

Indicators in World Development Project 2 write-up

Purpose: Our goal was to construct a visualization that will help the viewer answer questions regarding how countries are developing over time and how specific countries of interest fit in that trend. We wanted to visualize:

- Comparisons between countries: In year Y was country C1 doing better or worse than country C2? E.g. does the US currently use more or less renewable energy than Russia?
- Comparisons over time: Did country C see any improvement in the past years? Roughly, how does this change compare to the overall trend in the world?
- Distribution: Do the majority of the countries lie within a small range of values for a given indicator? E.g. do most countries provide basic sanitation services to 100% of their population?

Data processing:

Originally, our data set was very large with 1591 different and unique indicators of development, varying from female condom usage to life expectancy. We managed to trim down the data to find our chosen development indicators through 3 steps¹:

- I. Filtering to select indicators with enough data to make meaningful comparisons over time and countries.
- II. Finding the principal components (through PCA) along which the data varies the most (enough components to account for ~90% of the variance) and choosing the most significantly varying indicators, or the eigenvectors from PCA with the highest eigenvalues, within that space.
- III. Handpicking indicators that are both interesting to the viewer and which do not rely heavily on the land area/population of a country.

Interactivity:

- Map zoom: The choropleth map supports zooming and panning in order to compare countries within a specific region or to zoom in on a country of interest.
- Time slider: A time slider under the choropleth map allows the viewer to make general comparisons over time for a specific country or region.
- Country selection: Selecting a country draws a line in the heat-map that allows the viewer to see a clear change of the indicator value over time.
- Changing indicators: The viewer can switch between multiple development indicators to assess the country's development in different metrics.

What the viewer will learn:

Based on this visualization the viewer can answer very specific questions about countries they are interested in. The viewer can also assess the development of a country in a more meaningful way, by comparing it to the trend in the world, and seeing progress in time. Both high level trends and specific values can be extracted through this visualization.

Inspiration from class:

We came to this final design solution by considering the alphas that matter, while keeping in mind any potential confusers or hallucinators that may hinder our visualization task. Both color gradients are based on the principle of luminance variation in order to make ordinal comparisons, and with variation in hue to prevent simultaneous contrast effects. Other design choices guided by the class include the choice of the map background (crispening effect), and the use of space (layout) in addition to color (encoding) to depict variables. The project was done using React. Our team believes the class provided all the prerequisites for completing this project, but thinks that React should be introduced earlier in the course, as it is a hard tool to pick up in a short amount of time.

¹ The Jupyter Notebook with PCA is in the repository