DATA VISUALIZATION 2021

Global Gender Gap Index visualization

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⚤ Introduction

Gender Gap

Gender gap is a relative disparity between people of different genders, which is reflected in a variety of sectors in many societies. With the continuous progress of society and the continuous development of countries, gender gap has become a popular research topic recently.
The Global Gender Gap Report, introduced by the World Economic Forum in 2006, provides an annual detailed analysis of the breadth and extent of the gender gap around the world. Besides the extended textual description of the study findings, it dispenses rankings, shareable static infographics and a simple data explorer which shows the overall situation of the different countries in the examined year. It is one of the main surveys for stakeholders within each country to set priorities relevant in each specific economic, political and cultural context.

Motivation

Our motivation for this project is to let the public understand the gender gap among different countries and different times. Since gender gap is a really abstract concept, people can only tell the difference between different genders, but can not quantify this value.

With our visualization, people can get a deeper insight into the gender gaps rather than just feelings. Besides, by visualizing the difference between different countries, people can compare the level of gender fairness among different countries.

⚤ Exploratory Data Analysis

To visualize the world gender gap, we use the Overall Global Gender Gap Index Dataset downloaded from THE WORLD BANK. The dataset contains The Overall Global Gender Gap Index, which examines the gap between men and women. The highest possible score is 1, which means men and women are equal in this country. On the contrary, the lowest possible score is 0, which means men and women are unfair in this country. Besides, the dataset contains subindexes of four different categories. The subindexes are Economic Participation and Opportunity, Educational Attainment, Health and Survival, and Political Empowerment. Similarly, the highest possible score is 1, and the lowest possible score is 0. In addition, this dataset also provides the rank information of gender equality. Let us talk about the range of the dataset, this dataset contains Gender Gap Index from 2006 to 2020 and covers 157 countries.

Below we provide the complete schema of the dataset. Each entry in the dataset contains 19 attributes in origin, which are

- Country Name
- Indicator ID
- Indicator: one of the five indicators (Overall Global Gender Gap Index, Economic Participation and Opportunity subindex, Educational Attainment subindex, Health and Survival subindex, and Political Empowerment subindex)
- Indicator Type: Rank or Index
- The value of years from 2006 to 2020

Upon the original dataset, we do some improvement to make it easier to use in the visualization step. The first improvement is to clean the dataset. Since some entries are lost for certain countries, we removed those countries which contain NaN. Finally, we got a total of 103 country data available in our dataset. Another improvement we have done is to add a “Country ISO3” attribute for each entry, and it helps us to capture the country flag in the step of the visualization. An example of our refined dataset are shown in Table 1.

TABLE 1

	Country ISO3	Country Name	Indicator Id	Indicator	Subindicator Type	2006
2	ALB	Albania	27959	Overall Global Gender Gap Index	Index	0.6607
3	ALB	Albania	27960	Global Gender Gap Political Empowerment subindex	Rank	105.0

⚤ Design & Implementation

Design Challenge & Decision

To capture the eyes of the users, the first challenge of our design is to give users a quick guide to the global gender gap issue. Our decision is to average the index value of all countries for each year. Combining these values with visualization of some real measuring instruments can quickly attract the attention of users. Since we want users to have a whole view of the global gender gap, another difficulty is in showing information of all 103 countries in the same page. Our decision is to make the visualization small in the beginning, and let the users click on the visualization to show the detail. The zoom in effect can also make the initial visualization clean.
The progress of gender equality is also an important issue, and we would like to visualize it in our project. If we visualize each value by country and by year, we could not clearly see the progress. To deal with this problem, for all of our visualization, we add a timeline and a play button, which can animate the result among time. With this improvement, users can easily see the progress of gender equality.

Initial Design

Our initial design consists of four main parts:

1.Homepage(Figure 1)

In order to quickly engage the user, we decided to keep the introductory page quite simple. This page shows only the evolution of the global index over time, averaged across countries. A play/pause button animates a timeline slider and shows the gender gap score of the corresponding year, while a weight scale with the gender symbols animates accordingly.

2.World gap ranking(Figure 2)

This section visualizes a comparison of the gender gap between countries. The countries are represented with colored lines, with length inversely proportional to their score. The countries with a low score (higher gap) are positioned in the upper part, while the ones with a lower gap will be in the bottom part. In this way, the visualization simbolically represent a ravine, connecting the user to the meaning of the data.

Countries are grouped according to their geographical region, which is represented by their color. Clicking on one line will create a “lens effect” that will show bigger bars corresponding to the countries nearest to the selected area. These bars will contain text showing : country name, score and rank.

The play button animates the visualization to show progress over time. Moreover, on the side of the main visualization there are buttons enabling the user to filter the data.

3.Country Details(Figure 3)

Clicking on one country from the zoomed section opens a section containing a radar plot with the details of that country. The radar plot is made of one line representing the average between all countries and the colored filled plot showing the data of the selected country. The play button animates the plot over time.

4.Select country(Figure 3)

To further involve the user, we thought that after the Homepage it could be useful to add a ‘select your country’ section, to enable the user to firstly receive a personalized perspective of the gap.

We designed the page as a spiral collecting all countries in colored dashes(colored in the same way as in the Ranking page), each with width proportional to the ranking. The gender symbol would act as a wheel that follows the cursor position rotating and resizing accordingly, while pointing at the desired country.

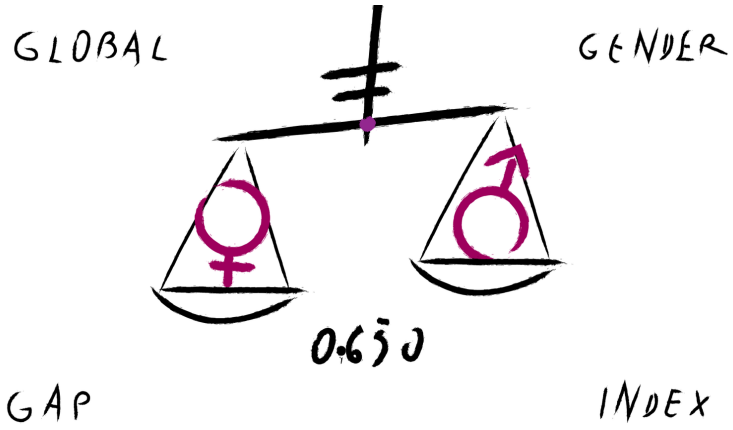

FIGURE 1-HOMEPAGE

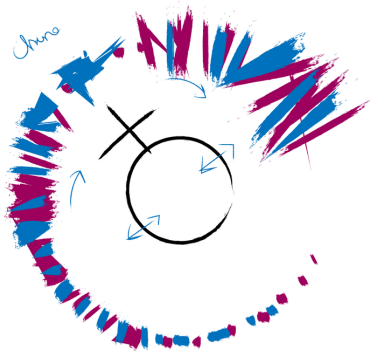

FIGURE 4 -SELECT COUNTRY

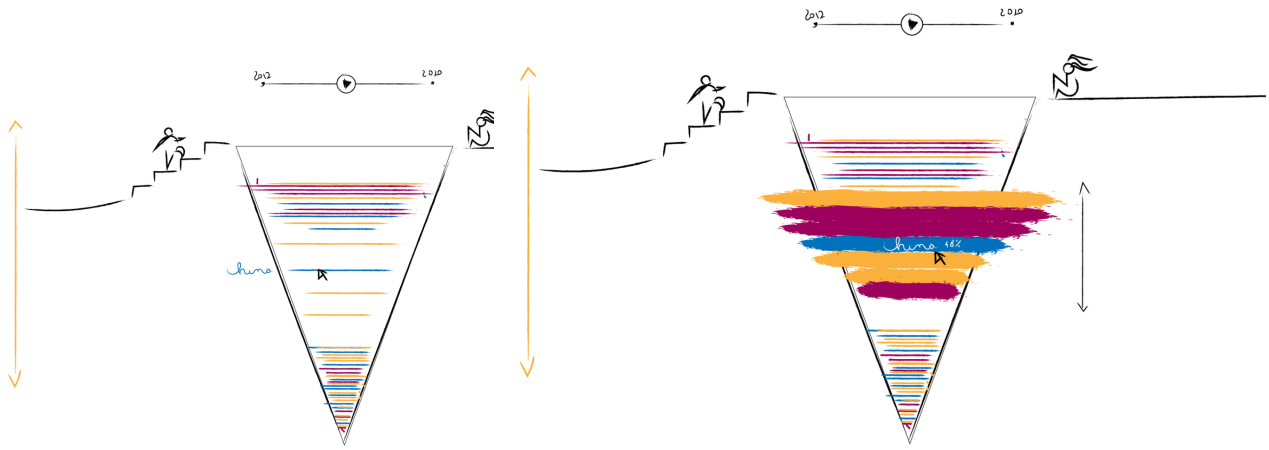

FIGURE 2- WORLD RANKING

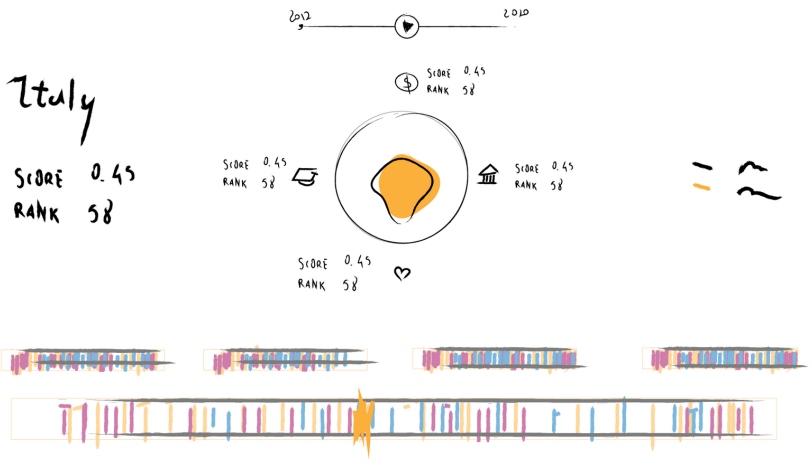

FIGURE 3- RADAR PLOT

⚤ Challenges & Changes

Overall, our implementation of the homepage and the world gap ranking page follows our initial design. However, we slightly modified the design of the remaining two pages.

In the original setting, the radar plot shows the information of one country compared with the average value of all countries. However, the visualization is a little monotonous, in which we always compare a country with a constant value. To make the visualization more interesting, we then decided to compare two different countries in the radar plot. The new visualization is shown in the next section.

Besides, from our original design, we had a circular country selector, which can also direct users to the country detail page. However, we realized that an additional page is a little redundant and is not very intuitive, which means we can not select and show the result in the same page. Therefore, in our final visualization, we combine the selection page into the country detail page and create a more interactive page. To further increase color richness, we also introduce the country flags and show it with the country names in the selection slider.

⚤ Final Visualization

The final version consists in three main sections, which are displayed in a single page website. To implement the navigation and page scrolling, we used the fullpage.js library.

1.Homepage(Figure 4)

We keeped this page very similar to the initial design. Clicking on the play button or scrolling the handle of the slider, the user can see the progress of the score in time throught the scale animation. To move the balance, we divided the scale in its components(e.g. arm, plates) and used the library anime.js to realize the animation accordingly to the data(acquired and averaged with d3.js). Moreover, we added some sentences to guide the user and explain the meaning of the index. Hovering on the score number, a further description is displayed.

2.World Gap Ranking(Figure 5)

Here we implement bar charts to show the gender gap ranking in each year. Each bar is a country and the color of the bar represents which continent this country comes from. By classifying the color, we can know which continent contains more/fewer countries with high/low ranking. Users can also look at a specific continent's ranking by clicking the button.

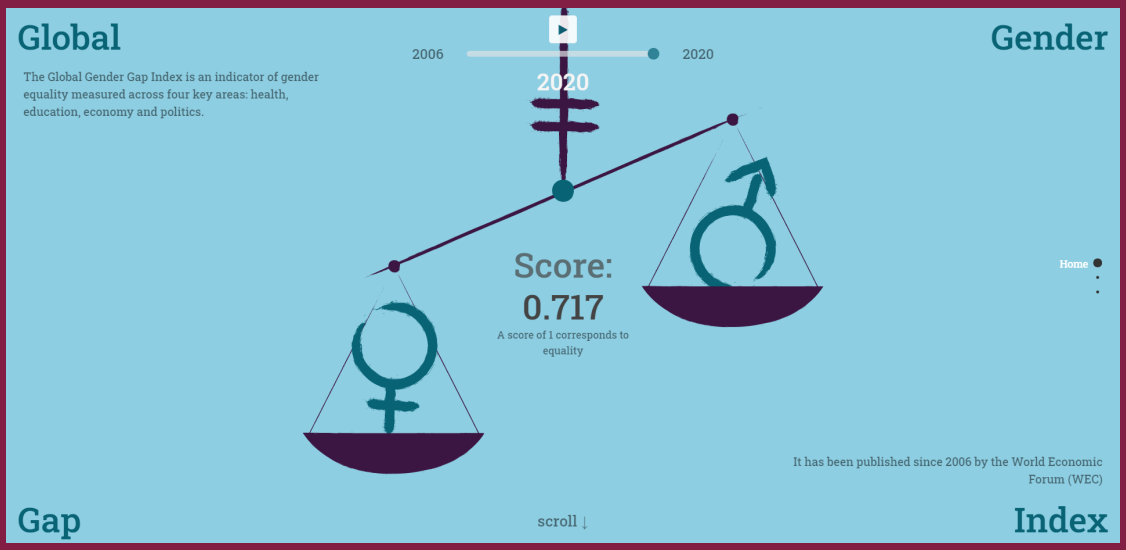

FIGURE 4

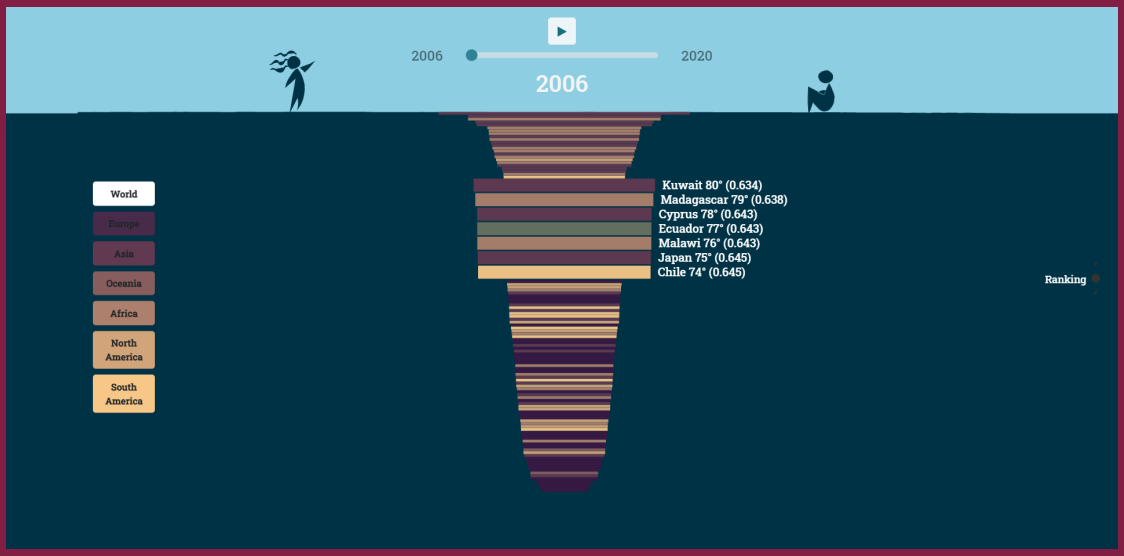

FIGURE 5

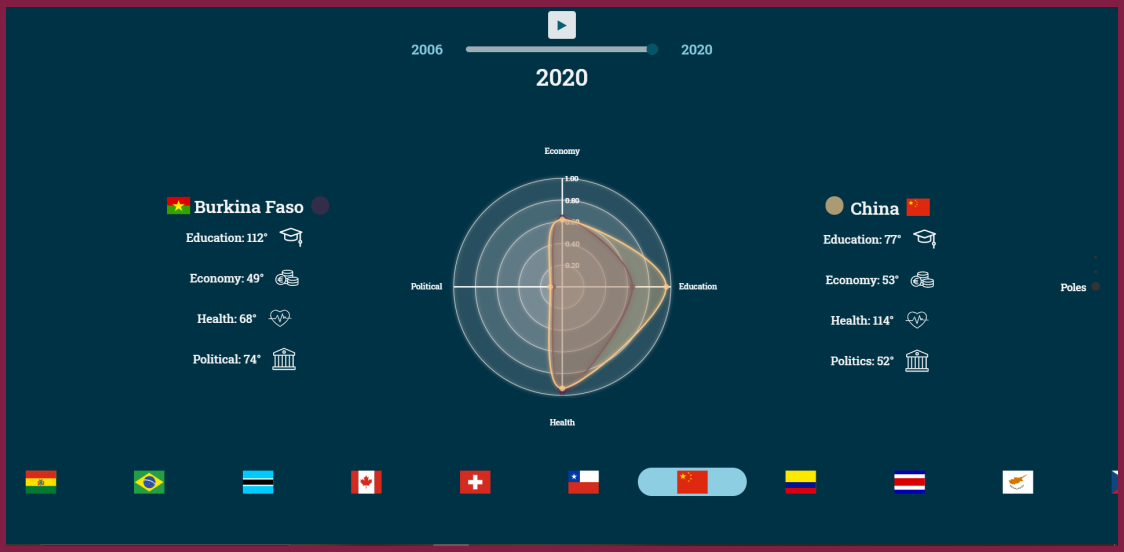

FIGURE 6

Besides, users can click on the bar to show the details of this country and also other 6 countries that have higher/lower rank around this country. After clicking, they can see larger bars and the country names, rankings and the overall global gender gap index belongs to the bar. If users are interested in getting deeper into the gender gap details of the country, they can click on the larger bar to open the next section. We also add a slider for users to choose a specific year's ranking and start the animation by that specific year.

3.Country Details(Figure 6)

The country details page contains four parts. A radar plot, a slider with country flags, a timeline, and two information blocks.

The radar plot(implemented from this source) shows the values of four subindexes of two countries. If users hover on the vertex on the radar plot, they can see the actual value of the target subindex. The slider(implemented with glider.js) helps users to browse through all countries and select countries they want to compare. Users can drag it in order to scroll different countries. With the slider, users can click on one country (which will be put on the left information block), and hover on the other one (which will be put on the right information block) to see the comparison between two different countries.

The function of the timeline is as the previous two pages: by clicking on the play button, the radar plot will animate the values of selected countries among time.

⚤ Peer Assestment

Brainstorming: Everybody
EDA: Yi-Hsin
Visualization - Homepage: Sabrina
Visualization - Ranking Page: Yi-Hsin
Visualization - Country Detail Page: Po-Jui
Navigation and Styling: Sabrina
Process Book: Everybody