Comorbidity and Genetic Factors and their Impacts on Patients with COVID-19

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Background

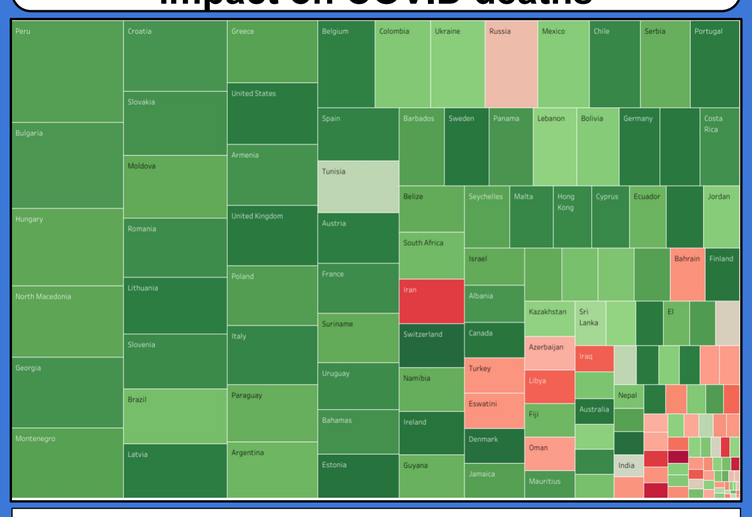
COVID-19, a highly infectious disease caused by the SARS-CoV-2 virus, has had a profound impact on the world, affecting health, economies, and daily life. Despite extensive research, there are still several overlooked aspects related to the disease that have been considered controversial and therefore, have not been thoroughly studied. It is important to consider these areas to gain a complete understanding of the virus and its impact on human health.

Objective

The objective of this project is to study overlooked or unconsidered aspects related to COVID-19 to gain a better understanding of the disease. This is being done by studying various areas, including clinical factors such as blood type and its association with disease severity and mortality, as well as the impact of geographical, economical, and social factors on COVID-19 cases, vaccinations, and mortality. Our approach involves segmenting the deliverables into three separate branches.

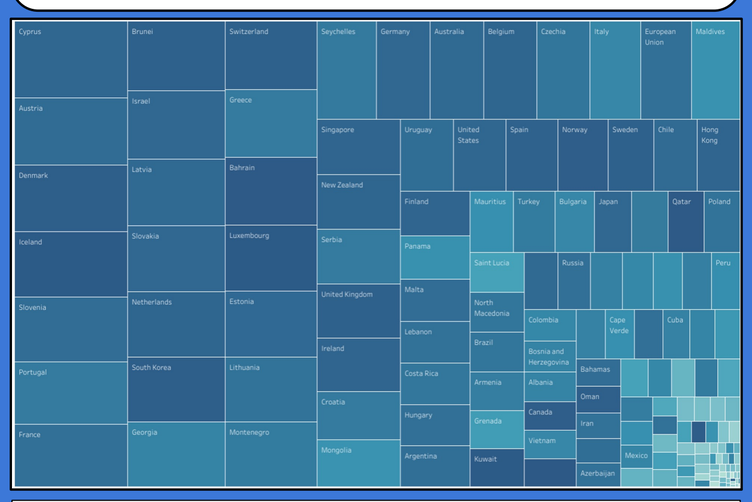
Tableau Portal

Country's Freedoms Score and impact on COVID deaths



A comparison of freedom score of different countries and COVID-19 deaths in those countries, with the countries having more freedom also having more deaths.

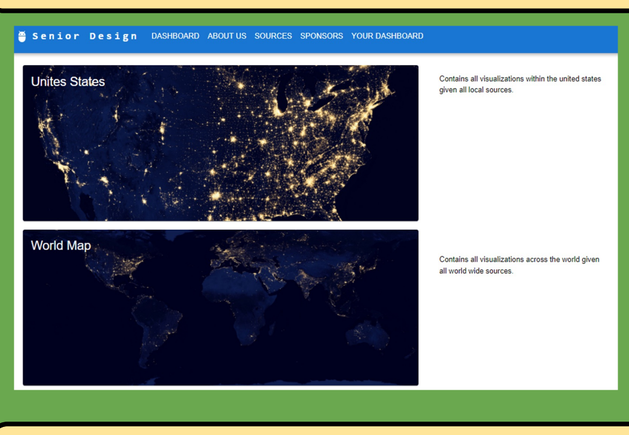
Internet Access vs Covid Cases



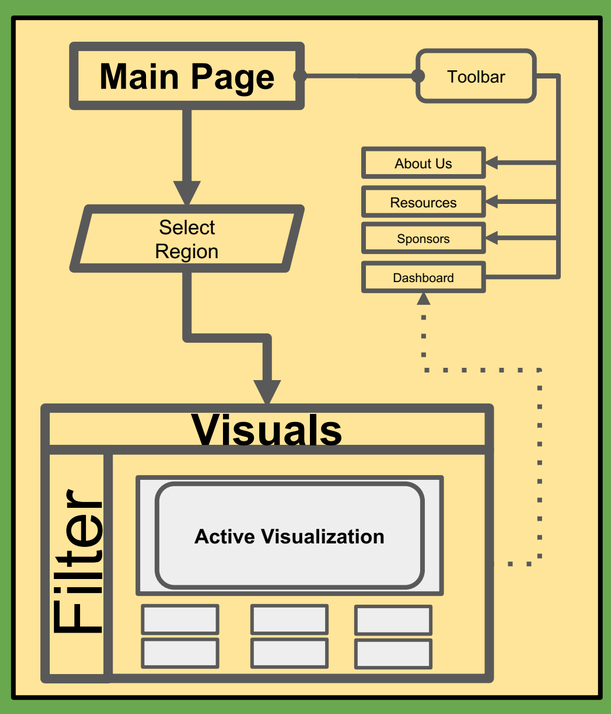
A comparison using percentage of internet access of different countries and COVID-19 cases in those countries, with the countries having more access also having more cases.

Visualization Application

Libraries Used



The application is created to display the visualizations



Blood Type Analysis

Comorbidities and Traits Investigated

- Blood Group
- Fever
- Chills
- Cough
- Dyspnea
- Anosmia Ageusia
- Loss of Appetite
- Asthenia
- Cyanosis
- Rhinorrhea
- Sore Throat
- Diarrhea
- Muscle Ache
- Nausea Vomiting
- Headache
- Gender.

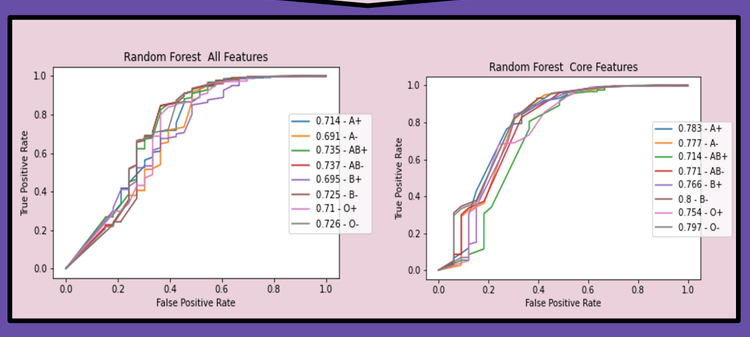
After preprocessing the data the Boruta Algorithm was used to identify core features.

Boruta Core Selected Features for Mortality (All Blood Types)

- Chills
- Cyanosis
- Diarrhea
- Cough
- Sore Throat

Features were further supported by high rank order stability in Fisher's Exact and Chi Squared tests.

Next multiple models were created for each, each varying a single feature informing if the sample matches the corresponding blood type.



Note:

- You can use the following QR codes to access the project's online versions.

Features:

- Realtime data
- Easy interaction
- Intuitive Design
- Custom Dashboard

Results:

- Identified Core Comorbidities associated with COVID-19
- Core Comorbidities helped reduce noise in the models
- No significant changes were found when examining blood type
- Blood type likely has no effect on COVID-19 mortality

similar were found for results severity