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Dashboard Covid

Introduction & Motivation

Since the start of the Covid-19 pandemic, charts and graphs have helped communicate information about infection rates, deaths, and vaccinations. In some cases, such visualisations can encourage behaviours that reduce virus transmission, like wearing a mask. We all have been affected by the current COVID-19 pandemic. However, the impact of the pandemic and its consequences are felt differently depending on our status as individuals and as members of society.

In the current era of big data, a huge amount of data has been generated and collected from a wide variety of rich data sources. Embedded in these big data are useful information and valuable knowledge. An example is healthcare and epidemiological data such as data related to patients who suffered from epidemic diseases like the coronavirus disease 2019 (COVID-19). As “a picture is worth a thousand words”, having methods to visualise and visually analyse this big data makes it easy to comprehend the data and the discovered knowledge.

In this project, our motivation was to present data visualisation tools for visualising and analysing COVID-19 epidemiological data in order to create new ways of looking at this data.

Dataset’s variables description

Data on COVID-19	https://github.com/owid/covid-19-data/tree/master/public/data#the-complete-our-world-in-data-covid-19-dataset
total_cases	Total confirmed cases of COVID-19. Counts can include probable cases, where reported.
new_cases	New confirmed cases of COVID-19. Counts can include probable cases, where reported. In rare cases where our source reports a negative daily change due to a data correction, we set this metric to NA.
total_deaths	Total deaths attributed to COVID-19. Counts can include probable deaths, where reported.
new_deaths	New deaths attributed to COVID-19. Counts can include probable deaths, where reported. In rare cases where our source reports a negative daily change due to a data correction, we set this metric to NA.
new_deaths_per_million	New deaths attributed to COVID-19 per 1,000,000 people. Counts can include probable deaths, where reported.
new_deaths_smoothed_per_million	New deaths attributed to COVID-19 (7-day smoothed) per 1,000,000 people. Counts can include probable deaths, where reported.
total_vaccinations	Total number of COVID-19 vaccination doses administered
people_vaccinated	Total number of people who received at least one vaccine dose
people_fully_vaccinated	Total number of people who received all doses prescribed by the initial vaccination protocol
total_vaccinations_per_hundred	Total number of COVID-19 vaccination doses administered per 100 people in the total population

people_fully_vaccinated_per_hundred	Total number of people who received all doses prescribed by the initial vaccination protocol per 100 people in the total population
new_tests_per_thousand	New tests for COVID-19 per 1,000 people
new_tests_smoothed	New tests for COVID-19 (7-day smoothed). For countries that don't report testing data on a daily basis, we assume that testing changed equally on a daily basis over any periods in which no data was reported. This produces a complete series of daily figures, which is then averaged over a rolling 7-day window
new_tests_smoothed_per_thousand	New tests for COVID-19 (7-day smoothed) per 1,000 people
positive_rate	The share of COVID-19 tests that are positive, given as a rolling 7-day average (this is the inverse of tests_per_case)
tests_per_case	Tests conducted per new confirmed case of COVID-19, given as a rolling 7-day average (this is the inverse of positive_rate)
total_tests_per_thousand	Total tests for COVID-19 per 1,000 people
tests_units	Units used by the location to report its testing data
iso_code	ISO 3166-1 alpha-3 – three-letter country codes
continent	Continent of the geographical location
location	Geographical location
date	Date of observation

Reading the Visualisation

The app counts with the use of different kinds of data visualisation. For instance, choropleth maps, pie charts, plot graphs, tables and bar charts provide a good translation of the data into visual elements. Colour, size, position and angle are a few things that were taken in consideration during the encoding of the data.

In respect of data filtering, the user is actually able to execute a good variety of filtering, such as choose a variable to plot, add or remove countries to a graph, see the logarithmic or linear behaviour of a graph and choose if he wants to see the map on a Equirectangular or Orthographic projection.

- Visualisation and interaction choices

Cases Dashboard

Types of Graphics:
- Choropleth
- Linear

Types of Interactions:
- World
- Continents
- Each Country

Types of Projetations:
- Equirectangular
- Orthographic

Grahics:
- Total Covid 19 Cases
- New Cases per Million

Deaths Dashboard

Types of Graphics:
- Choropleth
- Linear
- Pie Chart

Types of Interactions:
- World
- Continents
- Each Country

Types of Projetations:
- Equirectangular
- Orthographic

Grahics:
- Total Deaths 19 Cases
- New Deaths per Million

Dropdown Options:
- Smoothed
- Not Smoothed

Tests Dashboard

Types of Graphics:
- Choropleth
- Table
- Bar Chart

Grahics:
- Table on Testing
- Total tests per Thousand

Dropdown Options:
- Total tests per Thousand
- New tests per Thousand
- New tests Smoothed
- New tests Smoothed per Thousand
- Positive Rate
- Tests per Rate
- Tests Units

Vaccinations Dashboard

Types of Graphics:
- Linear
- Bar Chart

Grahics:
- Vaccinations per Thousand
- Total Vaccinations per Country

Dropdown Options:
- Total Vaccinations
- People Vaccinated
- People Fully Vaccinated
- People Vaccinated per 100
- People fully Vaccinated per 100

Types of Interactions:
- Each Country

Technical Aspects

We used Raceplotly [5] and Plotly [6] to develop our Graphics and matplotlib [7] to do the Animation of our timelines. The Project was deployed using Heroku and it has a direct pipeline to our Github Project. The app can be accessed here and the project repository here.

Discussion

After all the work put into the project, the group ended up with an app that provides users a large variety of interactions and information about Covid-19.

We managed to develop a variety of graphs to produce new ways of visualising and analysing, globally and locally, information about the virus. Besides the graphs, we used race plotly to show a more interactive time series, as well as a simple table that can be filtered by columns. Ideally this table would create visualisations based on the selected observations.

During the process of creating new visualisations for our chosen dataset, we faced some adversities. When plotting some variables, sometimes we would get weird visualisations because of Nan values so in order to solve this issue we had to do some preprocessing. Also, the huge amount of data used can make our app a bit slower. For example, the choropleth maps take some time to load.

Regarding some work we can develop in the future, a good option is to try new libraries to see if we could create different and better visualisations. Also, more features can be added to our existing ones of course. We can also add options to save the created visualisations.

References

[1] - Our World in Data

[2] - https://ourworldindata.org/coronavirus

[3] - https://ourworldindata.org/covid-vaccinations?country=OWID_WRL

[4] - https://ieeeaccess.ieee.org/tag/covid-19/

[5] - https://pypi.org/project/raceplotly/

[6] - https://plotly.com/python/

[7] - https://matplotlib.org

[8] - https://dash-bootstrap-components.opensource.faculty.ai/docs/components/