Impacts of COVID-19 and Government’s Responses

Group Members: Beixuan Jia, Luwei Lei, Miao Wang, Yuxin Zhang

The pandemic of COVID-19 has become one of the major challenges of global public health. To help the public and decision-makers better understand the trend and influence of COVID-19, this project not only created visualizations to demonstrate the underlying patterns of COVID-19 and its impacts, but also added interactive features which allowed users to focus on the relevant aspects and obtain interesting findings from the information.

All visualizations were created on the “Dash” platform based on python’s Plotly library and had been summarized to a website. The website contained five tabs, representing COVID-19’s overview and its impacts on Mobility, Public Opinion, Unemployment, and Legislation.

The Overview page evaluated the lockdown timeline and growth rates on two levels: each US state and each country around the world. In the US, 42 states were on lockdown by Apr 7, whereas most states in the central US were already partially open by Apr 21. Most states which are partially open claimed the stay-at-home earlier, whereas states with main metropolitan areas and cities generally started the lockdown later since there were more effects and concerns to lockdown major cities. On the global level, the line chart demonstrated which government handled the pandemic effectively. For instance, South Korea started the lockdown right at the first outbreak and effectively stopped the spreading of the virus. Unfortunately, Italy had missed the best time to lock down the country, as shown that the stay-at-home order was not issued until several outbreaks. The visualization showed that **the stay-at-home order had helped flatten the curve, since the growth rates of both new cases and death had been steadily decreasing since the lockdowns on both national-wide and world-wide levels.**

The Mobility page presented mobility data from in the US and main cities around the world. It showed that since March, people around the world had stayed at home more often and stopped traveling around as much. Moreover, in the line chart where the mobility was broken down into 6 categories, there existed some interesting periodical patterns: people stopped going to malls (retails) and taking public transportation since mid-March, when most states started the lockdown. Although most people stopped going to work and stayed at home, as shown in the mobility trends for workplaces and residential neighborhoods, the periodic patterns were more obvious in these two plots: people are more likely not at home and shortly stop by their office on weekends. “Grocery” and “Parks” showed that before lockdown, there were much more people panic buying and hiking than usual. After lockdown, people went grocery shopping and hiking less often as people became more cautious about going outside. **The plots also showed that people were not used to the quarantine life at the beginning of the lockdown, but most people had eventually developed their routines for activities such as grocery shopping. Overall, the mobility page showed that people generally were following the stay-at-home order.**

The Public Opinion page researched people’s opinions and concerns during the pandemic through surveys, social media posts and google search results. Surveys showed that after the first death in the US, people had been much more worried about COVID-19. Also, younger people and registered voters were generally less worried about COVID-19 than the others. The google search results had shown that before the lockdown, people paid close attention to the information about COVID-19, whose main source had changed from the JHU to CDC website. Since the quarantine started, besides the virus, people spent more time searching for online-streaming services (Netflix) and online shopping websites (Amazon). Meanwhile, people still cared about news and trending topics such as the stock and NFL. More recently, people started searching more about reopening the state and protests. **It proved that people’s concerns were mainly related to COVID-19’s impacts and the government’s response, and the concerns might be shifted through time.**

The Unemployment Page examined the unemployment rate by each US State since 2015. Before the pandemic, the unemployment rate was gradually going down, whereas the unemployment rate started rising again since the outbreak of COVID-19. Especially at the end of March when most states were under lockdown, the number of unemployment claims had grown significantly. The line chart showed that the most impacts states included those whose

major economic sectors were tourism, such as Florida and Colorado. This page revealed that the unemployment condition in each state is closely related to its economic structure. **States which relied more on tourism and manufacturing would expect growth in unemployment rates during the pandemic.**

The Legislation page demonstrated the COVID-19 related legislations in each state. Users could access each legislation by entering the keywords, select states, or click the “book” icons. **This page showed that states with most confirmed cases such as Massachusetts and New York had most legislative proposals.**