

Team 3

Using News to Predict Stock Movements

This idea was inspired by the [Two Sigma Kaggle Challenge](#). However, the original dataset has been removed from the platform, so we've devised alternative methods to gather relevant data from the internet as outlined below.

Link and description of the dataset

[Quandl Quotemedia End of Day US Stock Prices](#)

```
ndl.export_table('QUOTEMEDIA/PRICES', date = { 'gte': start_date, 'lte': end_date },  
ticker = tic, filename='data/QM_PRICES.zip', api_key = api)
```

[Yahoo Finance](#)

```
import yfinance as yf  
yf.download(ticker, start=start_date, end=end_date, interval='1m')
```

Description:

Professional-grade EOD stock prices, dividends, adjustments, and splits for publicly-traded US stocks. Including columns for opening price, closing price, trading volume, etc.

[Finviz News](#)

```
Request(url='https://finviz.com/quote.ashx?t='+ ticker, headers={'User-Agent':  
'Mozilla/5.0 (Windows NT 6.1; WOW64; rv:20.0) Gecko/20100101 Firefox/20.0'})
```

Description: contains information about news articles/alerts published about assets, such as article details, sentiment, and other commentary.

Overview of an industry, business, or problem

Investment firms have been employing technology and data science to predict financial market trends for many years. In this era of readily available data, investors can make informed decisions.

Define the specific problem that should be solved

Can we use the content of news analytics to predict stock price performance? The ubiquity of data today enables investors at any scale to make better investment decisions.

Why does this problem matter?

The ability to analyze news data for **predicting stock market movements** presents a unique avenue to advance research in deciphering the predictive power of news. If leveraged correctly, this could **aid in forecasting financial outcomes**, thereby having a substantial economic impact globally. The potential benefits of this predictive power could revolutionize the way investors, large and small, make decisions.

Papers related to this problem:

- [Sentiment correlation in financial news networks and associated market movements](#)
 - News articles from Reuters,
 - Use deep learning to extract company names from the articles → choose 87 companies
 - Something about creating a network of the companies with some model (each node is a company, and the edge weights are the similarity of the nodes)
 - Assign sentiment value -1 to 1 for each company across 6 years
 - Market data: use **cumulative abnormal return (CAR)**
 - “Generally speaking, positive sentiment promotes upward price movements whereas negative one promotes price declines and as a result both types of events elicit elevation in volatility”
- [Stock Trend Prediction Using News Sentiment Analysis](#)
- [Revisiting the use of web search data for stock market movements](#)

Process/Methodology

We will leverage the powerful capabilities of the BeautifulSoup package, a Python library for web scraping, to extract financial news headlines from Yahoo Finance. This package allows us to navigate and parse the HTML structure of the web pages, enabling efficient extraction of relevant textual information.

Once we have obtained the **financial news headlines**, we will apply advanced Natural Language Processing (**NLP**) techniques to perform **sentiment analysis**. NLP involves using algorithms and statistical models to understand and interpret human language. In our case, we will use NLP to analyze the sentiment expressed in the financial news articles. By determining whether the sentiment is **positive, negative, or neutral**, we can gain insights into market sentiment and investor sentiment towards specific stocks or financial events. NLTK

The sentiment analysis results will serve as **new variables** in our predictive model for the **stock market**. Combined with other return factors, such as **historical stock prices, trading volumes, and financial indicators**, we will **build a comprehensive model** to forecast stock market movements. By incorporating sentiment analysis, we aim to **capture the impact of market sentiment on stock price fluctuations and enhance the accuracy of our predictions**.

Overall, this data science project will harness the capabilities of web scraping, NLP, and predictive modeling to provide valuable insights into the stock market by leveraging financial news sentiment analysis as a crucial component of our predictive framework.