Information Visualization Assignment 3

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In this assignment, you will implement **3 interactions within a bar chart** . After you unzip assignment3.zip you will see 2 directories: **js** and data. You will see index.js and **main.js** in the js directory. You should write all your codes at **the designated part in main.js annotated as [your code #] (You should not edit other parts!! -4pts deduction if you edited other parts)**.

0   Setting Development Environment (0pts)

Before starting this assignment, you need to set the development environment to run the local server with Express. Express is a Node.js web application framework. To set up the environment and run a local server with the given files, you should follow these steps.

1. Install Node.js at https://nodejs.org/en

   After installing, you can check by running **node -v** and **npm -v** on the terminal. They will show the version of Node.js if it is installed properly.

2. Turn on the terminal and move to the directory where you unzip the assignment. Then, run **npm install** command.

3. Run **npm start** coomand on the same directory. It will run the local server. If you see the message *Local server with port 3000 opened!*, you successfully set up the environment. Now, you can check your implementation at http://localhost:3000.

1 Implementing Interactions (32pts)

After you finish the setting and turn on the server, you will see a bar chart like Figure 1. This bar chart shows the vaccination rates of 13 countries in South America. It uses the same dataset as the dataset in Assignment 2. Within this chart, you will implement 3 interactions: tooltips, toggle-color, and zoom. You can check the result in the video example.mp4. Please implement interactions following the instructions below and the example video.
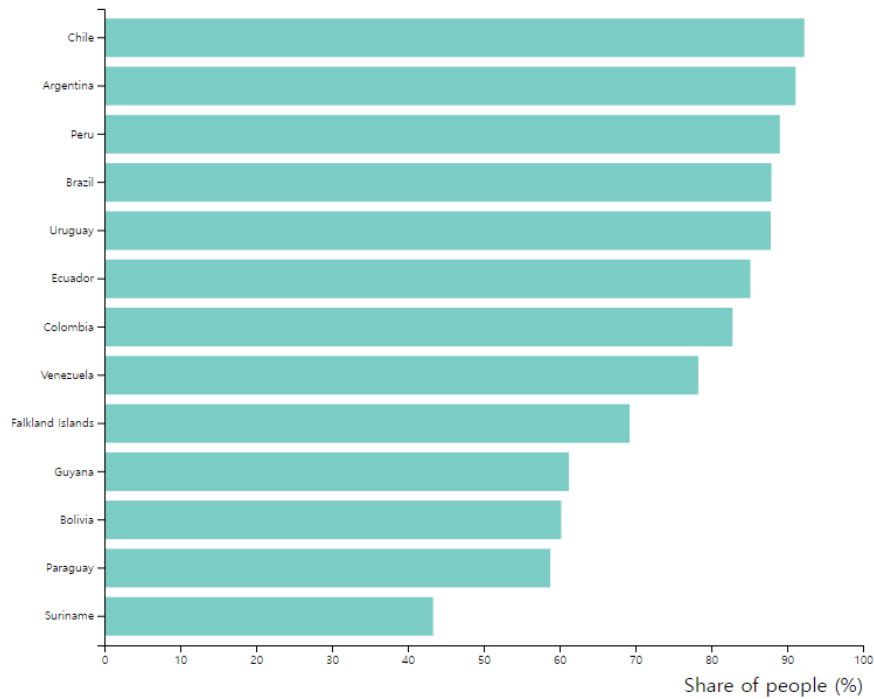

Figure 1: Initial Bar Chart

1.1 Implementing Tooptips (8pts)

In this subsection, you will implement tooltips. You have to implement tooltips following the instructions below:

- Your tooltip must appear when the mouse cursor hovers on each bar. (1pt)

- Your tooltip must contain 4 information:
    - Country name of the bar (1pt)
    - Population of the country (1pt)
    - The rate of fully vaccinated people (round to 2 decimal places) (1pt)
    - The rate of partially vaccinated people (round to 2 decimal places) (1pt)

- Your tooltip must be at the bottom right of the cursor. (1pt)

- Your tooltip must follow the cursor as it moves in the bar. (1pt)

- Your tooltip must disappear when the cursor leaves the bar. (1pt)

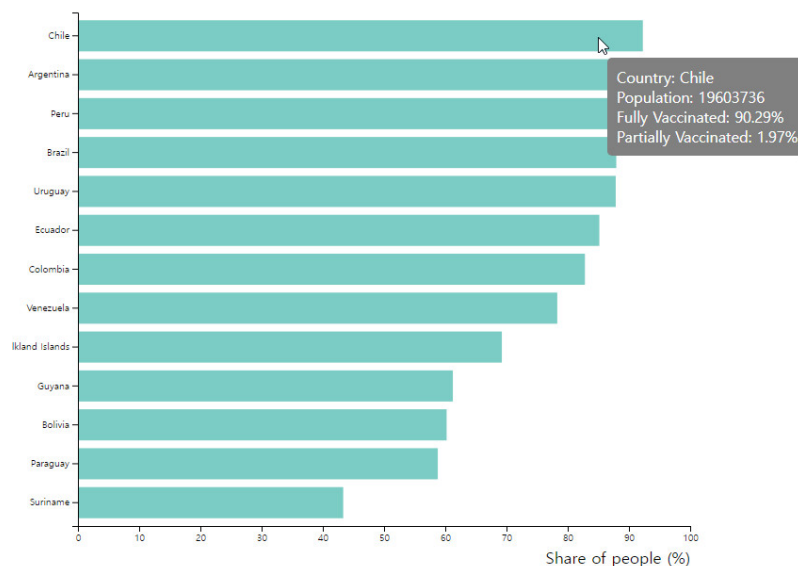After you finish implementing, you will see the tooltips like in Figure 2, or in the video.

Figure 2: Example image for tooltip interaction

1.2 Implementing Toggle-color (8pts)

In this subsection, you will implement a click-interaction which will change the color of the clicked bar. You have to implement this following the instructions below:

- If you click the bar, it must change the color into **#2b8cbe** (3pts)

- If you click the bar again, it must change the color into **#7bccc4** (3pts)

- The bar must be able to toggle color multiple times, not once. (2pts)

After you finish implementing, you can toggle the color of bars like in Figure 3, or in the video.
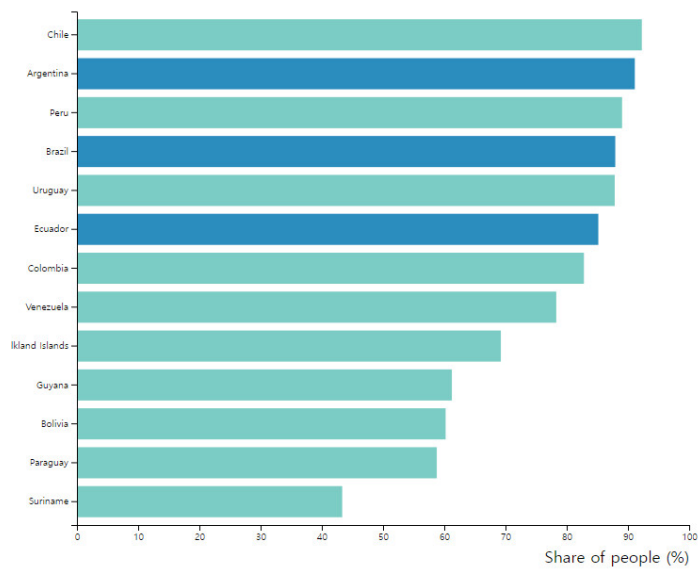

Figure 3: Example image for toggle-color interaction

1.3   Implementing Zoom (16pts)

In this subsection, you will implement zoom interaction. You have to implement this following the instructions below:

- You have to implement zooming by scrolling mouse wheel & panning by dragging the chart. (4pts)

- Zooming & panning should only affect X-axis. Y-axis must not change. (3pts)

- Your interaction must happen within the chart. You can **not** zoom at the outside of the chart. Refer the Figure 4 (The red area) (3pts)

- The scale for zoom must be 1 to 10. (2pts)

- The minimum value on the X-axis must be fixed as 0, and the maximum must be fixed as 100. (4pts)
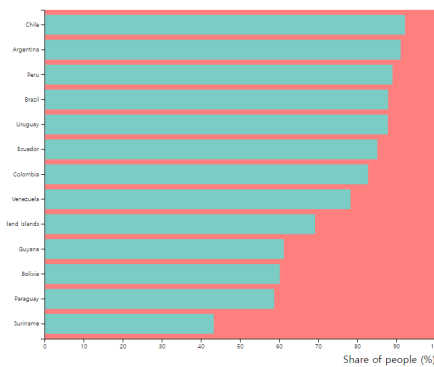

Figure 4: The allowed area for zoom interaction

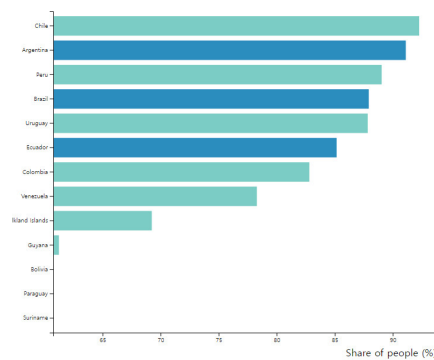After you finish implementing, you can zoom the chart like in Figure 5, or in the video.

Figure 5: Example image for zoom interaction

2 Writing a Report (8pts)

As written in the syllabus, the coding assignments require you to use ChatGPT for self-directed and meta-learning. To verify that you utilized ChatGPT, you should write a report about the usage of ChatGPT.

In the report, you should include at least one screenshot that contains your queries about the assignment and ChatGPT's answer. You don't have to upload all queries.

Then, you should write your analysis about how you utilized ChatGPT to solve problems, and what you learned. You should write at least 10 sentences.

Containing the contents above, your report must be up to 2 pages.

3 Submission

After you complete tasks, you should zip all the files into **YourStudentId_YourName.zip**. (e.g. 20251234_JohnDoe). Your file must look like this:

```
YourStudentId_YourName.zip
├── data
│   └── owid-covid-data.csv
├── js
│   ├── index.js
│   └── main.js
├── example.mp4 (Not essential)
├── example3.png (Not essential)
├── example3-1.jpg (Not essential)
├── example3-2.jpg (Not essential)
├── example3-3.jpg (Not essential)
├── index.html
├── package.json
├── Report.docx
└── Instruction.pdf (Not essential)
```

You should upload this file via Blackboard.

3.1 Late Submission

When you miss the due date, you will get 20% penalty if you submit within an hour, and 50% penalty if you submit within a day. After that, we won't accept any late submissions.