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Course code and name:	F21DV Data and Visualisation and Analytics
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HERIOT WATT UNIVERSITY

Data Visualisation and Analytics

(F21DV)

Course Work 1

(Academic Year 22-23)

Course Work Video Link: https://youtu.be/pi6-jsUXUds

Done By,

Abhishek Suresh

(H00391957)

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1. INTRODUCTION

The Application is developed using D3 JavaScript and CSS which shows the growth of Covid 19 pandemic around the world.

The report showcases mainly on how the application answers the task questions as well as an overview on the application requirements met by the application is also discussed.

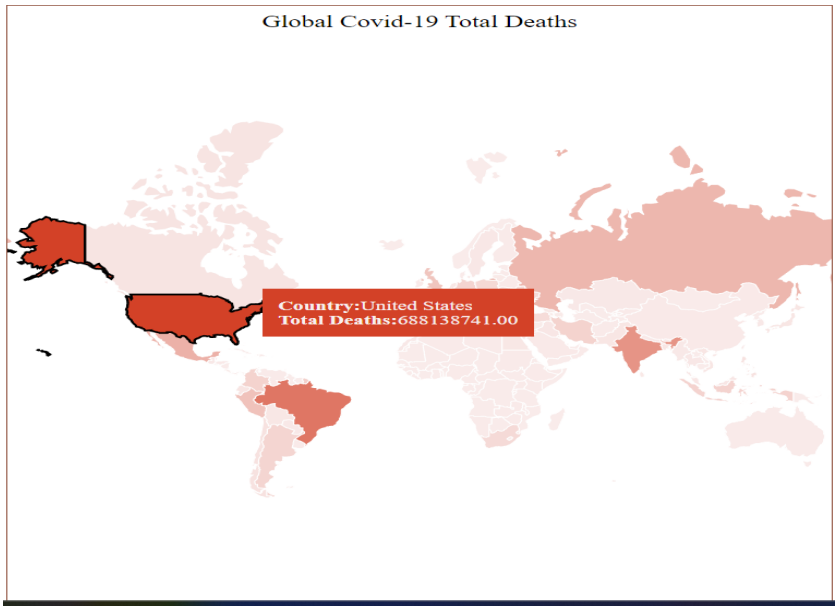
2. APPLICATION OVERVIEW

The focus of the application was to visualise and answer the task questions for the coursework. For this purpose, I have used 3 types of visualisations to present the data and help users to understand the data much efficiently. Below are the types of visualisations used in the application.

- Choropleth Map

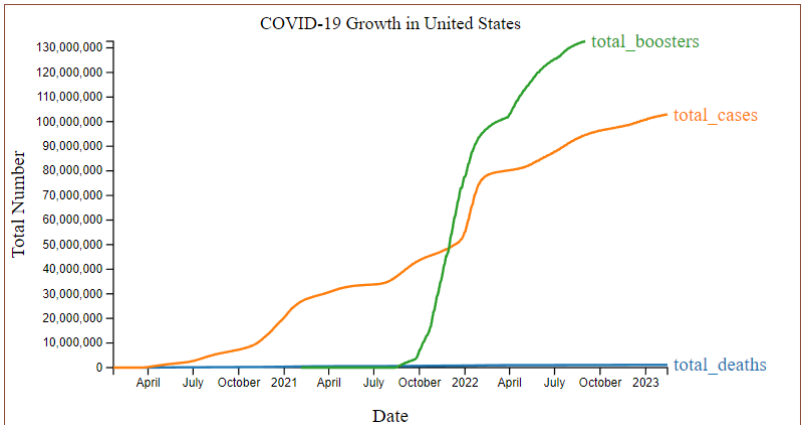
  A choropleth map representation is used to showcase the total number of deaths in a each country due to covid 19 pandemic. The number of deaths is represented as a colour scale in the map which gets darker as the number increases.

  Hover and tooltip styles are also included on the map to showcase data for specific countries.



- Line Chart

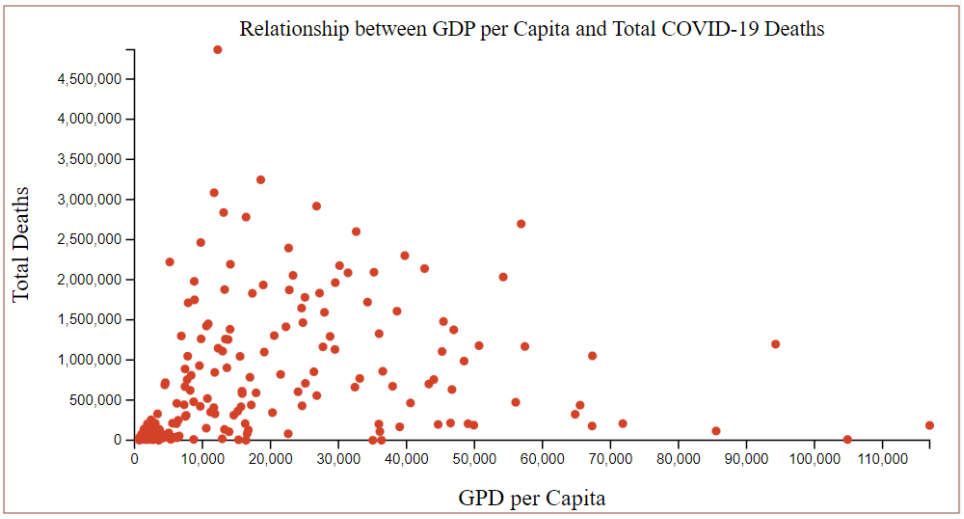
The Line chart is used to show the total number of deaths, total number of cases and total number of booster jabs as three different lines for each specific countries throughout the time. The data for each country can be visualised by clicking each country on the choropleth map.



- Scatter Plot

Scatter Plot is used to plot the relation between the per capita GDP and the Total Covid Deaths for each specific country. I used scatter plot to group countries

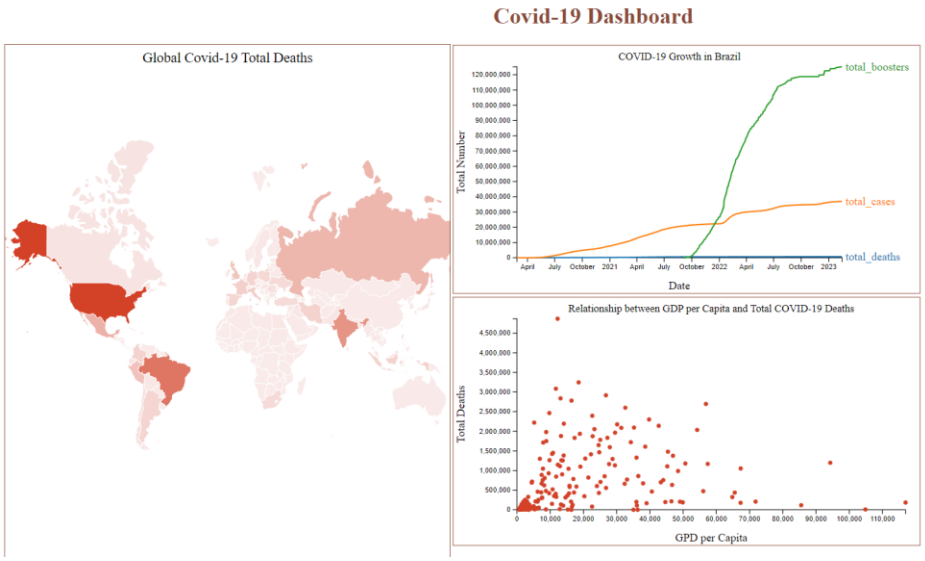
based on their GDP, which in turn helps in finding how per capita GDP of a country affects their Covid 19 death rate.



3. APPLICATION REQUIREMENTS STATUS

The application has met most of the requirements and the below section illustrates how these requirements are met.

- **All visualisations are loaded in a single html page and 3 visualisation types are used to present the data given for the coursework.**



The html page was split into different div and corresponding charts were placed on those div section to load all the charts in a same html page.

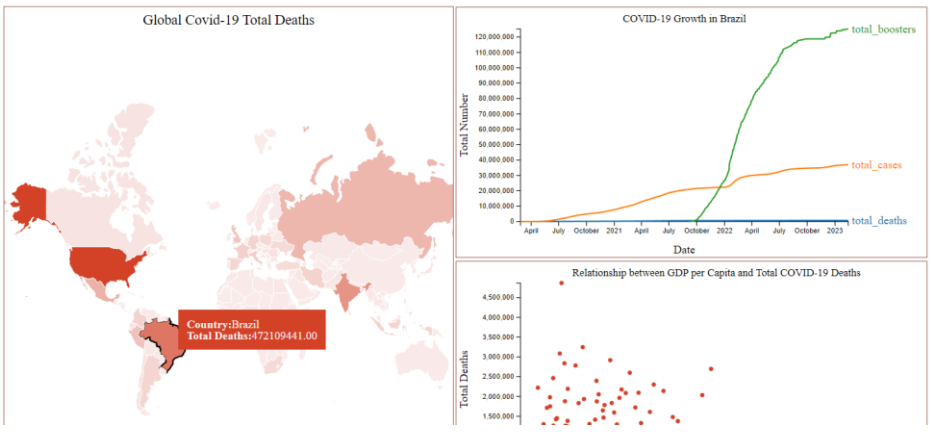
```
<!DOCTYPE html>
<meta charset="utf-8">
<link rel='stylesheet' href='style.css'>
<script src="https://d3js.org/d3.v7.min.js"></script>
<script src="charts.js"></script>
<body>
      <div class="container-fluid">
          <h1 style="text-align: center;color: #8b4a36;">Covid-19 Dashboard</h1>
          <div id="map"></div>
          <div id="line"></div>
          <div id="scatter"></div>
      </div>
      <div id="tooltip" ></div>
</body>
```

The above code illustrates how different div tag's are created for each charts so that all the visualisations are loaded in the same html page.

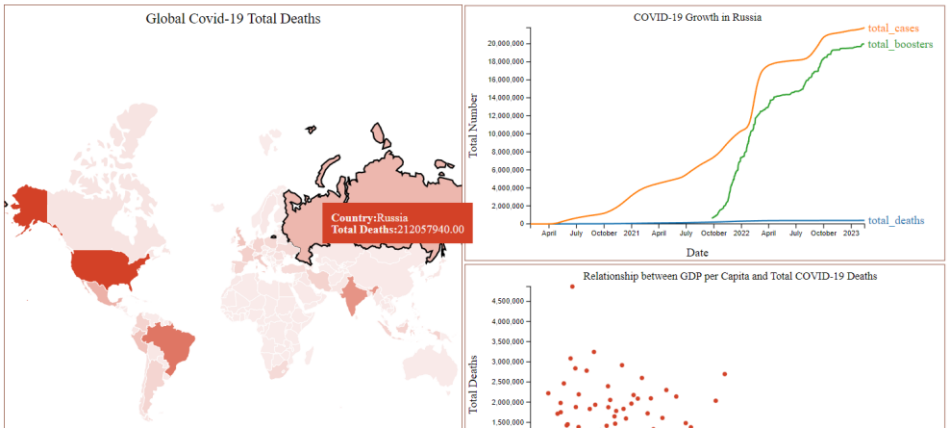
- **When data of a single visualisation is updated axes of that visualisation is rescaled or updated**

In the developed visualisation when we click on a country on the choropleth map, corresponding data of total deaths, total cases and total boosters gets updated on the line chart. The y-axis of line chart gets rescaled according to the data of the selected country.

Below image shows the data for Brazil on the line chart as we have selected Brazil from the choropleth map.



But when we change our selection to Russia in the choropleth map, the line chart gets updated with data of Russia and the y-axis of line chart gets rescaled according to the data of Russia. (Please refer below Image).



The line chart update is done .on('click') method of JavaScript. The below code illustrates how its done. When a country is clicked on the map its corresponding data is taken and passed to the LineChart function to update the Line chart.

```
.on('click' , function(event ,d) {

    //update the line chart
   LineChart(covid, d.properties.name)


});
```

The Y axis domain is rescaled as illustrated by the below code block. Here the y axis domain is set as a maximum value between the total deaths, total cases and total boosters of selected country. Hence whenever a country is selected the y axis domain value changes and get rescaled.

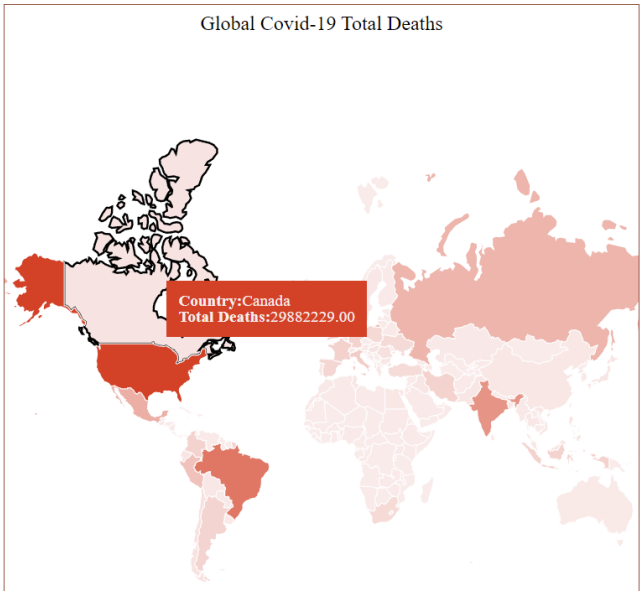
```
maxCases = d3.max(data, function(d) { return Math.max(+d.total_deaths, +d.total_cases, +d.total_booste
y.domain([0,maxCases])
```

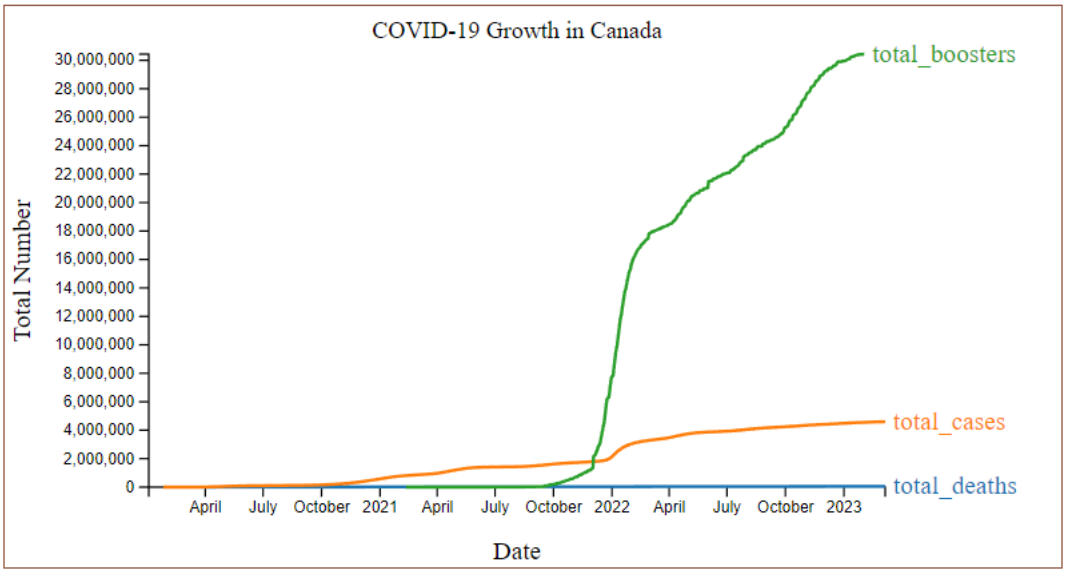
4. TASK QUESTIONS

I. How did the COVID-19 pandemic grow over countries and continents throughout the world from its start?

The spread of covid 19 pandemic is shown in a choropleth map where the darker shade indicate higher spread and lighter shade indicates lower spread of the pandemic. The below Image showcases this. The covid growth over date is illustrated in the line chart with three lines illustrating total covid deaths, total covid cases and total boosters for a specific country. The country is selected by clicking it on the choropleth map.

By Analysing this we could see that USA was mostly affected by Covid followed by Brazil, India, and Russia. The African countries are the least affected which can be noticed from the colour scale in choropleth map.

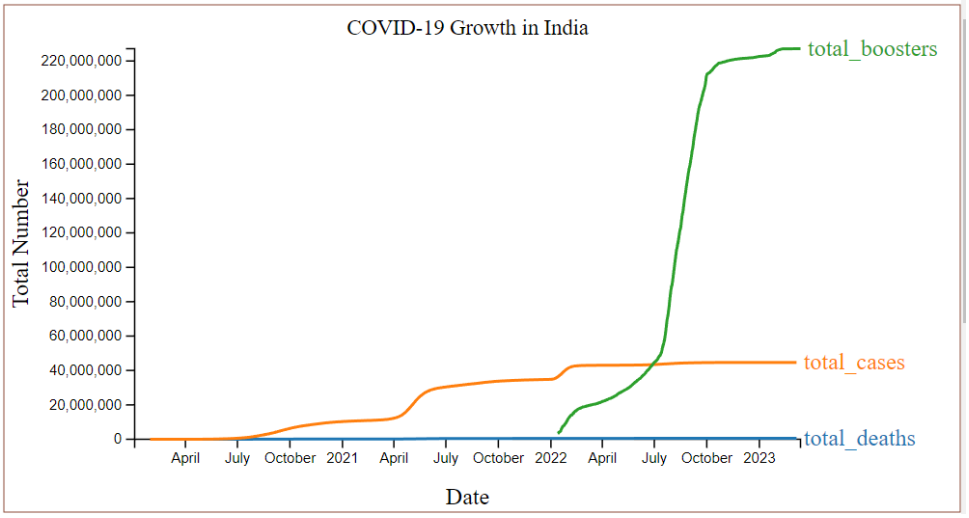




II. Choosing some specific countries, how successfully did they manage the outbreak?

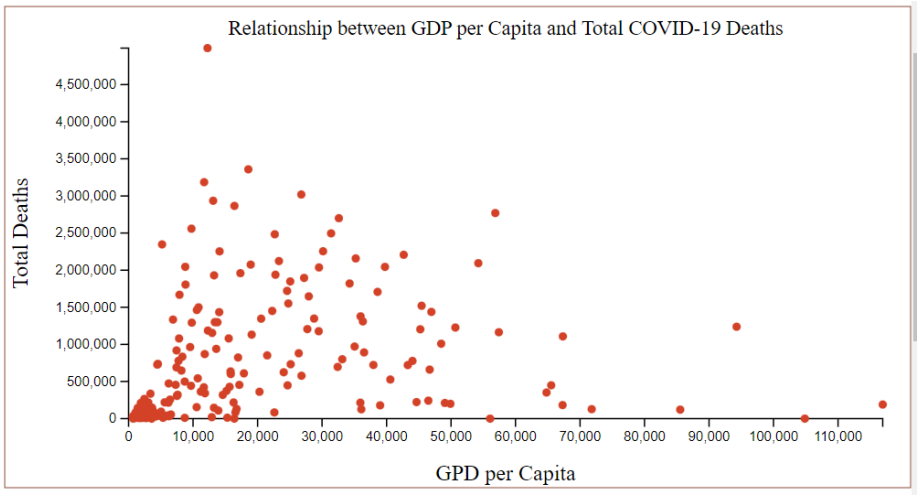
This can be analysed from the line chart for specific country. We can see that for higher effected countries like USA, Brazil, India and Russia number of booster jabs are way more than the rest of the countries. Which makes sense as they need to act fast to manage the outbreak. For lower affected countries the number of booster jabs is higher than the number of total cases, which again shows how much careful are these countries in managing the outbreak.

The number of booster jabs line in line chart is increasing linearly after the October of 2022 which explains the fact of scarcity of vaccines at the beginning of the pandemic stage.



III. Choosing some specific countries, is there a relationship between the relative "wealth" (e.g. GDP) of a population and the spread of the pandemic?

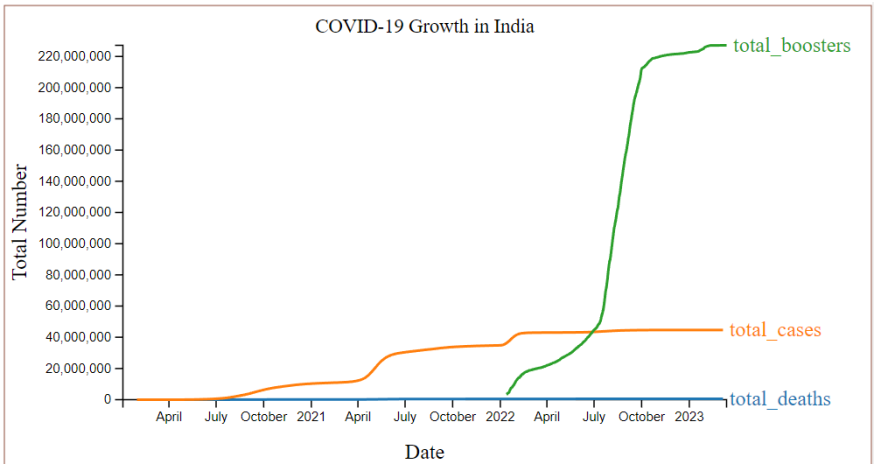
The GDP per capita vs Total Deaths for countries was plotted as a scatter plot so that countries with lower, higher and intermediate GDP can be grouped and compared. The below image shows this.



From the figure we can see that total number deaths are more for lower to intermediate GDP countries, and we can also notice that as the GDP increases the death rate follows a steady rate. Thus, it can be concluded that the GDP per capita has a relationship with the spread of the pandemic.

IV. What effect did vaccinations have on the spread of cases/deaths? Did booster jabs also have an impact on the spread/transmissibility of the virus?

The effect of vaccinations and impact of booster jabs can be analysed from the line chart.



From the Image for the case of India we can see that the total cases followed a steady rate as there was a boost in the line of total booster vaccination for the country.

Thus we can see a direct relation for vaccination and booster jabs on the spread/transmissibility of the virus.

5. REFERENCES

1) https://d3-graph-gallery.com/scatter.html
2) https://d3-graph-gallery.com/graph/scatter_tooltip.html
3) https://d3-graph-gallery.com/graph/line_several_group.html
4) https://d3-graph-gallery.com/graph/choropleth_hover_effect.html
5) https://github.com/AhmadChaiban/COVID-19-Dashboard || Used this as a reference dashboard in designing the dashboard for the coursework.