?
- Is the air quality diminishing with the increase of CO₂ emission?

This project aims to present a visual representation of climate change by looking at the impact of climate change on the environment between 1992–2022 which includes, temperature, precipitation, and air quality. The project will include interactive maps, line graphs, and animated charts, providing users with an immersive experience and insight into the reality and severity of climate change.

Three main views in this project are that of Temperature, Precipitation and Air Quality Index (AQI). We also intend to create a Climate Event Map, which will include data from web scraping related to climate change events like floods, wildfires and, more.

For this project we will first collect the data from open sources. After the data collection, we will move on to back end ETL process using PostgreSQL/MongoDB, Python and Jupyter Notebook. After the ETL process has been completed, we intend to create the Visualization and Dashboard using Flask API, HTML and JavaScript libraries.

Temperature and Precipitation View

Temperature and Precipitation view will consist of a map with a slider to change year with auto-play animation, line graph and animated graph. These visualizations will show the rate of change in temperature and precipitation over time. We will also use Race Bar Chart to display our data with animated racing bars.

Air Quality Index View

Air Quality Index view will include a line graph that compares the air quality index with CO₂ emissions, providing users with a visual representation of the relationship between the two factors. Additionally, we will create a scatter geo map of CO₂ emissions, displaying the geographic distribution of carbon emissions.

Climate Event Map

The Climate Even Map is going to be an interactive choropleth map. The map will have pinned locations which will have exact climate information for the pinned location. We will use web-scraping to collect data related to climate change events.

Data Sources

For data collection, we will use the following sources:

- Historical Temperature and Precipitation data: National Oceanic and Atmospheric Administration (NOAA) Climate Data Online API
- Historical Air Quality Data: OpenAQ API
- Historical CO₂ Emission Data: Data on CO₂ and Greenhouse Gas Emissions by Our World in Data (Hannah Ritchie, n.d.) collected from <https://github.com/owid/co2-data>

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