Visualization of World COVID-19 Cases Using d3.js

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Abstract

The rise of spreading pandemic, COVID-19 has been severely influenced on the world. Keeping track of live data of confirmed, recovered, and death cases becomes important for the public health. People should have own ability to check how the pandemic is treated, which helps to prepare for any emergency. In addition, it can be useful for any statistics and experiments that might contribute on the public health. World COVID-19 visualization is designed for those uses.

Keywords: COVID-19, pandemic, visualization

Index Terms: COVID-19-Visualization

1 Introduction

Our workflow includes data processing, visualization, dashboard, and data update. Our visualization is based on public API. We used API from validated website (https://www.covid19api.com) to get the data for the visualization. Then, we drew world map using geographical (latitude, longitude) data to match each country with the data of COVID-19 from the API. The size of the circle indicates the number of each case, and we constructed total three maps to display each case (confirmed, recovered, and death). Also, the dashboard of our visualization is implemented with pure Javascript and CSS to make possible for users to gain more interactive experience with the visualization. The data is updated through the API, which will provide the live information by each deployment.

With this visualization, users are able to check the pandemic situation at a glance to compare and understand the world situation regarding the disease. In addition, the visualization can be used for any kind of statistics and experiments that might contribute on the public health. Our visualization contains four sections; data processing, visualization, and interactive dashboard

2 Data Processing

It was important for us to get validated data to display authentic visualization that people are safe to trust. After the careful research and comparison, we decided to use public API from the validated website (https://www.covid19api.com). The data was well organized, and documentation was clear and intuitive enough to understand how they behave at once. We called "Summary" data among a great deal of options to match each country to the confirmed, recovered, and death cases.

As shown in the Figure 1, the data is formatted in JSON file, and it contains keys such as "Country", "CountryCode", "Slug", "NewConfirmed", "TotalConfirmed", "NewDeaths", "TotalDeaths", "NewRecovered", "TotalRecovered", and "Date". Among them, we adopted "TotalConfirmed", "TotalDeaths", and "TotalRecovered" for representing each case.

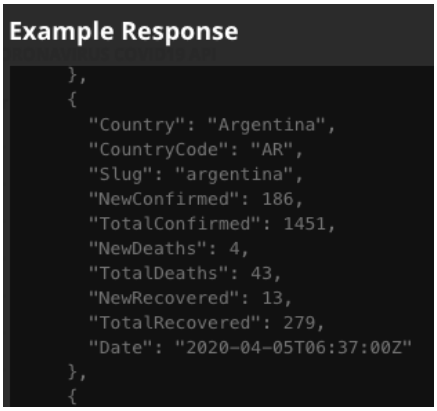

Figure 1: Example Response of API

As shown in Figure 2, we made GET request to receive the data from the API. Then, we created a variable called "countries" to restore the value of each case. These data is also associated with the geographical data of each country, so it is able to match each country and the pandemic data.

```
function getData() {
  $.get("https://api.covid19api.com/summary", function (data, status) {
    if (status == "success") {
      var country_list = data["Countries"];
      for (var i = 0; i < country_list.length; i++) {
        var element = country_list[i];
        countries[element["CountryCode"]]["cases"] = element["TotalConfirmed"];
        countries[element["CountryCode"]]["death"] = element["TotalDeaths"];
        countries[element["CountryCode"]]["recovered"] =
          element["TotalRecovered"];
      }
      total_case = data["Global"]["TotalConfirmed"];
      total_death = data["Global"]["TotalDeaths"];
      total_recovered = data["Global"]["TotalRecovered"];
    }
  });
}
```

Figure 2: Calling API from the function

3 Visualization

We chose to use a map to display the whole territory and tag the name of each country and the COVID-19 cases, because using map enables for users to comprehend the entire situation at a glance. In addition, map provides better user experience when browsing the data globally, because users can zoom in/out with their mouse and get desired data by hovering over the circles in the interested countries.

Each country represents its cases by circles which have different sizes according to the number of the case. The larger the circle, the more cases of the pandemic.

Also, users can easily identify whether the desired country is selected or not by the hovering effect. The default is light-brownish color, but it turns red when hovered.

We represented three visualization; each one for each case.

3.1 Confirmed Case Visualization

The most important figure to judge the situation would be the case of confirmed COVID-19, which can be a standard to help making any decision regarding the pandemic. As the visualization flow is described in the above section, the size of circles represents the number of the confirmed case.

For example, if the user zoomed-in the United States and hover the circle, it represents the value of 16,253,219 to show the number of the confirmed case of the country.

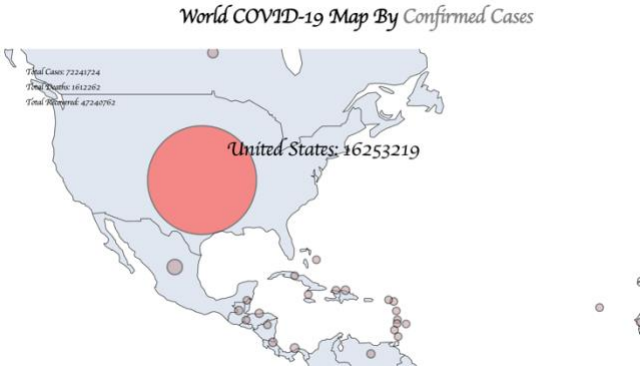

Figure4: Confirmed Case Visualization, Zoomed-In

3.2 Recovered Case Visualization

The visualization of the recovered case represents the number of people who got recovered from COVID-19. As the flow of the visualization, the worldwide map shows each country which also represents the number of the recovered case by its size of the circle.

For example, if the user zoomed-in the China and hover the circle, it represents the value of 88,041 to show the number of the recovered case of the country.

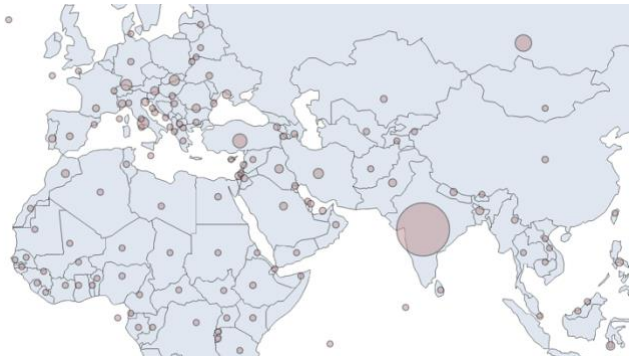

Figure5: Recovered Case Visualization, Zoomed-In

3.3 Death Case Visualization

The visualization of the death case represents the number of people who are dead from COVID-19. As the flow of the visualization, the worldwide map shows each country which also represents the number of the death case by its size of the circle.

For example, if the user zoomed-in the Egypt and hover the circle, it represents the value of 6,920 to show the number of the death case of the country.

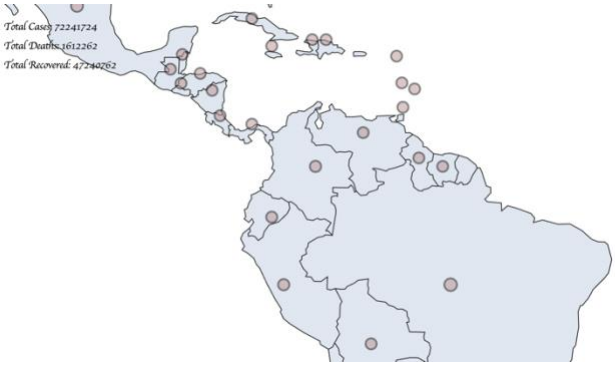

Figure6: Death Case Visualization, Zoomed-In

4 Interactive Dashboard

We designed a dashboard interactive to view each visualization of the case to help users gain better experience. The design would help users understand the data as well. There are several distinctions in design-wise.

The fixed header on the top of visualization enables user to identify themselves where they are in the application, which also help users to move from one to another map. By enlightening each tab of the header, it interacts with users with the map.

Also, there are arrows in the introduction section of the visualization, which will make the flow for the users to follow the visualization as intended by the author. This would also increase readability of the visualization as well.

5 Conclusion

We have designed worldwide map that visualizes confirmed, recovered, and death cases using d3.js. By processing data from the public API, we create our own visualization using d3.js. Lastly, the interactive dashboard is implemented for user experience. This work is intended to help the community who is still in fight with the pandemic, or any organizations that contributes on our public health. Most importantly, we hope our work could help people from all over the world who is in need.