Data Visualisation Track

Visualizing Global Carbon Emissions Using Our World In Data

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Purpose of this data visualisation

- To provide a clear, concise overview of global carbon emissions.
- Specifically looking at the main sources of CO2 emissions worldwide as well as specific countries.
- By presenting the data in straightforward charts we aim to make complex CO2 information accessible and understandable for a wide range of audiences.

Target Audience for This Presentation

This dashboard is specifically designed for key decision makers who have a major influence to carbon emissions where a reduction could be made. For example those who are in the fields as

- Government officials
- Corporate leaders in major companies with high carbon usage
- Researchers especially those working on environmental science

Ethical Considerations

Using the Dataset Legally and Ethically

Our project takes this seriously by following strict guidelines.

On the legal side,

- Licensing: As stated on the OWID GitHub "All visualizations, data, and code produced by Our World in Data are completely open access under the Creative Commons BY license.
- Copyright Compliance : we've made sure that all the data comes from reputable, publicly available sources.
- We haven't engaged in any web scraping and we've carefully reviewed the licenses to ensure full compliance with copyright laws.

From an ethical standpoint,

- There's no personally identifiable information (PII) in this dataset—it's just the global and regional CO_2 emissions .
- We've worked hard to make sure that the data focuses only on emissions statistics, with no sensitive information that could impact individual privacy.

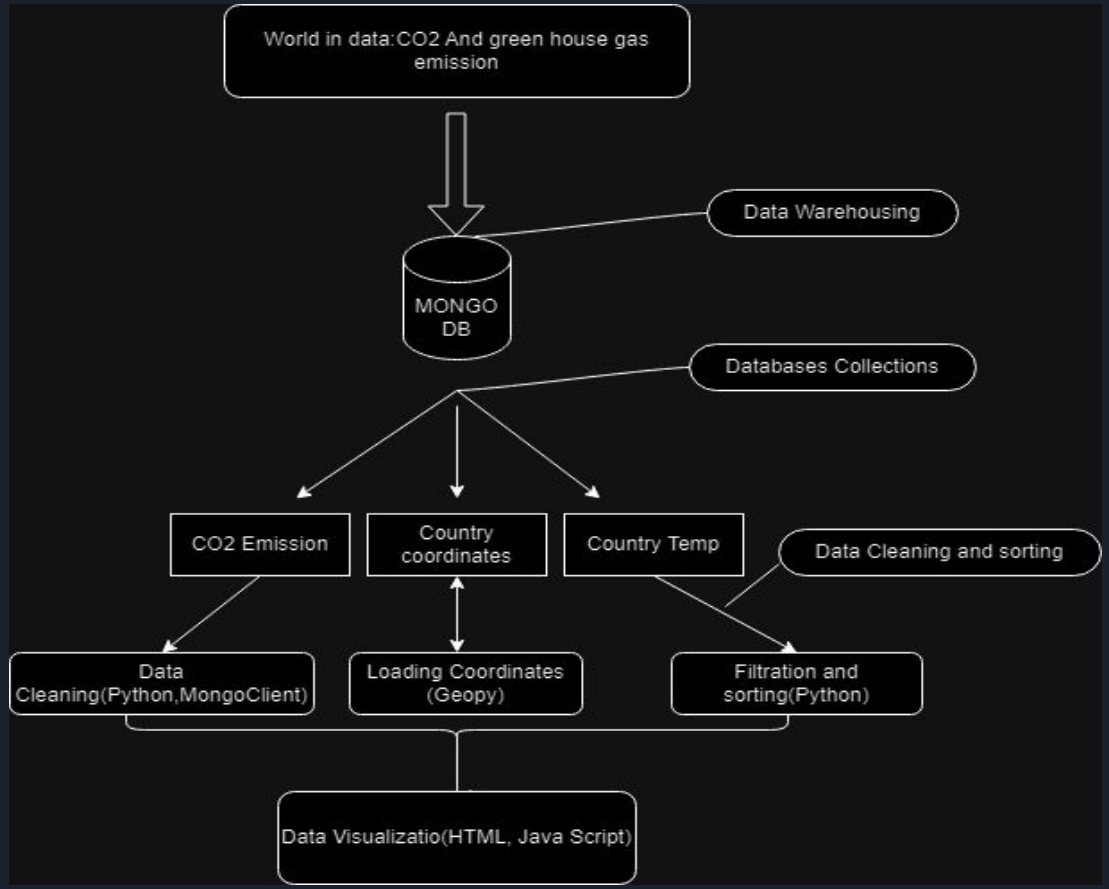
Data Warehousing/Cleaning process

- With the complexity of the data. MongoDB is used to warehouse the data.
- Pymongo to query the data.
- Column Filtration.
- Handling the missing data.

  Upon inspection we found a lot of data was missing and had null value, So we filtered the data by removing unnecessary rows.

- Filtered the data based on the year.
- Used Geopy to get the coordinates for the country.

Project Flow chart

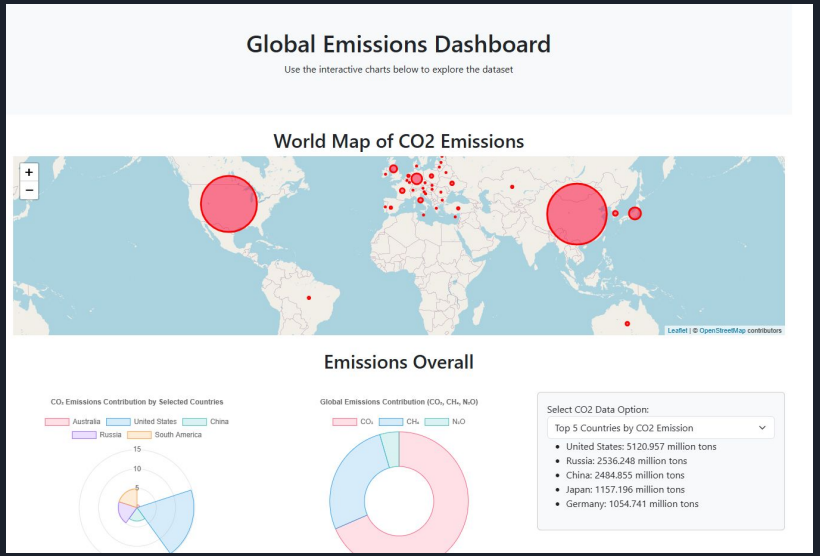


How our Dashboard was created

Javascript and HTML was used to integrate multiple javascript libraries to provide an interactive application designed to visualise and analyse global CO2 emissions data.

The beginning of the dashboard shows summary data containing:

- A world map depicting each countries emissions
- Summary Charts displaying the global emission types distributions and a selection of countries CO2 emissions
- Dropdown summarising CO2 data rankings



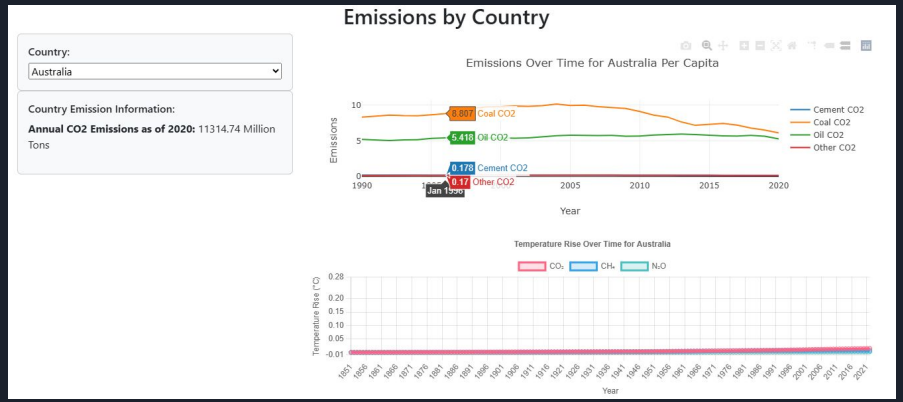
How our Dashboard was created

The second part of the dashboard filters the data by country:

- Displays different levels of emission sources over time per capita
- Displays temperature rise over time due to different emission types

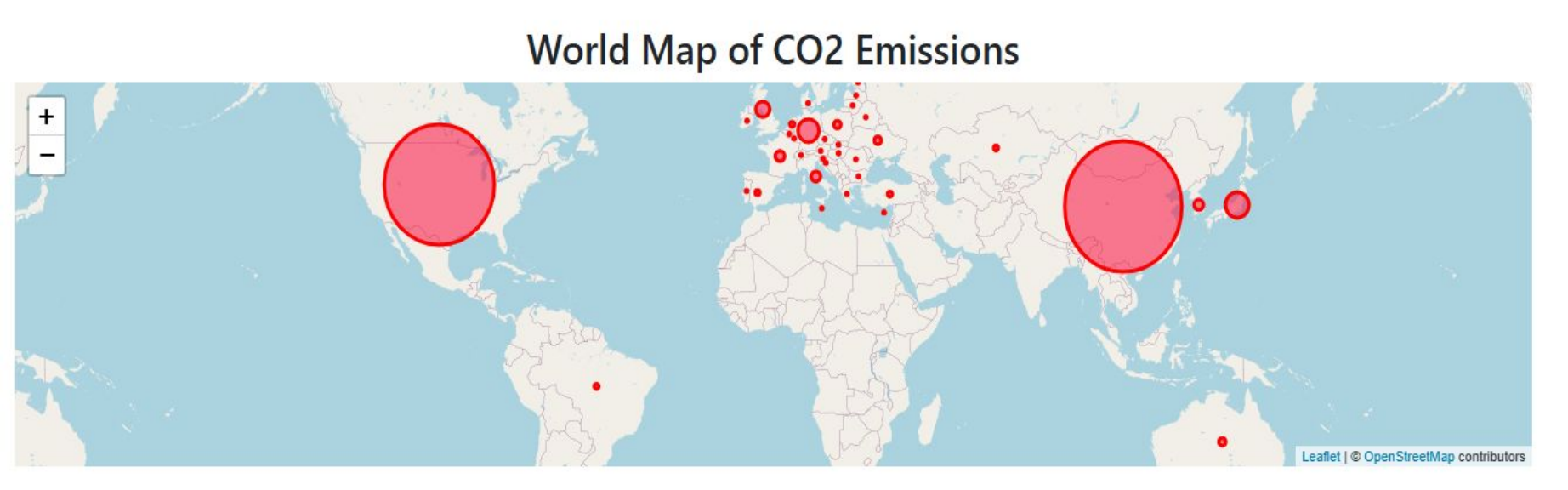
Libraries used:

- Leaflet.js
- Charts.js
- Plotly.js



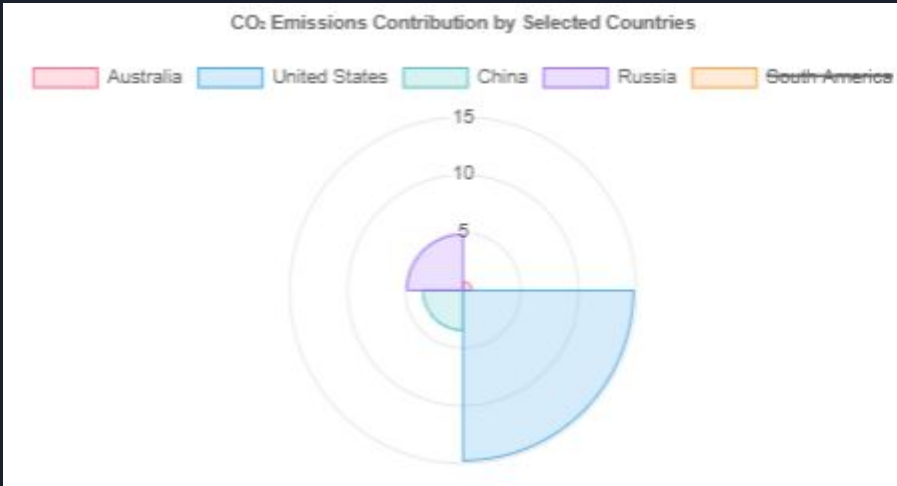
World Map of CO2 data

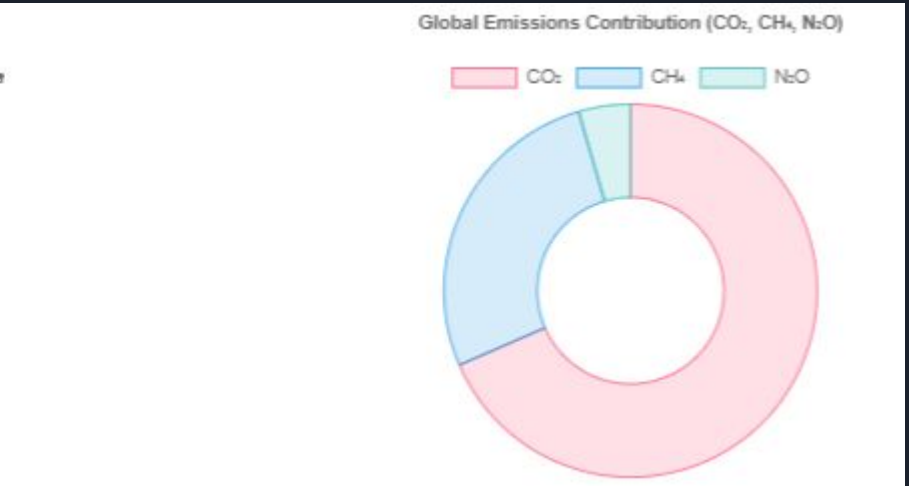
- The map gives us the overall summary of the carbon emission around the world.
- The circle on the map is proportional to the average CO2 emission of each country as of today.



Doughnut chart and polar chart using Chart.js

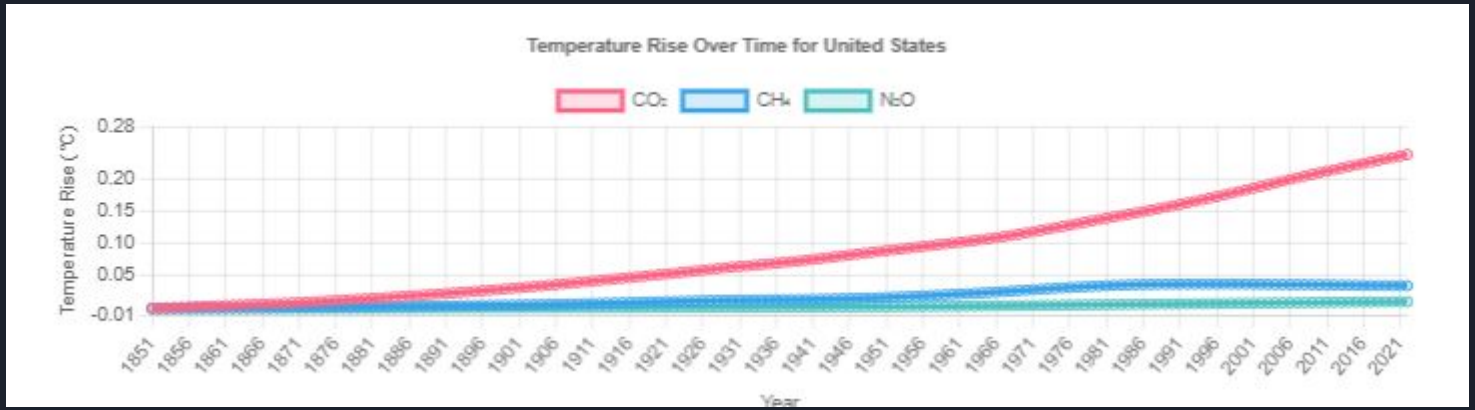
- These 2 charts was made to show clear and compelling visuals on CO2 usage.
- The doughnut chart includes the 3 types of gases on global emissions
- As for the polar chart, it shows the difference in the selected countries and their CO2 usage
- Able to see different ratios as you click on the countries or gases





Line chart using Chart.js

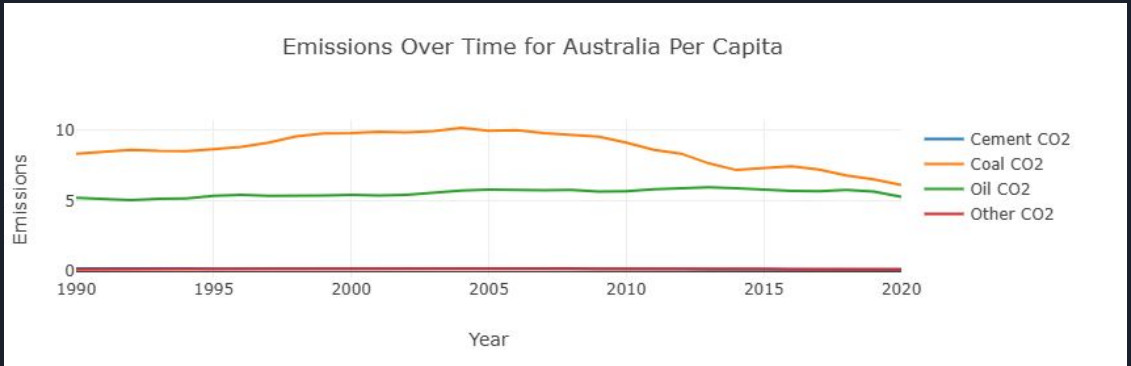
- Shows the contribution to average surface temperature risen by the type of gas
- Added a countries drop down connected to both line charts
- Reason for choosing Chart.js



Line chart using Plotly

Plotly was used to create a time series line graph to depict the different emission sources.

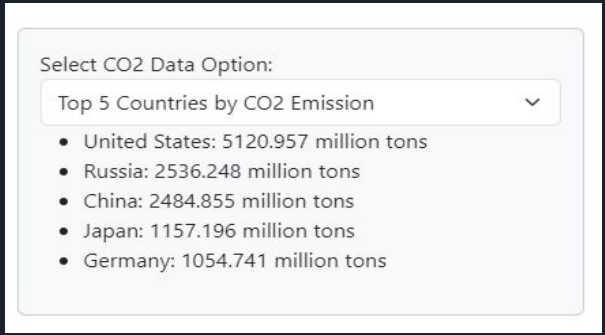
- The graph depicts the emission sources per capita for each country
- A drop down is present on the dashboard that allows the user to change which country's data they are observing.

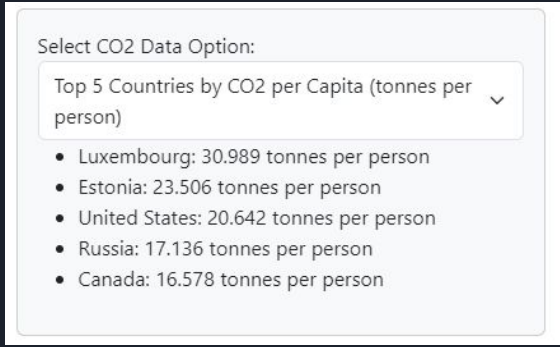


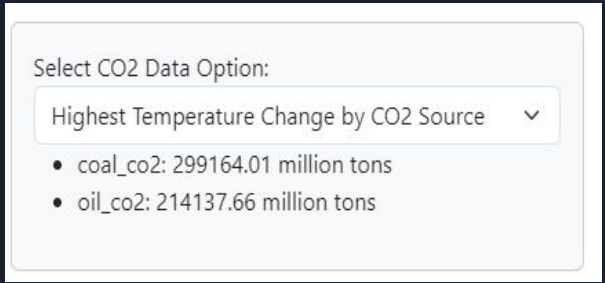
Drop Down Feature

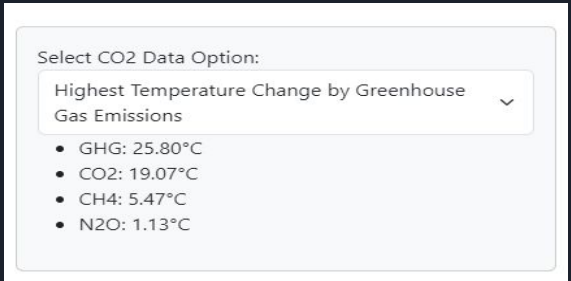
Responding to user input and showing the results of different analyses based on real-time data from a CSV file.

Dropdown tool that allows users to explore global CO2 emissions in a meaningful and interactive way..









Technical difficulties building the dashboard

- Combining various chart types that use different libraries
- Changing the layout of the dashboard & re-sizing graphs to improve usability
- Ensuring the html file is linking correctly to the javascript file
- Setting up Chart.js
- Importing world data into the dashboard

Conclusion

This project provides valuable insights into global CO_2 emissions, enabling users to better understand the sources to climate change.
For example,

- we can see that countries like the USA and Russia have the highest total CO_2 emissions, while smaller countries like Luxembourg and Estonia have high per capita emissions followed by USA,canada and Russia.
- We also identified that coal and oil are the largest contributors to CO_2 emissions.
- Among all Greenhouse gases, CO2 emission has the highest temperature change which is 19.07° C.

By empowering users with interactive tools and accessible data, this project aims to inspire action, inform decisions, and contribute to the global fight against climate change.

Demonstration

Global Emissions Dashboard (lhenry97.github.io)

Q & A

Questions and answers

Thank you.