Data Visualization Portfolio

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Contents

1 Bad Visualization

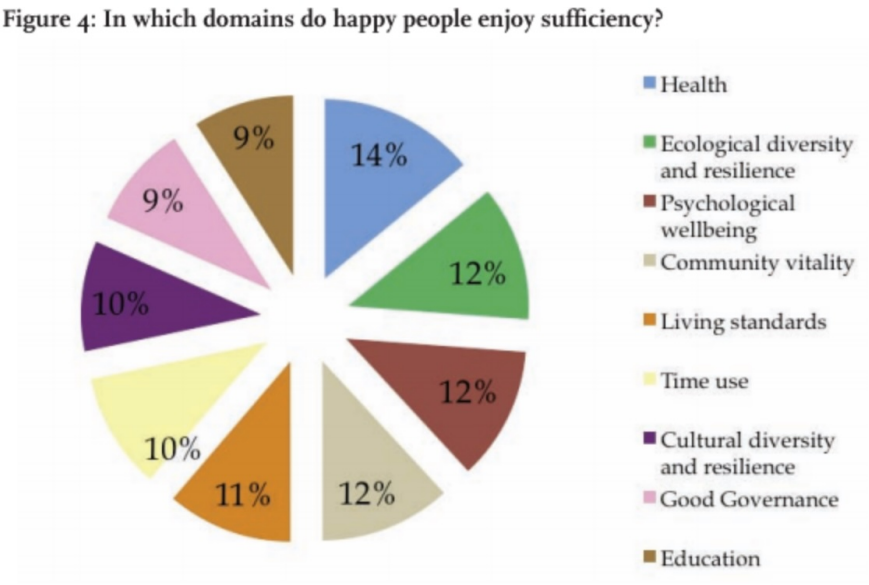

Figure 1: Bad Visualization about Domains of Life in which People Enjoy Sufficiency

The pie chart above was included in the first World Happiness Report [3] published by the United Nations in 2012. There are multiple factors contributing to the lack of quality of this visualization. Firstly, there are too many categories in the pie chart, which makes the difference in proportions not easily visible and the chart appears cluttered. For example, the difference in size between light brown part and the light blue part of the visualization is not conveyed well. Additionally, the text in the dark purple part is not visible due to lack of color contrast. One of the percentage overlays is missaligned. Moreover, the percentages do not add up to 100, which defeats the purpose of a pie chart, as they are designed to show proportions of a whole.

2 Improved Version of the Bad Visualization

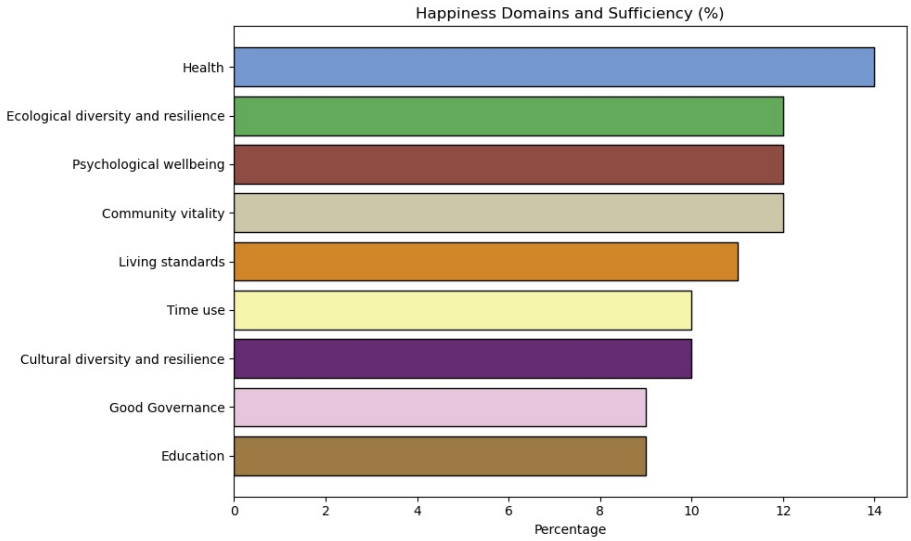

Figure 2: Improved Version of the Previous Visualization Depicting Happiness Domains and Their Sufficiency

From the context in which the original visualization was used, it is implied that the categories are all a part of the whole and should sum up to 100%, however, as it would not be accurate to randomly assign the missing percentage to one of the categories, it is not considered in the improved version of the visualization either.

3 Good Visualization

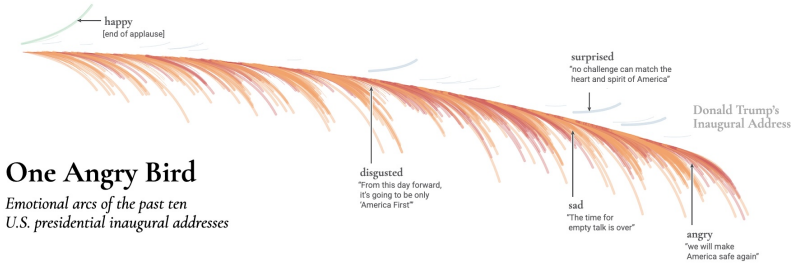

Figure 3: Emotional Arcs of Donald Trump's Presidential Inaugural Address in 2017 by Periscope

The above visualization represents one of the 10 depictions of the emotions expressed by the facial expressions of the presidents of the U.S. during their inaugural speeches, from Ronald Reagan's in 1981 to Trump's in the year 2017. [5] A barb of the feather signifies a point in the president's address where an emotion was displayed.

The intensity of the feeling is represented by the length of each barb.

There is also a clear distinction between the two poles of the emotional spectrum, as positive emotions are depicted above the quill, while negative emotions are depicted below.

This approach is extremely creative and innovative, yet it maintains the basic principles of good visualization practices. For example, it assigns positively and negatively associated colors to pleasant and displeasing emotions. All of the aforementioned factors contribute to the effectiveness of such a unique approach to visualizing the data obtained by facial expression analysis.

4 Create a Visualization About Climate Change

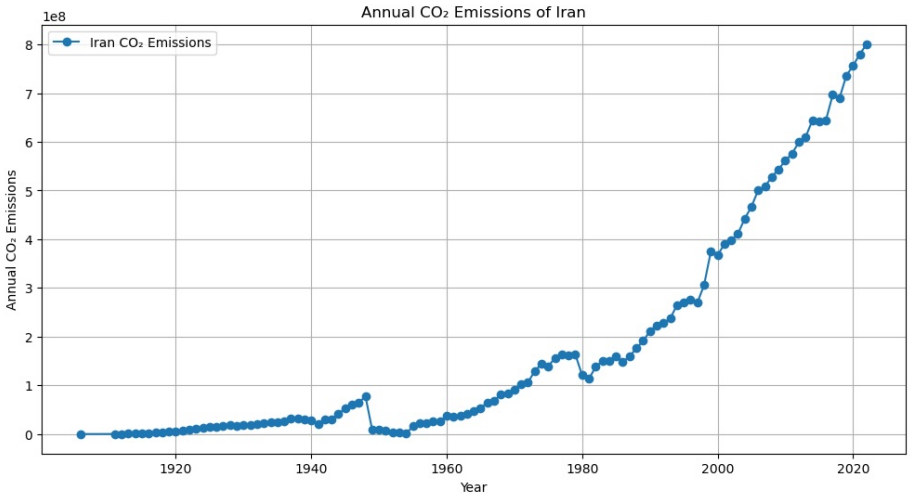

Figure 4: Iran's Annual CO2 Emissions

Data Source: [1]

LinkedIn Caption:

Over the past 100 years, Iran's CO2 emissions have increased exponentially, due to urbanization in the earlier years, but also through the use of low-quality heavy fuel oil (known as Mazut), following the sanctions from the western countries of the world.

Additionally, Iran's capital Tehran consistently ranks among the most air polluted cities in the world.

The connection is clear: as emissions have climbed, so has the prevalence of air pollution.

Addressing this issue isn't just an environmental priority—it's a health and economic imperative for millions of people living in the region.

It's time to explore some solutions and sustainable practices to reverse this trend. What measures do you think could help? I would love to hear your thoughts!

#ClimateChange #Sustainability #AirPollution #Tehran #CO2Emissions

5 Black-and-White Visualization

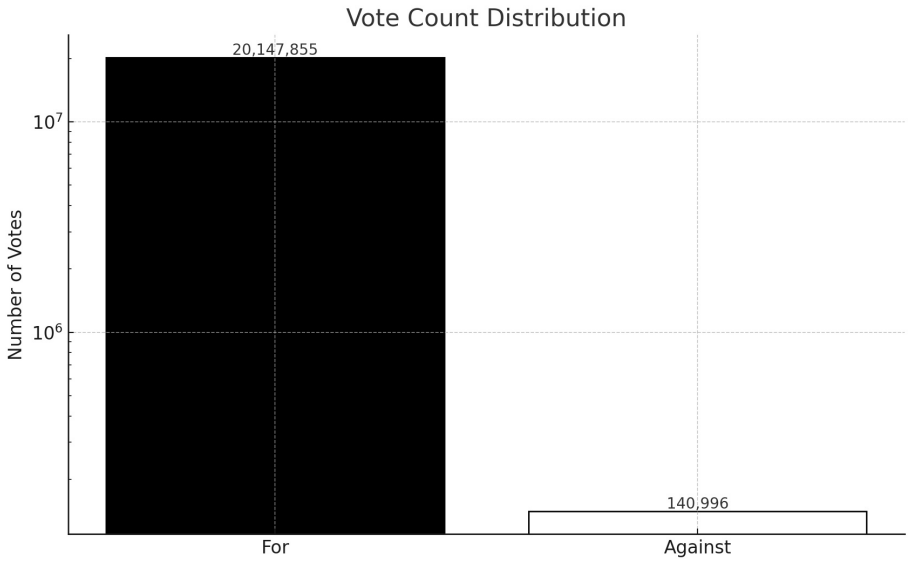

Figure 5: The Results of the 2-day Referendum on the Creation of the Iranian Islamic Republic

Data Source: [4]

6 Visualization With Color as an Important Aesthetic

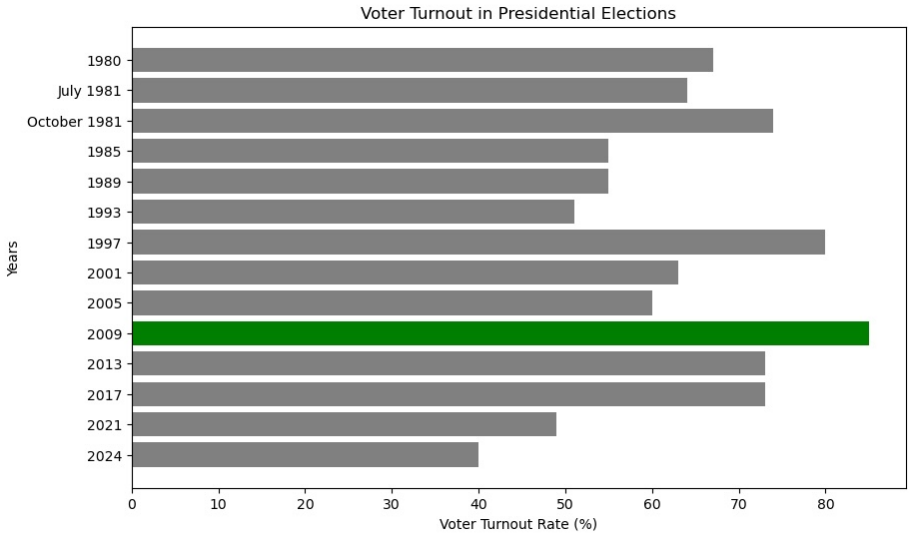

Figure 6: Voter Participation in Iranian Presidential Elections Since 1979, Highlighting the Largest Voter Turnout Rate in 2009

Context: The results of the presidential elections of 2009 led to widespread protests by millions of Iranians throughout the country and culminated in the formation of the Iranian Green Movement.

Data Source: [6]

7 Create a Visualization That Maximizes Tufte's "Data-Ink Ratio"

Create a visualization that rigorously maximizes Tufte's "data-ink ratio" (Google it).

8 Create a Visualization That Avoids Common Chart Types

Create a visualization that is none of the following: map, bar chart, scatter plot, pie chart, doughnut chart, line chart, box plot, density plot, histogram.

9 Create One Visualization by Hand

Create one visualization by hand. Choose plain paper or graph paper and create your visualization accordingly. Scan your visualization using photocopiers or make a really good photo of it.

10 Create One Visualization with ChatGPT Pro or Similar Tool

Create one visualization with ChatGPT Pro / Microsoft Copilot (or any similar tool). Include the visualization as you download it from the AI assistant without any further processing or improving it. Document your conversation (screenshots!) in the appendix.

11 Data Map

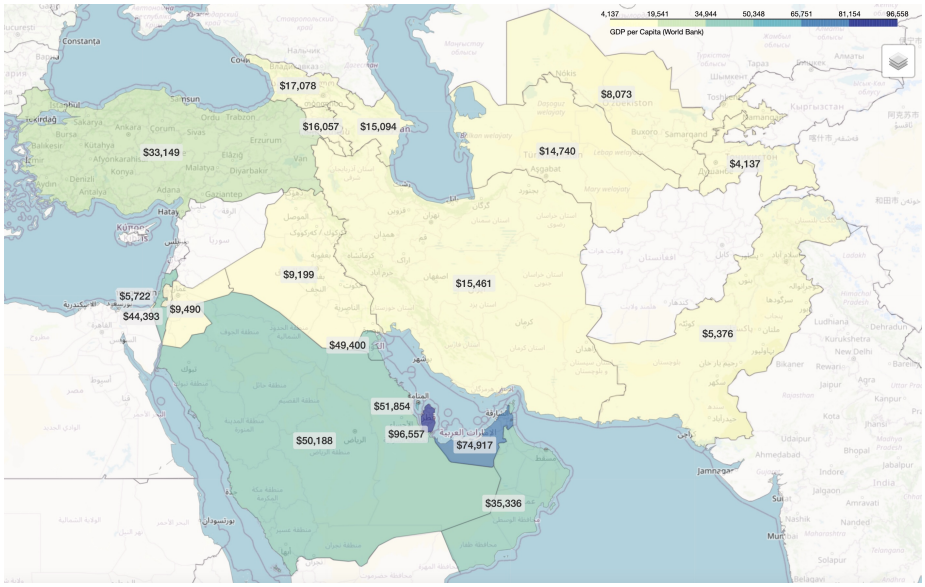

Figure 7: GDP per capita of Iran, its Economic Partners and Geopolitical Adversaries in the Region

11.1

The figures are adjusted for inflation and variations in living expenses across nations. Afghanistan, Lebanon, Syria, and Yemen are amongst coutries with missing reliable GDP data from the year 2022. Data Source: [2].

12 Create One Interactive Visualization

Create one interactive visualization:

12.1 Documentation of Interactive Visualizations

Document interactive visualizations using screenshots.

12.2 Deployment of Interactive Visualization

Deploy the interactive visualization on a publicly accessible URL. The visualization must be accessible using only a web browser without downloading or installing anything. Do not forget to mention the URL!

13 Document the Creation Process

Document the creation process of one of your visualizations in the portfolio from idea and (hand) sketch to several versions and the final version. Add up to 150 words explaining the process if you want.

14 Document Favorite Tools for Data Visualization

- Python/R packages: matplotlib, pandas, folium
- Other software programs: ChatGPT
- Data sources: https://ourworldindata.org, https://kaggle.com

15 Reference Page

Sources for all data used, sources for "good" and "bad" visualizations, all tools used, and disclosure of the use of generative AI for each individual graph.

Software used that was NOT part of the course, e.g. additional Python packages, any online service, additional programs, other programming languages.

Sources for third party plots (i.e. the "good" and "bad" examples)

References

[1] Our World in Data. *CO and Greenhouse Gas Emissions: Iran*. Accessed [insert date here]. n.d. URL: https://ourworldindata.org/co2/country/iran.

[2] Our World in Data. *GDP per Capita (World Bank)*. Accessed [Jan 2025]. n.d. URL: https://ourworldindata.org/grapher/gdp-per-capita-worldbank.

[3] John F. Helliwell, Richard Layard, and Jeffrey D. Sachs. *World Happiness Report 2012*. Accessed [Dec 2024], page 137. 2012. URL: https://www.earth.columbia.edu/sitefiles/file/Sachs%20Writing/2012/World%20Happiness%20Report.pdf.

[4] Dieter Nohlen, Florian Grotz, and Christof Hartmann. *Elections in Asia: A Data Handbook*. Vol. 1. Oxford: Oxford University Press, 2001. Chap. Iran, p. 68.

[5] Periscopic. *Emotional arcs of the past ten U.S. presidential inaugural addresses*. Accessed [Dec 2024]. n.d. URL: https://emotions.periscopic.com/inauguration/.

[6] Iran Data Portal. *Presidential Elections*. Accessed [Dec 2024]. n.d. URL: https://irandataportal.syr.edu/presidential-elections.

16 Appendix: Documentation of AI Conversations

Appendix: Documentation (screenshots) of your conversation with the AI.