Human Development Reports

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Syllabus

Abstract

This data visualization page provides an in-depth examination of wealth development over the years. Through interactive graphs and charts, viewers can explore trends and changes in various indicators, including life expectancy, infant mortality rate, pollution and Human Development Index (HDI). The page highlights the impact of advances in industrialization, public wealth, and access to healthcare on global health outcomes, providing a comprehensive understanding of the challenges and achievements in the field. This page serves as an educational tool for anyone interested in learning more about the history and human progress.

Introduction

You will find interactive graphs and charts that illustrate the changes and trends in various indicators such as Human Development Index (HDI), Material Footprint (MF) and much more information. Explore how various factors such as advances in medicine, pollution, and salary have affected global human development. Get a comprehensive understanding of the challenges and achievements and how they have impacted people's lives.

Data Sources

All the data has been taken from the following link and with python we have created all the data visualization.
https://hdr.undp.org/data-center/documentation-and-downloads

Data Pre-Processing

Since the general data frame has missing values we needed to get rid of them in some way, but the problem was the fact that each row represents a country, thus erasing the missing value means erasing the country which we didn’t want to do, so we decided to impute them with kNN imputation (machine learning algorithm that takes the most similar elements to the one with missing values and imputes that missing value based on the similar found).

Then for the graph we had different pre-processing methods for each of them. For the first chart we took all the information of the HDI per country in the last year, then we printed a choropleth chart adding a 3D animation.

The interactive timeline graph we took the data frame (composed with countries as rows and features (per-year) as columns. We transposed the data frame to have the countries as columns, took out the possible years and re-plugged in the features in the right country and year (so now we have year as index and country as columns with MF (Material Footprint) as value), than we used plotly.express library to plot the interactive choropleth.

For the final data visualizations, we created a dataset for each type of value considered. We then reconstructed the dataset so that each continent is a column and each row a year.

Interface Design

The interface design is visually appealing, with effective use of colors and charts to clearly communicate the data. The layout is organized by the main 2 visualization in a dedicated page and the less important all together in a drop-down menu that allow to see each by world region allowing the user to quickly find the information needed. The choice of data visualization has been made considering the target of giving a clear and quick preview of the wealth changes in the years keeping at the same time the useful information.

Data visualization

Human Development Index (HDI)

The map shows a 360-degree movable world with data of the 2021. The color representing the HDI value for each country with a darker color as the value increases. With the mouse it is possible to scroll the world seeing all the country. Each country is represented with the ISO value that could be easily checked with the search bar below the chart.

Footprint

The data visualization shows the change of material footprint of a country (which is the amount of local resources that that country uses for itself) over 30 years, namely from 1990 to 2021. The interactive visualization design is a rectangular map-box with a color scale that goes from white (for low MF countries) to black (for high MF countries) passing through orange as a middle color, to have the highest contrast. The development of such graph was very cumbersome, but in the end with the Plotly documentation and a lot of sweat we managed to do the plot. We found that poorer

countries have a very low MF which mean that most resources are used by other countries and not them. During the years this process oscillates for most countries, but for others it just rises, which means they are developing slowly.

Multiple Chart

This visualization shows the differences between the various continents of the world in some important areas concerning human development. The line chart used was chosen to emphasize the evolution of the states over time while showing the disparities between them. The off-white, minimalist design mirrors the structure and style of the website by focusing attention on the display without providing any distracting elements. The development of this plot took a long time as we had to modify several construction elements from the initial data in order to obtain the result you can observe.

Next Steps

For future visualizations we were thinking to create some plots about the interactions of the features of the dataset among themselves to see which is more relevant to determine the HDI. Another idea was to see, the current years, information for the chosen country, given that data get updated frequently.