Data Set Link: Link

Visualisation Link: https://akashgarg933.github.io/DV_Final/globalHealth.html

CodeBase: https://github.com/akashgarg933/DV_Final

1 Introduction

Welcome to our comprehensive data visualisation project, an exploration of key global indicators across four interconnected pages: Global Health, Quality of Life, Energy, and Education and Development. This visualisation aims to offer insights into critical aspects of our world, fostering a better understanding of the complex interplay between various factors influencing our lives. The interconnected nature of these visualisations enables users to navigate seamlessly between different domains, encouraging a holistic exploration of global data trends. Whether you are interested in health, quality of life, energy consumption, or education and development, our visualisations provide a dynamic and engaging platform for exploration.

2 Tools/Technologies and Data Overview

In developing this visualisation project, we utilised a combination of cutting-edge technologies, leveraging the power of D3.js for dynamic and interactive visualisations, HTML for structuring content, and CSS for styling. Our dataset is a diverse collection of global indicators sourced from reputable databases. The preprocessing steps included data cleaning, transformation, and structuring to ensure its suitability for effective visualisation. The dataset incorporates various data types, including numerical values, categorical information, and time-related attributes. Additionally, derived attributes were crafted to provide a more comprehensive view of the data, enriching our visualisations. This diverse dataset sets the stage for a detailed exploration of global health, quality of life, energy patterns, and educational development. The inclusion of varied data types contributes to the complexity of our visualisations, making them essential for uncovering nuanced patterns and relationships.

For DataPreprocessing, raw data was provided by the professor, The Data used is the Data Vis Data set. Given data represents the various changes in different domains. The first step was to select the category which needs to be visualised. We removed the data if they had more than 3 data points missing. Then we select 8 data category to visualise within each domain so the graph look uniform throughout the visualisation. After finalising it, we then calculate the percentage growth of current year data to the previous year. Using formulae

% growth current year =

[(Data value Current year - Data value Previous year)/Data value Previous year]*100

We then also calculate the 10-year change by the same formula where the Current year = 2020 and the previous year = 2010.

3 Dataset Types

Quantitative Data:

All different data present are quantitative, as they are just no. Although each data point is normalised to percentage change(as a part of preprocessing), the original data have different scales for each data point, for example,

- death per 100k (Global Health category)
- % to with respect Electricity produced (Energy category)
- Road traffic death rate (Quality of life category), etc.

Categorical Data

The categorisation is provided in the data set itself, Example all data point related to health and disease is represented in one subgraph. Other in different subgraphs. These sub-graphs can be accessed using the Navigate button on the graph.

Each Data point is also categorised into positive or negative data points.

Overall 10-year growth in the sector Is also categorical data, with +ve or -ve result

Temporal Data:

The growth percentages from 2011 to 2020 are represented on the doughnut charts, reflecting temporal trends.

4 Key Tasks

Comparison: Viewers can compare the growth percentages of different category indicators between years, identifying positive or negative trends, which are represented by the colour of the section. The doughnut charts facilitate easy visual comparison between categories and reveal the extent of change over time. Users can also compare data with other categories such as comparing the growth of death by smoking vs cancer, etc, within in same categories.

Trend Analysis: Trends in health metrics can be analysed by observing the growth percentages over the years. Viewers can identify patterns, fluctuations, and overall trends in each health category.

Correlation Exploration: Users can dynamically explore relationships between different indicators, fostering a deeper comprehension of global dynamics.

Engagement: The user can engage in visualisation, and be more enthusiastic and interested in the data.

Lookup: The doughnut charts serve as a quick reference to understand the growth percentages of various health indicators. Viewers can easily look up specific categories and gain a generalised idea of the trends.

5 Explanatory Nature of Visualisation

This visualisation project explains the growth percentages of various category indicators over the years, providing valuable insights into global trends in different sectors. The interconnected doughnut charts allow users to explore and understand the changing landscape of different metrics.

6 Encoding Channels and Idioms

Our encoding strategies were carefully chosen to maximise the clarity and effectiveness of the visualisations:

- **Colour Coding:** Positive and negative trends are encoded using distinct colours, facilitating quick trend identification. Categorical Data such as year-to-year growth and 10-year Growth is represented by this.
- **Positional Encoding:** The spatial placement of elements aids in regional comparisons, offering an intuitive understanding. We have clubbed up data in the same categories in one subgraph. Example: The First Page represents the Global Health category data, and all doughnut chart refers to some kind of health-related data. This helps users to compare different Doughnut charts of the same category.
- **Size Encoding:** The size of visual elements represents the magnitude of growth, allowing for quick assessments. Each section of the doughnut chart represents growth when compared to last year. Quantitative data has been encoded using this. Each data point is represented by the length of the doughnut segments.
- **Angular Encoding:** Temporal Data is represented using Angular Encoding. Each doughnut chart corresponds to a specific category, and each section represents the specific year, using position encoding, allowing viewers to observe changes over time. The data starts from the

top first section from 90 degrees, the first section reprints the 2011 data compared to 2010, and the next section follows the same trend.

The chosen encoding channels and interactive features were selected to maintain a balance between simplicity and depth. Colour coding helps users to do quick trend identification, while interactive elements provide a more in-depth experience, enhancing user engagement, helping with the Lookup and finding correlations between data. The main goal of the visualisation was to be aesthetically pleasing to the end user. That is why, I used a Sea shore theme for the visualisation, To have a user-immersive experience I also added wave-moving animation as the background, Sea wave music as background audio, represented doughnut chart as swimming tubes, and a kayak rider in the centre with a guide how to read visualisation, this increase the Engagement of user to visualization significantly. These Encoding channels make the visualisation very effective in doing key tasks.

7 Interactive Operations

The interactive features of our visualisations include:

Tooltips: Users can access detailed information about data points, promoting a deeper understanding.

Clickable Buttons: Seamless navigation between pages enhances the user's ability to explore interconnected themes.

8 Novelty

Our visualization stands out due to its integration of diverse indicators across multiple domains. The interconnected nature of the pages allows users to explore correlations between different aspects of global well-being, providing a more holistic and aesthetically pleasing perspective.

Complexity Analysis

Strengths:

- The visualisation provides a holistic view of global indicators, fostering a nuanced understanding.
- Interactive features enhance user engagement, allowing for a personalised exploration of data.

Weaknesses:

- The complexity of integrating diverse datasets poses challenges in maintaining absolute coherence.
- While interactive, some users might find the learning curve steep for in-depth exploration.

9 Discussion

This visualisation project effectively combines multiple doughnut charts, demonstrating parallel representation of different global scale metrics throughout 10 years. The use of position (length of segments) is appropriate for showcasing growth percentages, facilitating precise comparison and analysis.

Legend and The Direction of time moving ”2011—>2020” help user to understand how to read and understand graph.

The colour scheme of green and red effectively encodes positive and negative growth, respectively. This choice is suitable for distinguishing trends and providing clarity to viewers. The choice of colour is very subtle and easy on the eyes of the user, not too pungent.

Given the complexity of multiple global phenomena indicators and years, the chosen encoding channels are standard and effective for conveying the necessary information. The doughnut chart format is familiar, making it accessible to a broad audience without the need for non-standard idioms. The visualisation stands as an informative tool for understanding global health trends over the years.

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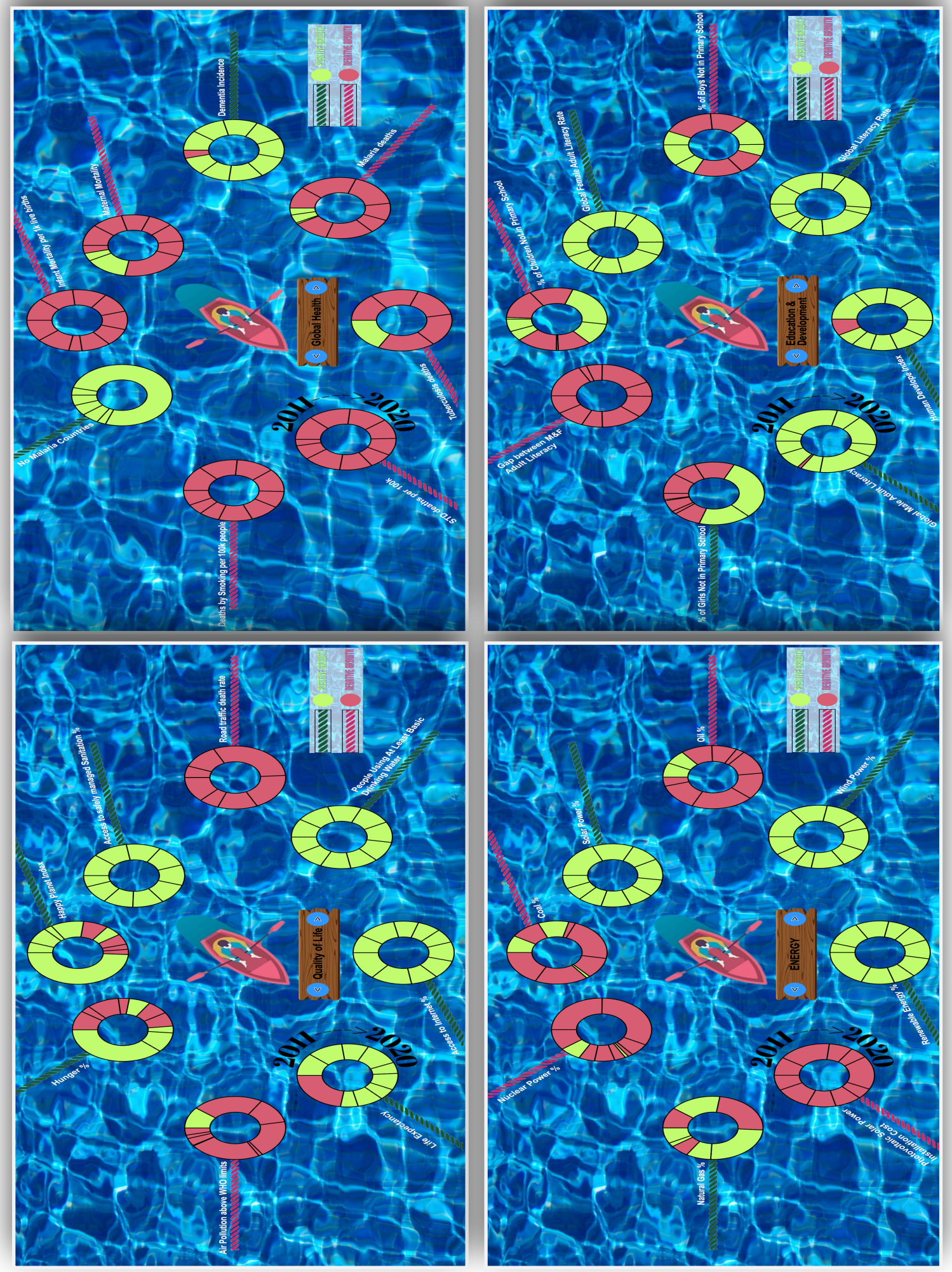

10 Reference

- https://www.theshapeofchange.com/
- http://www.go4trees.com/four-seasons/
- https://d3js.org/what-is-d3
- https://d3-graph-gallery.com/donut