Information Visualization Final Project Proposal

Ming Xian, Silvey Yu, Mingqian Zheng

{mx565,ly1164,mz2392}@gmail.com

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Basic Information

- Project title: Interactive Visualization of the World Happiness Report from 2015 to 2022
- Team members: Silvey Yu - ly1164, Ming Xian - mx565, Mingqian Zheng - mz2392

Overview

How happy are people around the world? What are the happiest and unhappiest countries? Is there a pattern in where they are located? What factors affect the level of happiness in that country? What's the trend of so-called happiness scores throughout the time, especially after the turning point marked by Covid-19?

In this project, we answer the above questions by visualizing the World Happiness Report data during 2015 to 2022, illustrating a global picture of individual happiness and the trend for the countries involved.

We will use a Kaggle dataset from the World Happiness Report project, an on-going project that surveys people from all over the world for their happiness levels, and uses econometrics methods to analyse how much social, economic, and medical factors contributed to the happiness levels.

Description of the Data

The World Happiness Report has surveyed people globally to evaluate their own lives, and a scale from 0 to 10 is used to indicate the level of happiness calculated form the results, the higher the number, the happier. Since the list of countries vary a little each year, we will only select countries that participated in the survey annually from 2015 to 2022, which is about 150 in total.

- The "Happiness score" (i.e. Ladder score in 2020-2022) is a populated-weighted average score on a scale from 0 to 10. Its standard deviation is also recorded.
- There are 6 other columns indicating how much different socioeconomic factors contributed to the happiness score: GDP per capita, healthy life expectancy, social support, freedom to make life choices, generosity, corruption perception.
- There is a 7th factor "Dystopia". Adding it with the other 6 factors will produce the "Happiness score". (Dystopia represents the lowest national averages for each key variable and is, along with residual error, used as a regression benchmark).

We will clean the country names so they are all valid, we'll add matching Regions according to countries without a Region entry.

We will use the "Happiness score" to represent the happiness level for each country and the influence of 6 factors to visualize the composition of each happiness score.

Usage Scenario & Task

Sophie is an undergraduate student considering which countries to go to for education and work after graduation. She would like to live in a happy country where she can also feel happy–preferably a place that has freedom, good healthcare system, and stable economy. Sophie wants to have a

quick overview of how happy each country is–whether or not people there feel happy, and what aspects of their country make them happy–and where these countries are located. On our map, she can see at first glance which country has the highest happiness by color. Hovering the mouse over the country, Sophie can see from the pie chart that which aspects–economy, healthcare, or freedom, etc., and how much they contributed to the happiness of people there. The data we are using is also provided by an ongoing econometrics project on which a great number of scholars have worked, and demonstrates internal details of different countries.

When Sophie logs on this system, she will see four main graphs. The first graph on the top left is a geomap, where the color of each country indicates its level of happiness score. The slide bar above enables her to select a specific year of her interest. The second graph below is a line chart, where each line represents the happiness score of a continent over the time period 2015-2022. Sophie can easily compare the lines before COVID years with the years after, so as to get the impact of COVID.

When she puts the mouse over a designated country on the geomap, not only will its corresponding continent's line on the second graph be highlighted, its own trend line of the happiness score will also appear. In this way, Sophie is able to have a better sense of the relative position of that country's happiness in its continent. Also, she will see a pie chart composed of all happiness factors – area of the pie chart is proportional to the factor weight to the happiness score.

Additionally, the drop down menu below the slide bar enables Sophie to choose top xx (e.g. top 10) happiest countries in a certain year. The result will be shown through a bar chart and displayed next to the line chart, where x-axis is country and y-axis is happiness score. Moreover, the bar chart will be sorted for Sophie to have an intuitive impression.

Description of Visualization & Initial Sketch

Must-have features

- A **line chart** of each region's happiness trend during 2015 and 2022. Regions include: Western Europe, Middle East and Northern Africa, North America, Eastern Asia, etc. This graph serves as an overview and baseline.
- A **slide bar** from 2015 to 2022 that enables users to select a specific year and see the data visualization of that year, including the below components:
- A **drop-down bar** to select the top 5, 10, etc. happiest countries. This will make other countries half-opaque to emphasize the filtered countries.
- A **bar chart** showing the happiness scores of top X countries in descending order at a certain year collectively determined by the drop-down bar and slide bar.
- A **geomap** of the world. The area of each country is filled with color indicating happiness level of the year specified by the slide bar. The higher the value, the greater the saturation.
- A **MouseOver event** that does the following:

  (1) **Add a line** to the line chart to show the happiness level trend of the selected country. This extra line and its corresponding continent line will be highlighted for comparison.

  (2) **Highlight the country's area.** It's a linked view with the line chart.

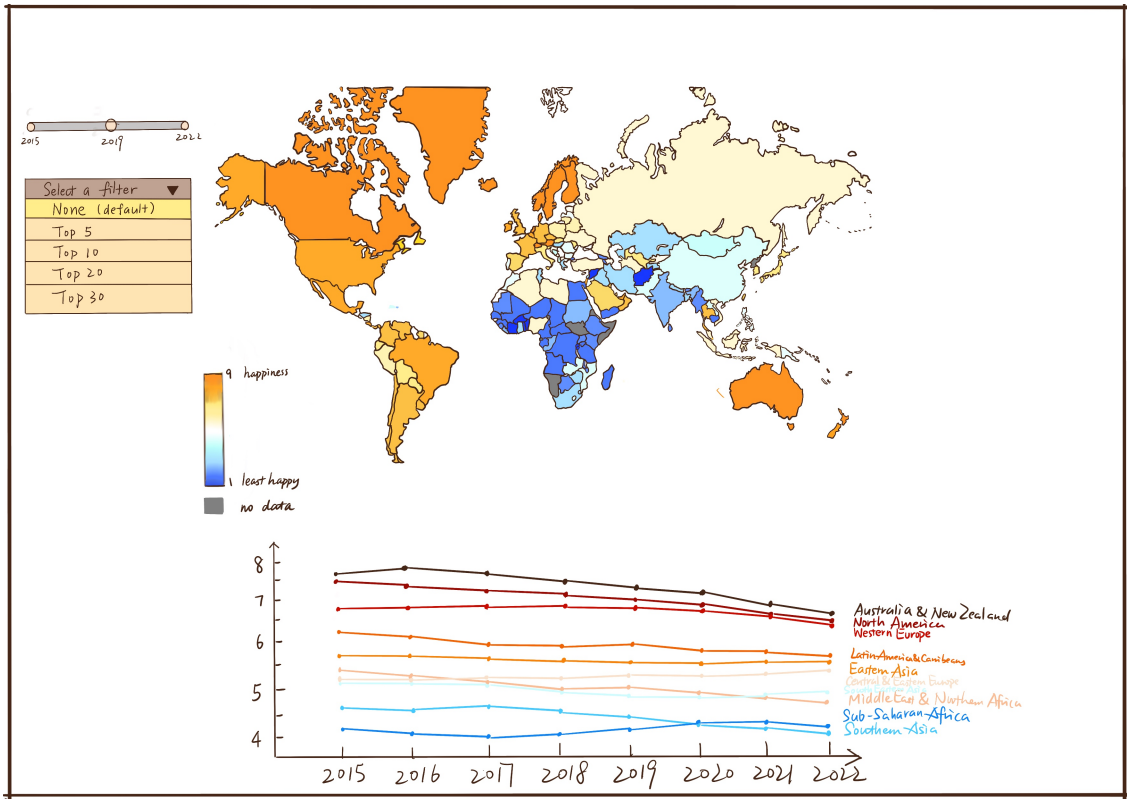
  (3) **Create a tooltip** showing (i) country name (ii) country happiness level (iii) happiness level world ranking of the country (iv) other relevant information if possible.

Optional features

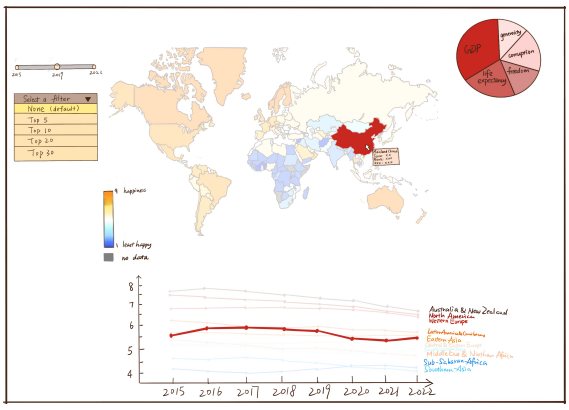
- When mouse over, show a **pie chart** that shows the country's composition of happiness score (this year). Users can see what factors contributed most to the happiness level, and how much they each contributed.
- The drop-down bar can not only select the top countries but also select the countries with lowest world ranking. If possible, turn it into a range selector.
- The linked view from line chart to geomap: mouse hovers over a line, put an isolation square on top of other countries except those in the selected region

Initial Sketch

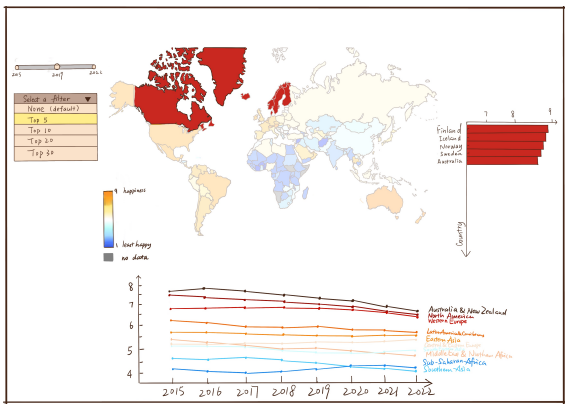
initial appearance



mouseOver



top X countries filter



Work Breakdown and Schedule

1. Data cleaning and data organization (4 hours) April 23 [Silvey Yu]
2. Slidebar, drop-down bar and code structures (4 hours) April 24 [Silvey Yu]
3. Geomap with colors: (8 hours) April 26 [Ming Xian]
4. Linemap for regions: (8 hours) April 28 [Mingqian Zheng]
5. Linked view between Geomap and Linemap, MouseOver event: (8 hours) April 30 [Silvey Yu]
6. Tooltip for mouseOver: (8 hours) April May 3 [Ming Xian]
7. Barchart at moustOver: (8 hours) April May 3 [Mingqian Zheng]
8. Extra optional features if time allows, (8 hours) for each person, May 4 - May 8, else debug and finalize the project. [All]