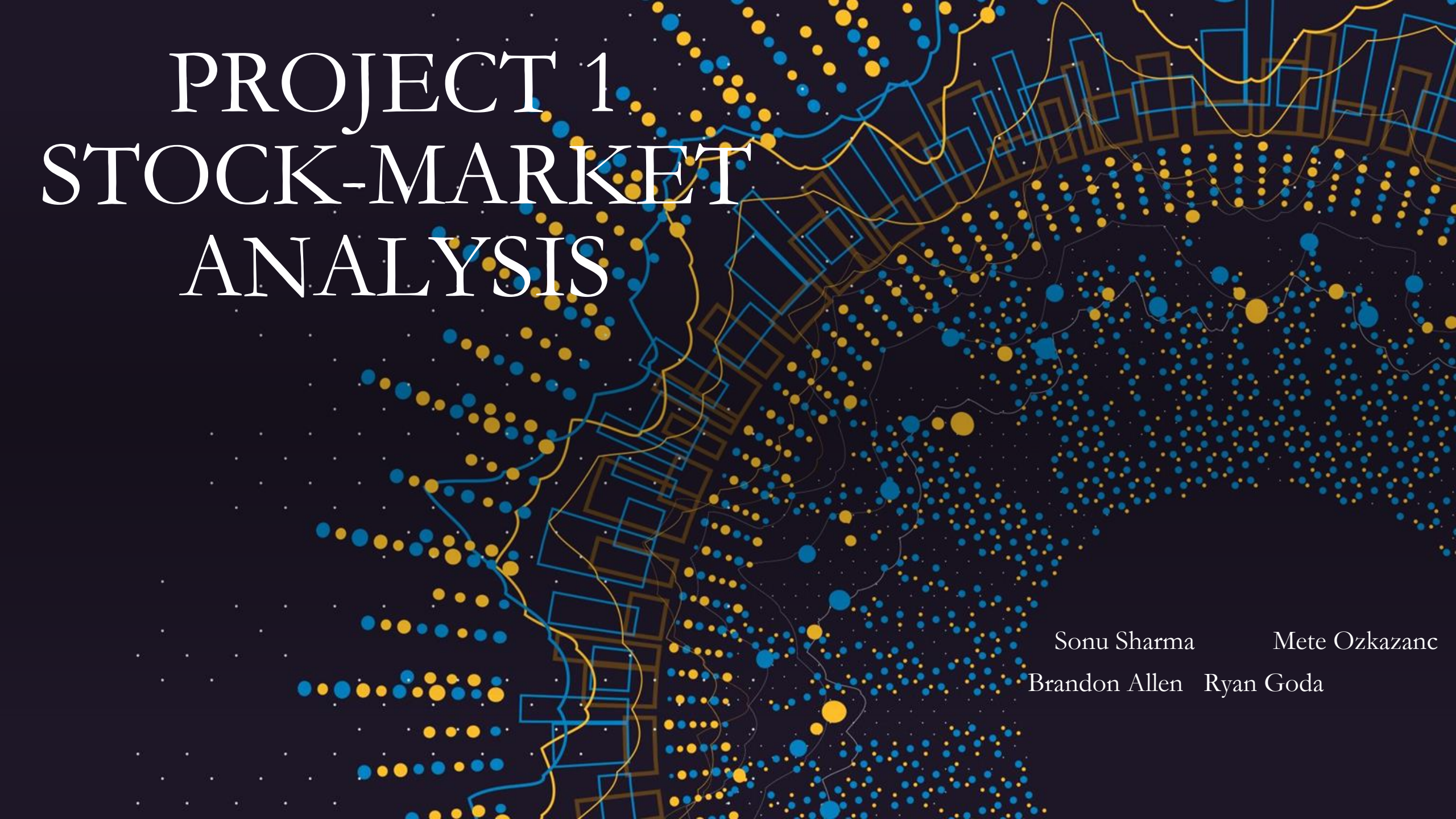
PROJECT 1
STOCK-MARKET ANALYSIS



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Introduction Summary

What type of data are we looking at and what is the timeframe of our data?

- In this project, we will be looking at a portion of NASDAQ stock data ranging from 2019 – 2024.

Where did we acquire our data?

- We acquired our CSV data set from "Yahoo-Finance" and acquired our outlier events from "Morningstar", "Google Finance", "New York Times", and "MarketWatch".

What Analysis / Plots / Time-Series information will we be running on our data?

- In this project, we utilized concatenation, forecasting, model-prediction, data cleaning, maximums, minimum, averages, correlations, to-datetime, and indexing.

Points regarding news of speculation vs. authentic news:

- When dealing with markets, it should be noted that not all news sources are accurate in their research, and many speculate news. One shouldn't make investments based on fabricated information.

Were there any expected outliers in the data?

- From our dataset, we expect outlier events to include COVID-19, Global Conflicts, and Interest Rate fluctuations.

Questions:

Understanding historical data to better forecast potential future data. (Ryan)

How do outside events impact the market: Pandemic, Wars, Interest Rates. (Sonu)

Based on data, how could one better position their trading based on prior trends, peaks, lows, etc…(Mete)

True data vs. Speculation data and how that impacts the market. (Brandon; Can speak on the API KEY and the impact this has on the data)

NQ History

NQ = NASDAQ 100: Stock Market index made up of 100 of the largest non-financial companies listed in the NASDAQ stock exchange.

- Excludes the financial companies (banks) but includes the major technology companies like Google, Amazon, Meta, etc.
- Other areas of focus besides technology are retail, biotechnology & telecommunications; however the major tech companies (magnificent 7) have the majority impact on how the index performs
- Created on January 31, 1985
- Trading products included in NQ include ETFs (QQQ & TQQQ), options, futures, etc.
- The index is a important measure to not only the American economic status, but the global landscape and primary concerns trends in tech & innovation industries

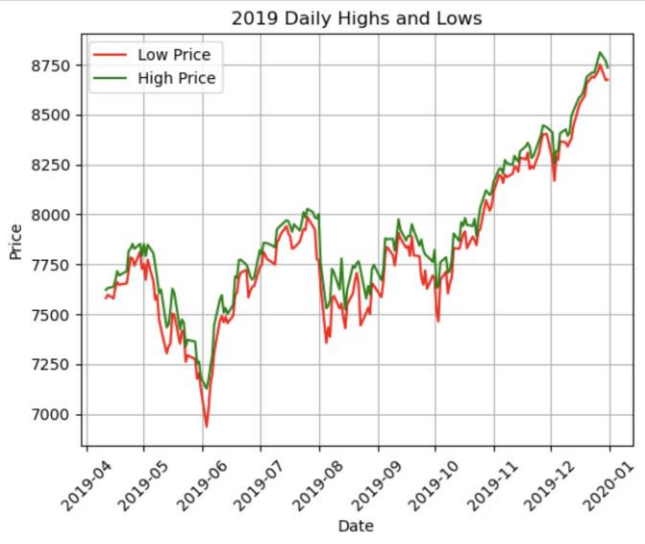
Correlating NQ with the New York Times

1. Connect to the New York Times API
   - Pull the last five years of front page headlines that relate to "United States Economy"
   - The headlines also came with between one and five additional associated keywords.
2. Compute the days with the largest Nasdaq drops and surges (largest daily deltas)
3. Combining the data, what were the headlines on a day of great change?

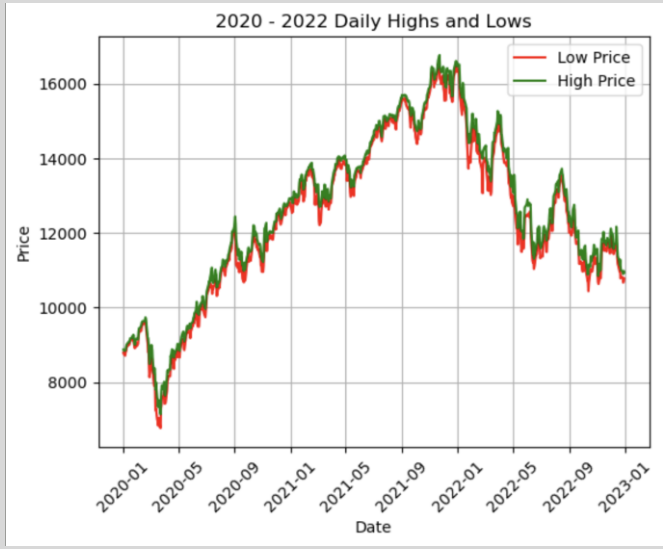
Date	Daily Change	headline
2020-02-24	-399.089844	Fears About Coronavirus Rattle World's Markets
2020-03-02	388.919921	Economists Worldwide Cut Outlook On Growth
2020-03-12	-416.420410	Beyond Bears, Markets Show Strange Signs
2020-03-12	-416.420410	Worst Rout for Wall Street Since 1987 Crash
2020-03-16	-435.059571	Trump Urges Limits as Virus Batters Economy
2020-03-16	-435.059571	Markets Plunge as Investors Fear Cataclysmic ...
2020-03-16	-435.059571	Crisis Shutting Down Commerce, Likely for Months

keywords	
Inflation (Economics)	36
Interest Rates	29
Coronavirus (2019-nCoV)	23
Recession and Depression	18
Prices (Fares, Fees and Rates)	18
United States Politics and Government	16
Banking and Financial Institutions	16
Stocks and Bonds	15
Labor and Jobs	14
Standard & Poor's 500-Stock Index	11
Wages and Salaries	11
International Trade and World Market	7
Government Bonds	6
Shutdowns (Institutional)	6
Consumer Behavior	6
Credit and Debt	6
Mortgages	5
Consumer Price Index	5
Real Estate and Housing (Residential)	5
Quarantines	5

Plots & Analysis #1:



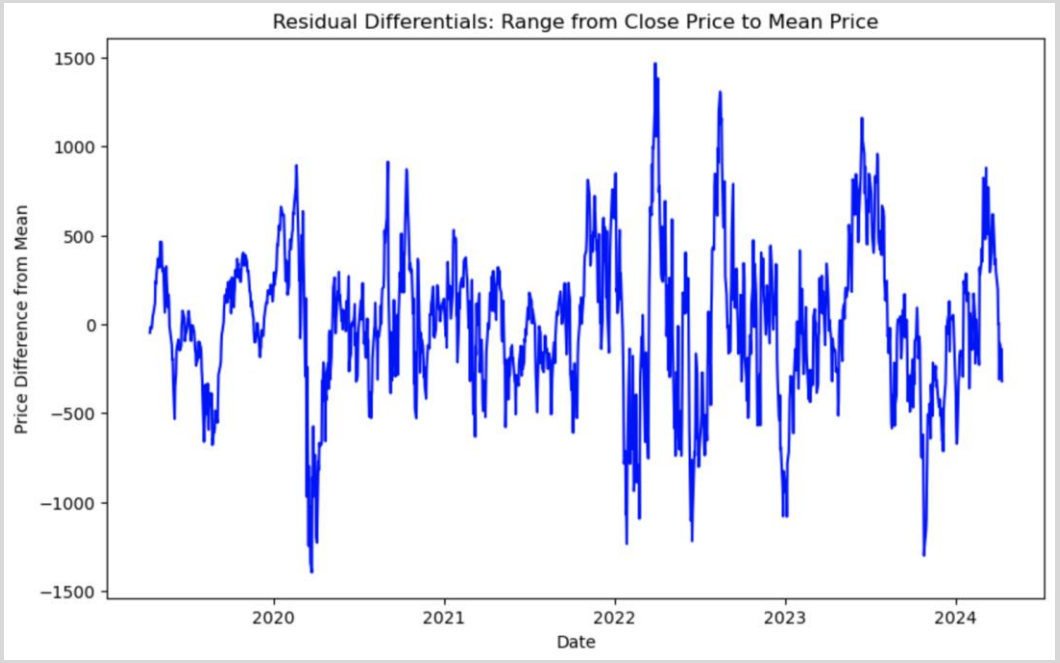
Our "2019 Daily Highs and Lows" data indicates a significant upward trend beginning in the month of October. Notably, the lowest price of all the data occurs in June.

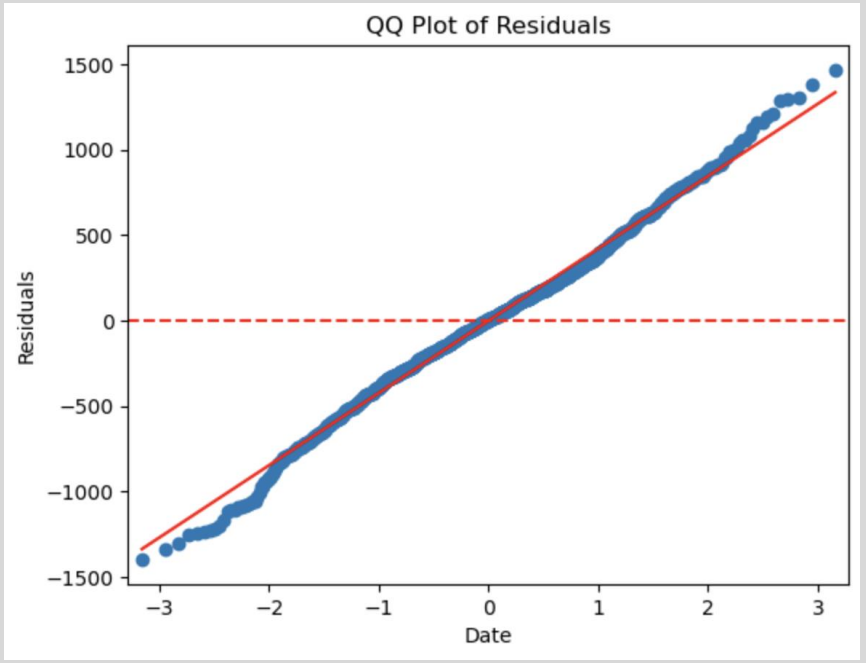


Our "2020 - 2022 Daily Highs and Lows" data continues from the 2019 data; the upward trend remaining through most of the two years. This unusual as historically, the trend upward begins in October instead of April.

Our "2022 - 2024 Daily Highs and Lows" data continues from the 2020 - 2022 data; there is now a steep downwards trend for essentially the entirety of 2022, to which the market begins recovering at the beginning of 2023 to 2024. The NASDAQ also broke an all-time high in 04/2024.

Plots and Analysis #2:





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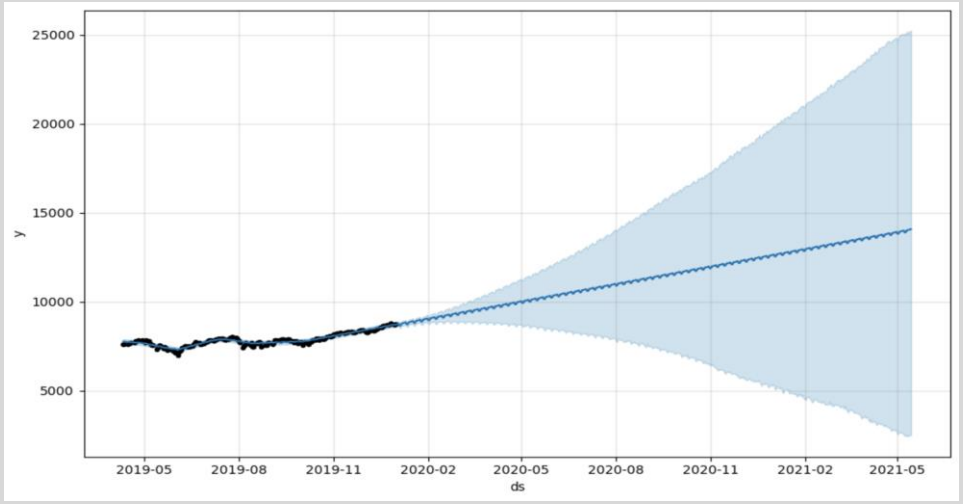
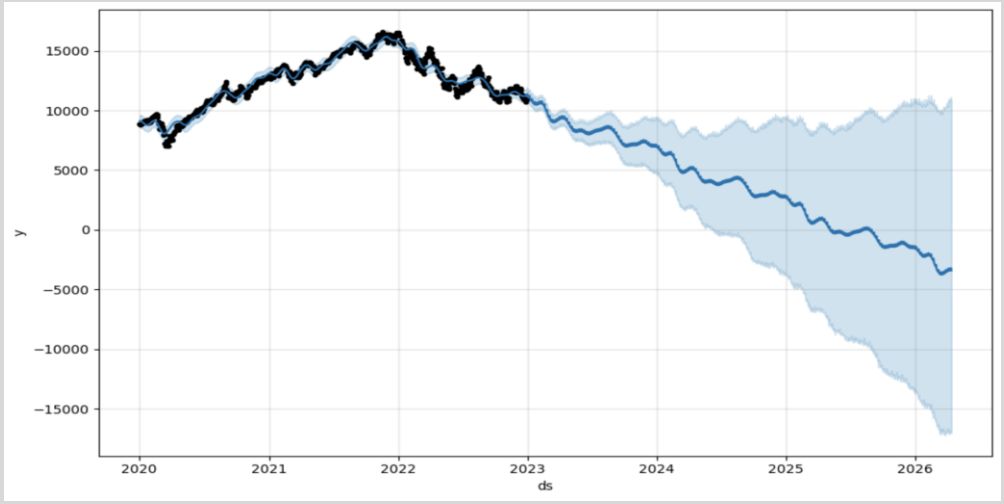
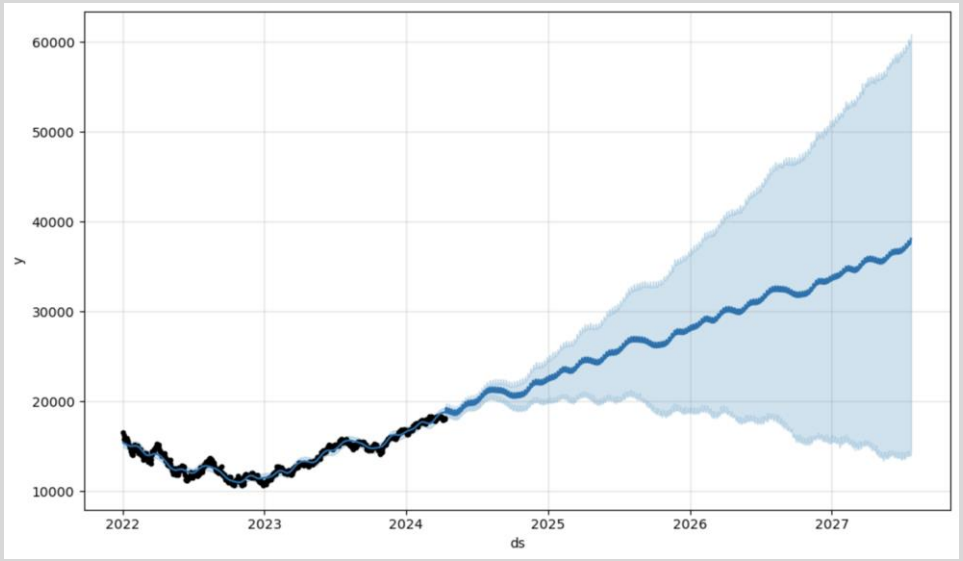
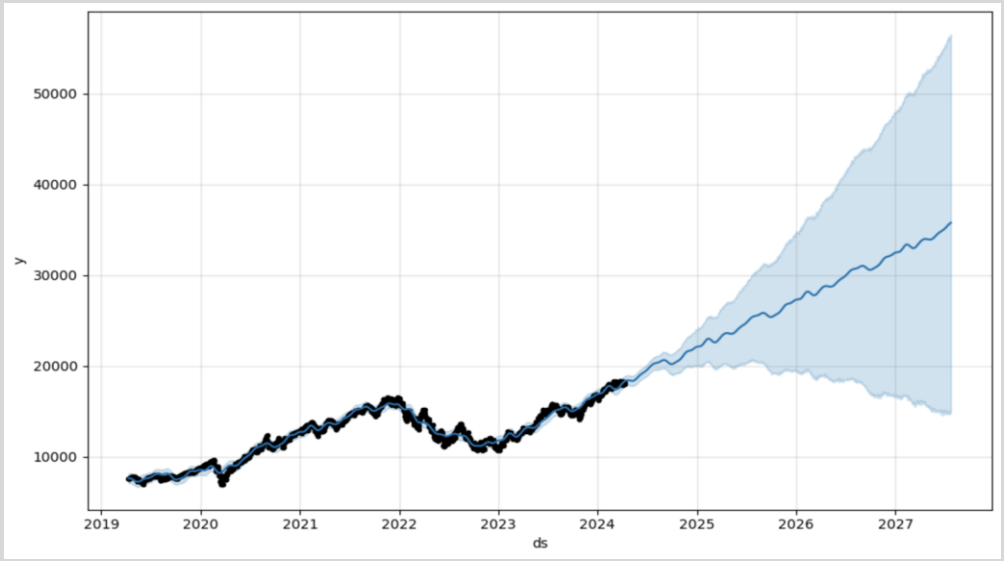


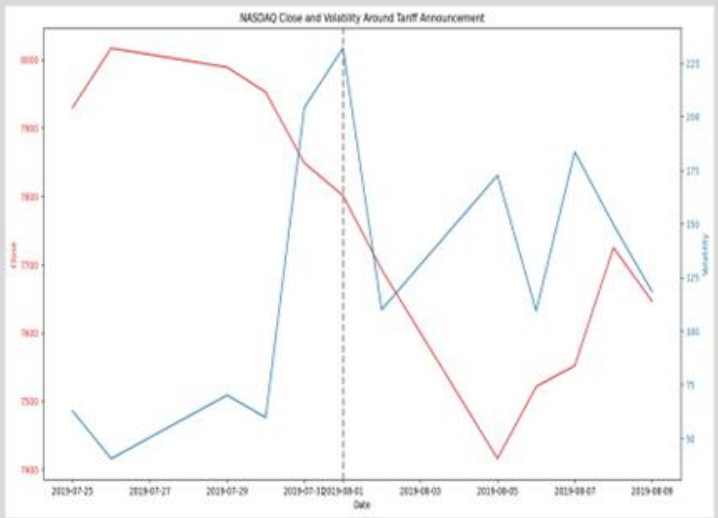


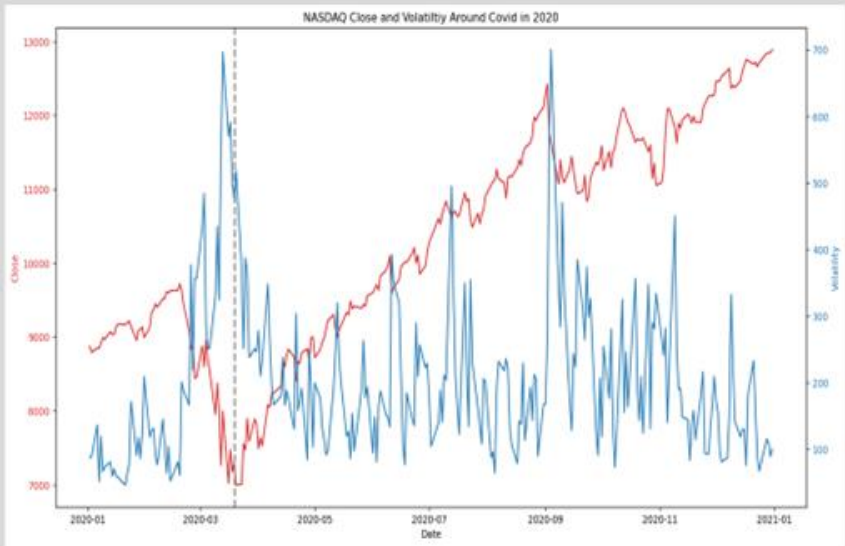


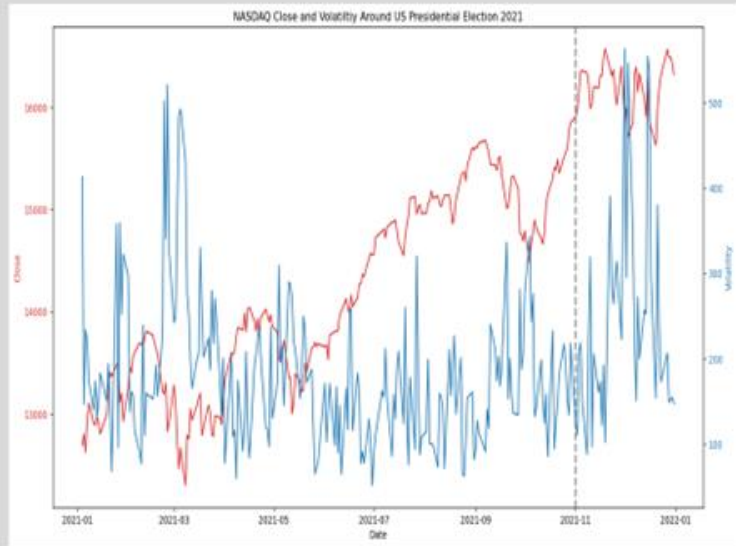


Global Market Reactions to Major Geopolitical Events: An Analysis from 2019-2024.

Example: 1. In August 2019, the U.S. announced new tariffs on Chinese goods, and China responded with tariffs on U.S. goods.
2. 2020, a period marked by the global onset and impact of COVID-19
3. the U.S. Presidential Election in November 2021







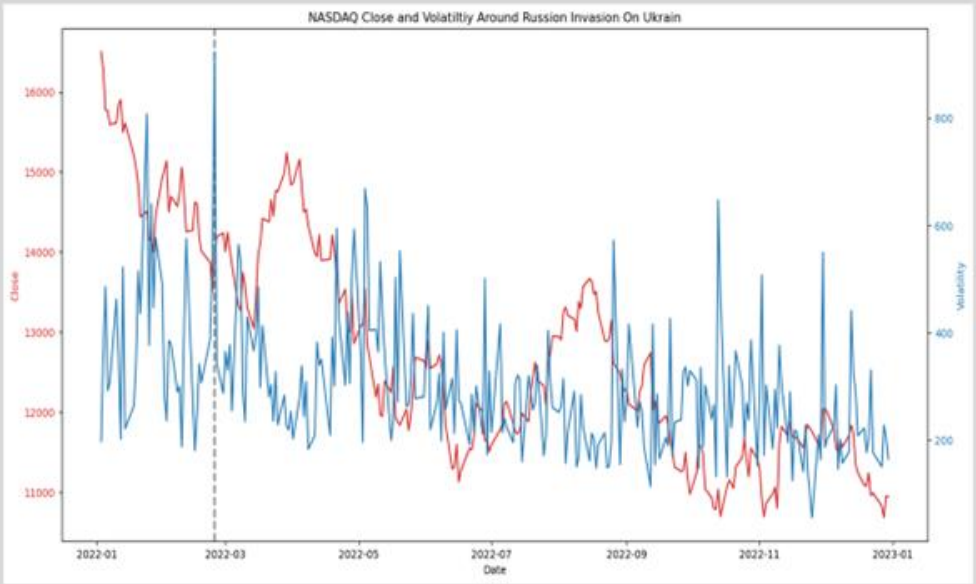
The NASDAQ graph shows a red line for closing prices sharply dropping at the tariff announcement (grey dashed line), then rebounding, while the blue volatility line spikes, indicating immediate market reaction and continued uncertainty.

The NASDAQ's performance in 2020, as depicted in the graph, illustrates the immediate and severe reaction to the onset of COVID-19, followed by a robust recovery and a return to lower levels of volatility. The market's response highlights the impact of the pandemic on investor sentiment and the overall resilience of the tech-heavy index in the face of unprecedented global health and economic crises.

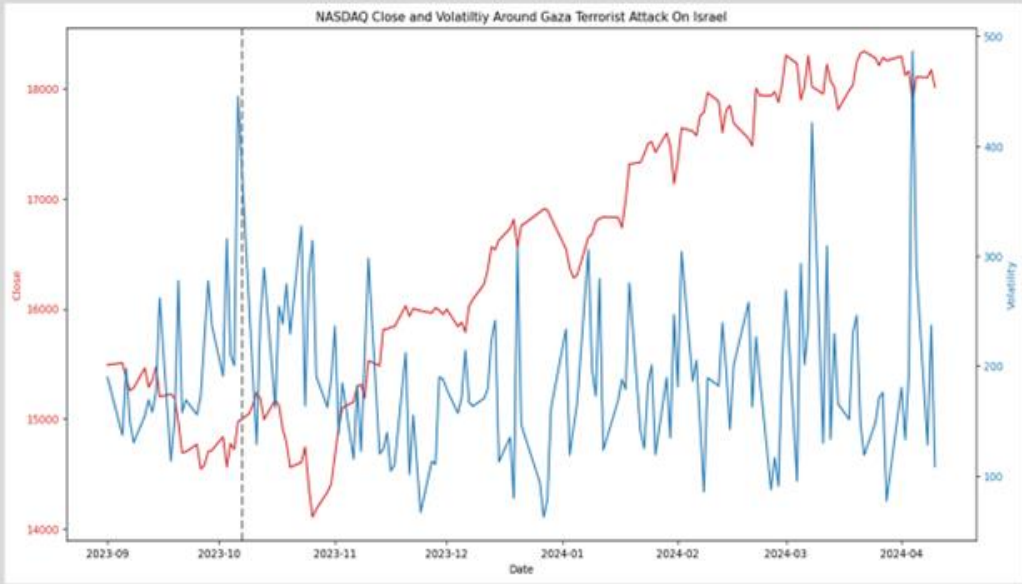
The NASDAQ's performance post-U.S. Presidential Election in 2021 highlights a typical pattern of initial market volatility due to political uncertainty, followed by a trend of adjustment and stabilization as investors gained clarity on the direction of future policies.

Global Market Reactions to Major Geopolitical Events: An Analysis from 2019-2024

Example: 4. Russian Invasion on Ukraine 2022.
5.Gaza Terrorist Attach On Israel



The NASDAQ's performance around the Gaza conflict, as shown by the dashed line, reflects a spike in market volatility without a significant corresponding drop in closing prices, suggesting a contained immediate impact on the market. The subsequent upward trend in closing prices alongside the gradual normalization of volatility indicates resilience and a market rebound from short-term geopolitical tensions..



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Implementation:

- While you can never "predict" the market, you can analyze it's prior performance to help make better educated decisions
- From our data we can see that outlier events directly correlated with unusual fluctuations in the stock market. Through our 2019 stock market information, we were able to see what a regular market looks like, in comparison to our other datasets from different years.
- For new or seasoned traders, analyzing trends (peaks/high) is vital if your a position trader; or a more hands on (day trader)
- In preparation for scenarios such as outlier events, we believe it would be best to begin by taking precautionary steps in the event something happens and placing "stop losses" on your investments. It is also important that your information gathering is from an authentic source.
- Month by month, week by week, or even day by day, comparing the highs and lows will give any trader the range they can expect and help make better decision in terms where to place their trading

Post-Evaluation:

- After evaluating our project, we are interested in further researching and developing a simple website implementing our code to which users may enter their required rates of return on investment. With this information, we would like to create a dashboard enabling the forecasts of future market predictions and comparatively evaluating their rates of required return to trends in the market based on internal factors such as "Beta = Risk Aversion" (β) through use of the security market line, and external factors such as market conditions, authentic news, and economic considerations.
- Finally, we are interested in programming the addition of "holiday-exemptions", meaning the forecasts would skip over known U.S. national holidays.

Appendix Information:

In the data, <u>what could be incorrect?</u>

- From our dataset, we believe no information to be incorrect. We do note that of all the available days; Monday – Friday, 9:30AM – 4:00PM the stock market could be open, it is not due to certain holidays. Therefore, any forecasting methods used may show a slightly misconstrued utilization rate.
- We must also ask if our dataset includes data outside of regular trading hours; which it does not.

What news outlets did we utilize to identify information that could result in outlier data?

- As previously mentioned, we created a column named "Headline" to help us and the audience identify potential reason for outlier data indications through utilizing a New York Times API Key to filter-search articles for each day pertaining to the filter "United States Economy."