

COVID-19

Assignment - 5 - Final Report

Shreyas Kottur Shivananda
Shashank Kanakapura Srivatsa
Vivek Jaganath
Guru Prasad Savandaiah
Seena Mathew

University of Paderborn

1 Introduction

In the month of January 2020, most of the European countries were affected by COVID-19. As there was not much information about COVID-19, for example - how it was transmitted, what measures needed to be taken to stop its spread, etc., it was very hard for the European governments to formalize an approach to prevent the spread of COVID-19. In such a situation the German government came up with many measures to counter COVID-19. In this project, we are comparing the response of Germany with its European counterparts in aspects such as the closure of schools, home quarantine, tests, etc through visualization.

2 Data set

We have used the following datasets for the creation of visualization, to compare the response of Germany compared to other European nations.

– Data-set 1:

Name: Dataset1.csv

Source :

https://raw.githubusercontent.com/OxCGRT/covid-policy-tracker/master/data/OxCGRT_latest.csv

From this data-set, we consider a subset of columns that will help us to create the visualizations. We have also combined three restrictions from dataset at source:<https://www.google.com/covid19/mobility/>. We have used this dataset to compare the various restriction imposed by the governments in Europe with German government.

Characteristics:

- Type: Nominal, Ordinal and Quantitative
- Dimension: Two dimensional

- Brodliès model: E_2^{46S}
- **Data set 2:**
 Name: owid-covid-data.csv
 Source :
<https://ourworldindata.org/coronavirus-testing#source-information-country-by-country/>

We have used this dataset to get information on the total affected cases and total deaths due to corona virus across Europe.

Characteristics:

- Type: Ordinal and Quantitative
 - Dimension: Two dimensional
 - Brodliès model: E_2^{34S}
- **Data set 3:**
 Name: time_series_covid19_recovered_global.csv
 Source :
https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_covid19_recovered_global.csv

We have used this dataset to retrieve information on the recovered COVID cases across Europe. We merged this data with owid-data from covid-data.csv data to compare the affected, death and recovered cases across other countries in Europe with respect to Germany.

Characteristics:

- Type: Ordinal and Quantitative
 - Dimension: Two dimensional
 - Brodliès model: E_2^{157S}
- **Data set 4:**
 Name: acaps_covid19_government_measures_dataset_0.xlsx
 Source :
www.acaps.org/sites/acaps/files/resources/files/acaps_covid19_government_measures_dataset_0.xlsx

We have used this data to get policy milestones regarding the various restrictions imposed by European government.

Characteristics:

- Type: Nominal, Ordinal and Quantitative
- Dimension: Two dimensional
- Brodliès model: E_2^{18S}

These datasets were used to represent how the various restriction policies imposed by Germany helped in controlling the spread of COVID-19. With respect to the chosen data sets, we performed data pre-processing before creating

the visualizations. Data pre-processing consisted of modifications to the structure of data sets, smoothing some of the data values based on the requirements, changing the date format etc.

3 User and Task

3.1 Users

Few of the potential users can be:

- Persons affected by COVID-19.
- Persons who are planning to travel to and from Europe.
- Government authorities.
- Persons assessing Germany's COVID-19 response when compared to other European nations.
- Individuals living in Europe, who are assessing the possibility of restarting their normal day-to-day lives.

3.2 Tasks

Few tasks that are possible for these users are as follows:

- View information such as new cases, new deaths, total cases, total deaths, total recovery due to corona virus in European nations.
- View information such as opening of public facilities such as schools, public transport, workplaces, travel restrictions, public transport restrictions, availability of travel options.
- Compare COVID-19 response of Germany with other EU nations.

4 Visualisation

We have used the following visualization techniques:

- We have used the library `plotly.express` to generate the choropleth map of Europe. We have used this map to visualize the effect of COVID-19 based on affected cases, death and recovered cases across each European countries. The effect of this pandemic can be assessed based on the intensity of colour for each country. As the intensity of colour increases, the respective cases(affected, death, recovered) increases.
- Line graph representing the affected, death and recovered cases of Germany and the selected European country. This line graph will help to compare COVID-19 effect on Germany and other EU countries. We have used the library `plotly.express` to generate the line graph.
- Bar graph between dates and chosen policy restriction.
- Data Table provides information about different measures taken by the government of the selected country.

5 Interaction

Our project comprise of the following interaction techniques:

5.1 Interaction Operator

- Navigation - Zoom, Hoover cursor to display data etc.
- Filter - Select subset of data based on certain factors like date.
- Encoding - Switch from line graph to bar graph and vice-versa.
- Range Slider - TO select the date range for which the data needs to be displayed.

5.2 Interaction Operand

Considering the above mentioned interaction operators below mentioned interaction operands will be used.

- Screen space will be used in accordance with Navigation.
- Data value space will be used in accordance with Filtering.

6 Participants

- Shreyas Kottur Shivananda worked on comparison of new cases and deaths visualization, encoding of line graph and bar graph, dropdown interaction, preparing of initial concept report and data set research.
- Shashank Kanakapura Srivatsa worked on comparison of policy measures, dashboard UI, initial concept report and dataset research.
- Vivek Jaganath worked on choropleth to visualize general trend in total cases, total deaths and recovery, presentation preparation and dataset research.
- Guru Prasad Savandaiah worked on preparing comparison of policy milestones, range slider interaction, dashboard UI and dataset research.
- Seena Mathew worked on comparison of general trends of European countries pertaining to total cases, total deaths, total tests etc., dropdown interaction, final report preparation and data research.

7 Learning Outcome

- Understanding of dataset characterisation.
- Dataset processing.
- Characterisation of users and tasks.
- Understanding Visualisation technique, interaction techniques.
- Understanding of various libraries like pandas, plotly, dashboard and dashboard components.

8 Concept

Our concept of this project was to compare the response of German government on COVID-19 spread-out compared to other European nations. We were successfully able to implement the goals mentioned in our concept paper. Apart from the datasets mentioned in the concept paper we made use of 2 more datasets to visualize the COVID-19 effect.