COMP7507A Visualization and visual analytics (Individual Report)

Name: *Li, Xinlei* ***Student ID:*** *3036410720*

Problem Description

One of the important tasks of world happiness visualization is to present the regional distribution of world happiness. By visualizing the happiness comparison of different regions or countries, we can intuitively feel the level of world development. This also helps us further highlight the successful cases of some countries or regions and explain their measures to improve happiness.

Data Preparation

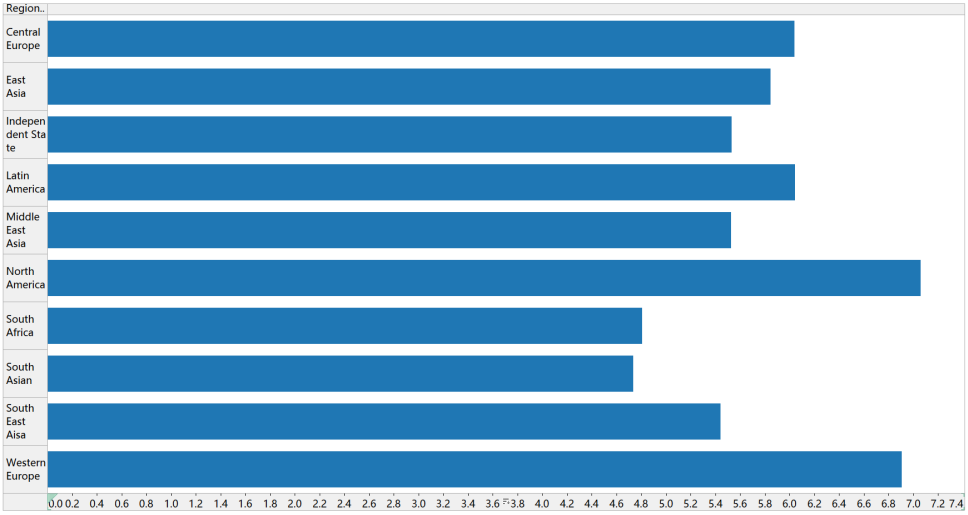
According to the dataset, all countries in the world are divided into the following regions: **Western Europe, North America and ANZ, Middle East and North Africa, Latin America and Caribbean, East Asia, Southeast Asia, Central and Eastern Europe, Commonwealth of Independent States, Sub-Saharan Africa, South Asia.** Based on the above division, we first counted the average happiness score of each country from 2019 to 2024, and then distributed it according to the regional attributes provided by the dataset, so that we got the sum of the happiness scores of each region. Then, for each region, we calculated its mean value according to the number of countries and we can get the happiness score of each region. From the final effect, the happiness score divided by region is also in line with our common understanding. Countries with high happiness index are concentrated in Western Europe, North America, Australia and other regions, while countries with low happiness index are concentrated in Africa.

The computing method is as follow:

$$RegionHappinessScore_i = \frac{\sum_{n}^{i=1}(country_i \; in \; Region_i)}{n}$$

Visualization Result

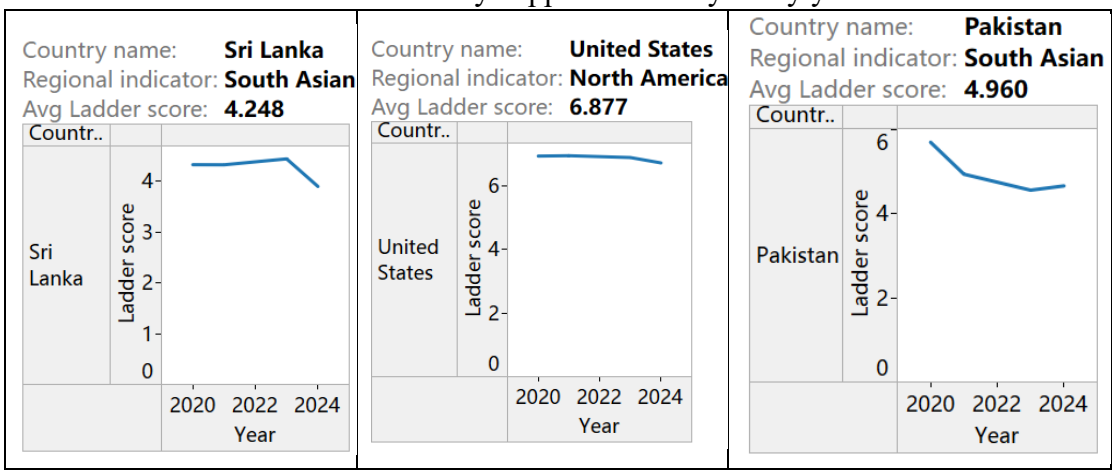
1. Horizontal Bar to visualize the average happiness score in recent five years



As shown in the figure, the happiness score of North America and Western Europe is

around 7 points, which is significantly higher than other regions, while the happiness scores of South Asia and South Africa are both below 5 points, which is significantly lower than other regions.

2. Line chart to visualize the country happiness score year by year



As shown in the figure, the happiness scores of most countries have been stable in the past five years. A few countries have experienced relatively large fluctuations, such as Sri Lanka and India. The data of some countries are incompleted and some years are missing.

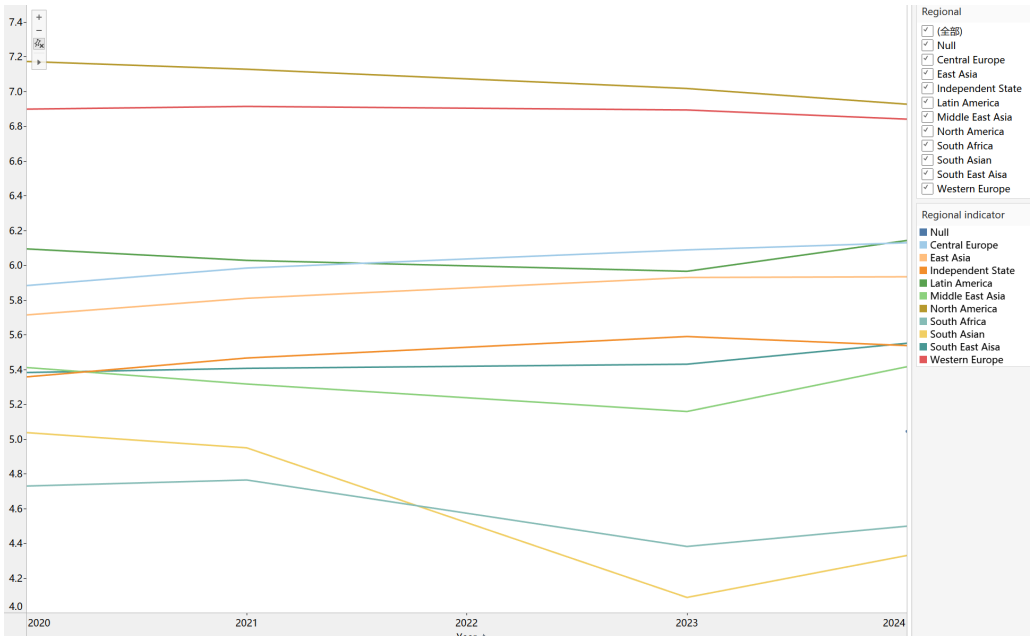
3. Use Score range table as selection

4. Table1. Score Range Table

Score Range	Country Nums
3.0-4.0	11
4.0-5.0	29
5.0-6.0	41
6.0-7.0	45
7.0 or higher	11

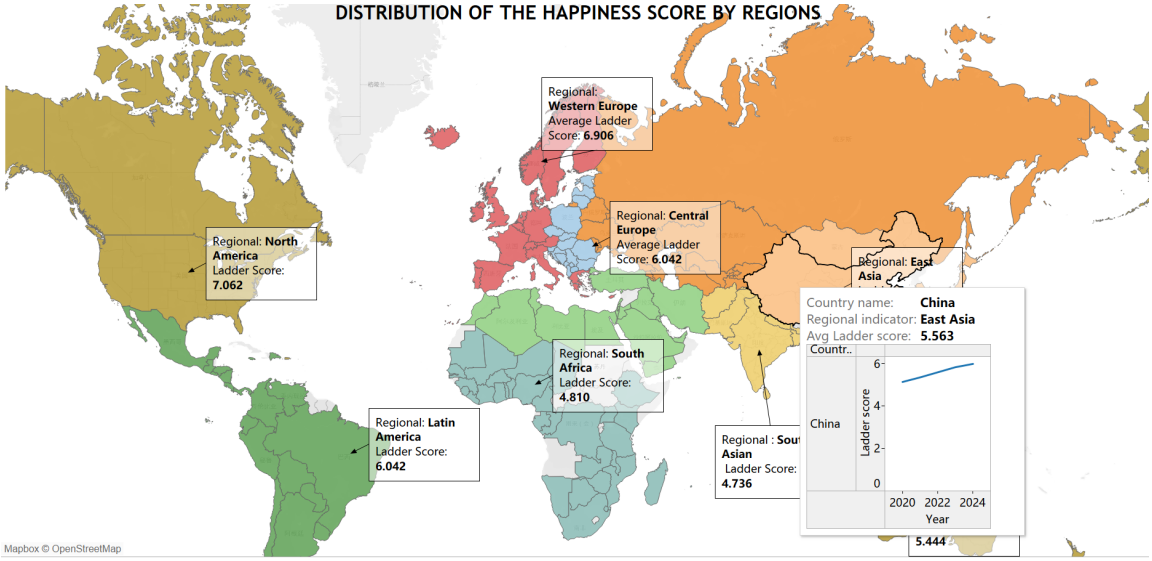
As shown in the table, most countries are between 5.0 and 7.0, with a few countries having a higher or lower happiness score.

5. Line chart to visualize the region happiness score year by year



As shown in the figure, most regions have shown a downward trend from 2019 to 2023. Only East Asia, Independent State and Central Europe have shown an upward trend. The most obvious decline is in the South Asia region, which will increase from 2024 to 2024. 5 points dropped significantly to 4.2 points in 2023, the most significant drop among all regions. In 2024, the happiness index in most regions will show an upward trend, but the East Asia region will instead decline.

6. Integrate into map visualization



Specific Information about the regions. And we could select countries to view the detailed information.

Limitations

1. Missed Values

The happiness score of many countries over the years is missing in the source data, which means that some countries are not included. This missing data will affect the accurate assessment of the happiness of each region, which means that the conclusions we draw when analyzing a country through happiness scores in different years are not sufficient.

2. The algorithm needs to adjust the weight

In the original algorithm, we simply added together the happiness index of all countries in each region and took the average. This algorithm assumed that all countries in the same region were equally important, but this is not the case in reality. The influence of some countries in the region may be greater than the sum of the other countries. For example, in East Asia, China's influence is obviously greater than the sum of the other countries in the region. Simply taking the average may not be very reasonable. We should also assign weights to each country based on its economic level and population size.

3. The information should be more specific

The current visualization may lack specific information about the factors contributing to the happiness scores in different regions. For instance, breaking down the happiness index into sub-components like income, social support, life expectancy, freedom, generosity, and perceptions of corruption can provide deeper insights. Moreover, including historical context or socio-economic data alongside the happiness scores would enhance understanding. This specificity would enable policymakers and researchers to identify targeted interventions and better understand the dynamics of happiness in various cultural and economic contexts.

Conclusion

The analysis of world happiness scores across various regions from 2019 to 2024 reveals significant disparities in well-being, highlighting the need for targeted interventions to address these inequalities. The visualization of average happiness scores indicates that regions such as North America and Western Europe consistently report high levels of happiness, while South Asia and Sub-Saharan Africa lag behind, underscoring the complex socio-economic challenges these areas face.

Despite the stability in happiness scores for many countries, notable fluctuations in specific nations, such as Sri Lanka and India, point to underlying issues that merit further investigation. The limitations of the dataset, particularly the missing values, pose challenges in accurately assessing happiness and may skew the overall findings. Additionally, the simplistic averaging method used in calculating regional happiness scores fails to account for the varying influence of countries within each region, suggesting a need for a more nuanced approach that incorporates weights based on factors like economic status and population size.

To enhance the understanding of happiness dynamics, future analyses should consider breaking down happiness scores into constituent elements such as income, social support, and perceptions of corruption. Providing historical context and socio-

economic data alongside happiness metrics would further enrich the narrative and empower policymakers to devise informed strategies for improving well-being. Ultimately, this comprehensive approach can foster a deeper understanding of the factors influencing happiness and guide effective action towards enhancing the quality of life across diverse global regions.