REPORT FINAL

Features of the application

1. World map
    - Colored regions based on total covid cases.
    - Date picker to see the world in such time.
    - A timelapse button to see how covid spread around the world.
    - Click a country to see how total covid cases increases over the whole period in a line-chart.
    - Hover through a country to briefly see its region's name, death tolls and total cases.
    - Gradual increase by x amount of time to observe changes.
2. Interactive circle plots (Hans Rosling style)
    - On default, it plots new_deaths, new_cases on Y and X axes, while the circle size represents number of total_cases (as shown in the title place).
    - Drag the slider to see real-time transition of the group of countries in each day.
    - You can pick the content of X, Y axes and content of the circle size in the tools on the right.
    - Can pick a group of countries from the world map to the plot, after that, there's a button to rescale to only that specific group.
    - Since the plot can get very dense, drag your brush on the plot and create a rectangular area to see what countries are in that area.
    - Since the circle size can also get extremely tiny or extremely big, there's a button to resize all the circle sizes to be equal.

Design rationale why choosing the particular visual encodings, interactions, and animation techniques.

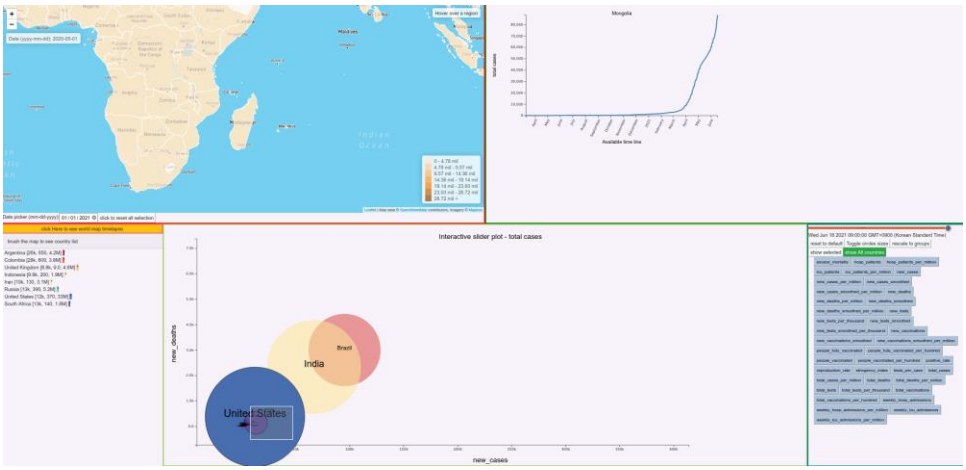
- It is easier to visualize covid with a real world-map since it occurs worldwide. The color represents the most important aspect of the virus: total cases.
- There are tons of attributes in the original data set, so it is best to let user pick their own axes to visualize whatever they want. Moreover, the data is time-series-oriented so adding the slider should make the user see how things move in real-time.
- Picking a group of countries is done on the world map, since users will be curious about their country and their neighborhoods, and they will tend to remember the location of their country on the world map more than picking in a list.
- It is also recommended to scale the axes again after selecting a group of countries, so actually see the relationship between those countries.

Observation of data using your system

- By observing the data in a time series, we can figure out which country control their population the most effective. For example, select all countries with high cases on the world map, and plot them with the addition of time-slider allow us to see that some countries with high cases will not get abnormally high new cases every day or new deaths every day since they control everything very well.

- By seeing the timeline, we can also pick the period where the countries are in “controlled” and search articles, related information about that country in that period to learn about their defense.
- Looking at the time-lapse on the world map will allow us to see how covid sprout from a global perspective.
- By adding a line-plot of total cases, viewer can quickly determine the period where many cases occurred, the stabled periods, etc …

Overview image of the application (enlarged to fit one picture)

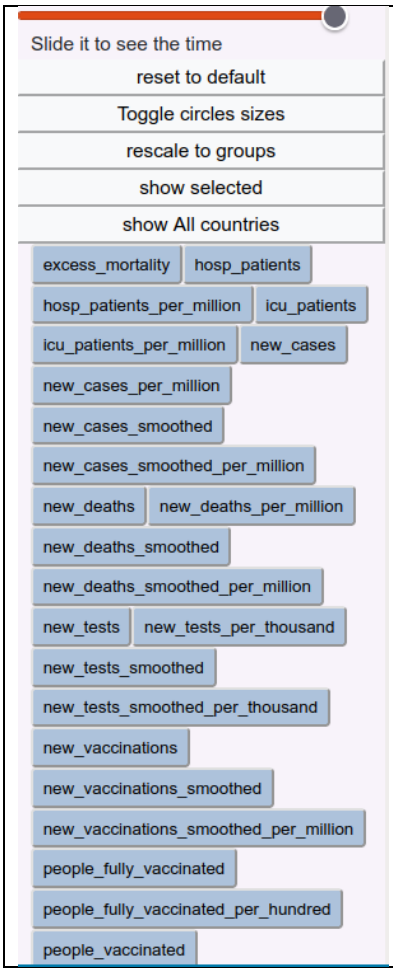


How to run and operate

To run the application, we need internet (for the map to load), and preferably IntelliJ to load and run the project as it will set-up the hosting itself.

Otherwise:

- Need python or python3 in PATH.
- In the root folder, open terminal, type “python3 -m http.server”, and go to the corresponding link provided in the command line (I.e: http://0.0.0.0:8000/), then select “main.html”.



To understand this tool:

Z-axis means circle size (represented in the program as letter “O”)

- **Reset to default** will reset all axes (x, y, z) to default value of “new_cases”, “new_deaths” and “total_cases” respectively, as well as the default scaling, and you can start selecting X, Y, O again .
- **Toggle circles sizes** will toggle size between constant (every circles have equal sizes) and “be affected by the z-axis"
- **Rescale to groups** will resale to the ranges of x and y axes of every countries displayed on the plot.
- **Show selected** will plot only what user select on the world map.
- **Show All countries** will plot every country (if you scale the axes for small group of countries before, you should click **rescale to groups** again to get to scale back).

The blue buttons represent choice to be made on selecting the X, Y, Z axes. Clicking will follow the pattern: X – Y – O. For instance: if you choose X and Y already, then the next one is definitely Z. Clicking on the selected button, will prompt it to the first un-selected one in the pattern. For example: if you have not pick “X” and you click on the button marked with “O” then it will be changed to “X”, and now you should find another one for “O”.