The following is an outline for your final project write-up. In addition to the write up, I will also grade your actual visualization for level of effort and creativity. You will need to submit all your code/workbooks/data that you used to create the visualization. If any of these are not available (such as your data is too large to upload or is privately maintained) that is fine, just note that somewhere in the write-up.

Visualizing the Effect of SARS-COV-2 on the American, European, and Asian Stock Equities

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## Introduction/Background

As 2020, SARS-COV-2 or more commonly known as the Novel Coronavirus 2019 has devastated equities across all global markets. From affecting airlines in China, region lockdowns, frozen supply chains to mass hysteria. Coronavirus has affected the global markets nearly as hard as the 2008 crisis as corporations and companies alike scramble to refit to remote operation. Loss of productivity and consumers worldwide as practice of social distancing enacts in almost all regions.

The purpose of the visualization is to pinpoint key events along the Coronavirus’s timeline to pinpoint correlations of key shutdowns, country announcements, and key news headlines effect onto stock market indices such as the Dow Jones Industrial Average(DJI) for the representation of American markets, Nikkei 225 (NI225) for the Japanese Market, Financial Times Stock Exchange (FTSE) for the London markets. By tracking region specific headlines, and their effects on their correspondent stock exchange alike with their effects on neighboring or global stock exchanges as well.

## Audience/Purpose of Work

The purpose and targeted audience of this visualization is the general public or any who are interested in viewing the timeline of the global stock exchanges in correlation to the timeline of the global pandemic in a concise and organized manner. With many key federal actions such as reduction of the federal interest rate to news of potential lockdown of New York City, any of these headlines will be summarized alongside for anyone interested in seeing how the pandemic crisis escalated and mass hysteria drives a freefall of stock trading.

## Dataset(s)

The first dataset comes from an open source GitHub. This Github was designed to scrape from WHO situation reports and to update the confirmed cases confirmed automatically. I will be grabbing the time series csv file from this open source github, and building my cases of coronavirus upon it: <https://github.com/CSSEGISandData/COVID-19>. The data looks as follows:

|  |  |
| --- | --- |
| Column Name | Description |
| Province/State | State/Province dictated by WHO of recorded area. This will be unneeded as I will concatenate all state/provinces into a single country. |
| Country | These store the country names of recorded. I will be scraping these country names to work to match up with a chloropleth |
| Lat | Latitude of Country |
| Long | Longitude of country |
| Day of 1/23/2020 | This is the recorded amount of infected on this day |
| Day of 1/24/2020 | This is the recorded amount on the next day, and etc. |
| Etc. | These are the subsequent days which have recorded values in every country with cases |

All historical data for the stock indices will be downloaded off of Yahoo! Finance. An example URL for the DJI data is as follows, the formatted Data includes 7 columns and n rows, n being the amount of days to be tracked. <https://finance.yahoo.com/quote/%5EDJI/history?p=%5EDJI>

|  |  |
| --- | --- |
| Column Name | Description |
| Date | The date of each day, important to viewing relative time throughout the data |
| Open | The price at stock market open |
| High | The highest price during the trading period |
| Low | The lowest price during the trading period |
| Close | The price at stock market close, important as this is the main indicator of the price of the index |
| Adjusted Close | The price at stock market close, adjusted to account for dividends and splits |
| Volume | The amount of shares being exchanged within an index, important for gauging stock market activity |

## Visualization Methods

## For my visualization, I chose to use d3.js extensively into a static web application. On my website, there will be a choropleth that pulls current data from the covid19 cases GitHub and parses it client-side to try to match up with a country information json file to correctly display a choropleth that is animated with the day of infection. This is meant to play automatically onload of the website. There is a counter that displays the date of infection and displays how many confirmed cases of COVID19 exist in the country on set date. Secondly, there is a multiline animated line chart that is meant to move intime with the choropleth to view the movement of stock equities in line with the infection cases globally.

Secondly, I chose to use d3.js again, this time to draw a multiline graph to display the stock indices Dow Jones, Nikkei 225, and Hang Seng Index onto the chart. This chart is meant to be inline timewise to the choropleth. This was meant to stop periodically to emphasize major events in the coronavirus timeline that would majorly affect the stock equities globally.

## Results

There are no extra requirements of running my web application. Any simple local server should be able to run the web application within the zipped code package. Otherwise, I have uploaded the entire project directory to a Github repository, found here: <https://github.com/lamn18/Covid19vsStockIndices>

The data visualization is rather simple. The data visualization includes a Choropleth or a shaded in map. The map is shaded in respectively towards the amount of cases of COVID19 per each country. You can view the cases of each specific country on hovering over each respective country. Else, you can tell approximately how many cases there are by the shaded in color. Next, you will find a large green slider below the map. If you manipulate this slider, you can manipulate the date to see how many cases you have on a certain date. Nextly, you can view the animated choropleth by clicking on the “Play the choropleth animation” button.

Unfortunately the website is work in progress, and the stock indices portion of this project is left incomplete. There were many complications that I will list in the next section.

## Discussion/Future Work/Complications

Here, record any last thoughts on your visualization. Include any future work that you wanted to do or will do in the future. Also include any complications that you ran into. This is the opportunity for you to explain why your visualization does not match up with what you proposed or why it is broken or incomplete.

I believe I nailed the interactive choropleth, however, I feel as if I could include more information on hover of each country. I am very happy to how I was able to set up the animated portion, manual date control, after wrestling with the data to match each country from the WHO situation reports with each country, which took a massive amount of time.

Of the future work I need to do to complete this project, I need to finish the multiline graph as well as match up its animation with the choropleth. Perhaps add a third linegraph to display the rate of coronavirus cases along with a news feed of specific events in the coronavirus cases linking them to each specific peak or valley in the line chart. There were many complications having to wrestle the data from the Yahoo Finance CSV files to be workable for D3,js.

There were massive holdbacks on variable type disagreements. While I got the time scale to work for the line chart, I failed to get the stock price axis to cooperate with the numbers. There was a specific problem with converting a stock price (e.g. 23743.42) into a position on the line chart. Passing this number through the linear scale yielded a NaN (not a number). Which completely bricked the line chart.

Elsewise, I believe this project was a very nice exercise of javascript and furthered my understanding and usage of the coding language greatly along with my understanding of the syntax of d3 and logic to get all of the sliders and animations to work correctly.

## Work Cited

Stock data sources:

<https://finance.yahoo.com/quote/%5EDJI/history?p=%5EDJI>

WHO infection source:

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/>

Figure 1 & Figure 2, stock data:

Yahoo Finance Compare Feature.

Figure 1, map:

Lam Nguyen’s Tableau Project using product sales

Figure 2, map:

<https://www.businessinsider.com/coronavirus-map-for-tracking-covid-19-cases-state-country-microsoft-2020-3>