



ECE 180 Project: Social Effects on Company Stocks

Team Members

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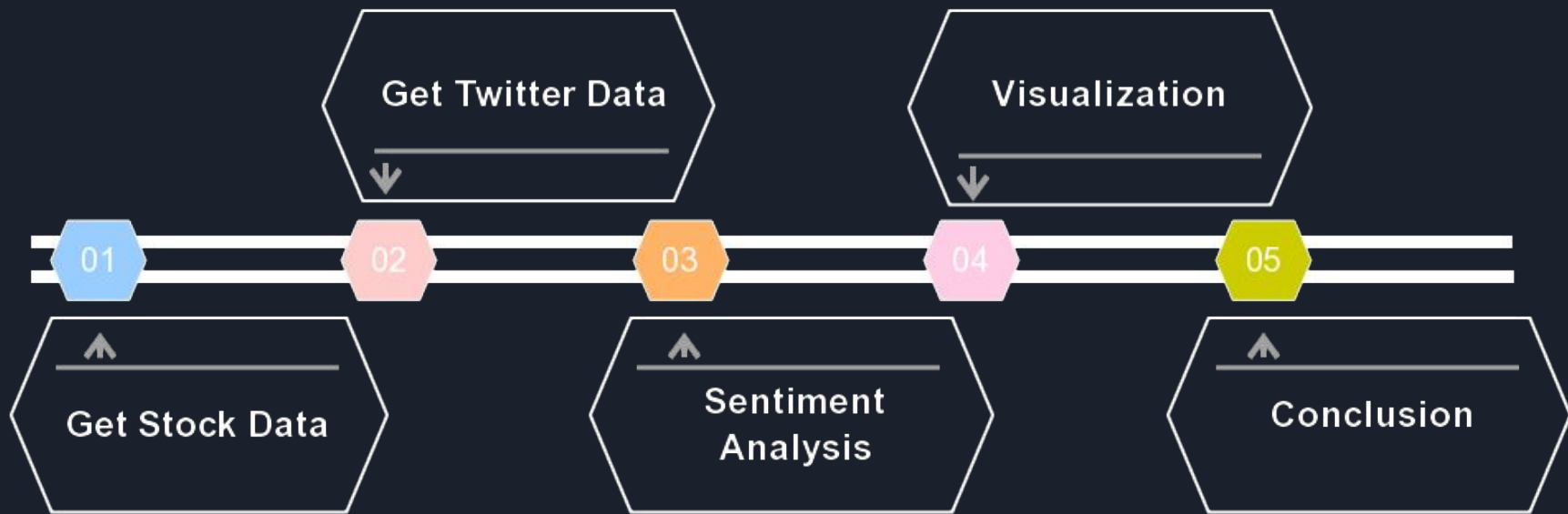
Motivation

- The goal of this project was to analyze positive and negative statements posted on twitter and comparing them to effects they could have on the stock market

Key Events:

- 1. **Snapchat** stock loses \$1.3 billion after Kylie Jenner tweet (Feb 21, 2018)
- 2. Elon Musk Sent His **Tesla** to Space (Feb 6, 2018)
- 3. **United Airlines** scandal, beat passenger (April 9, 2017)

Pipeline





Packages

Get Stock Data: `googlefinance-client-python`

Get Twitter Data: `Get-Old-Tweets`

Get Sentiment Data: `VADER-Sentiment-Analysis`

Process and Plot Data: `Matplotlib`, `Pandas`, `Numpy`.



Stock Data - I

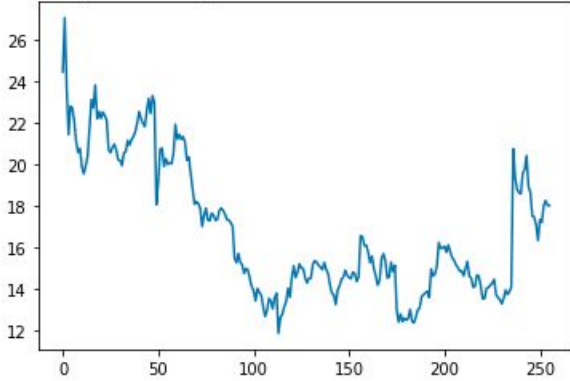
Used package “googlefinance-client-python” to get past five years per day basis stock data from Snapchat, Tesla, United Airlines.

Why this package: Use Google hidden API, avoid restriction.

	Open	High	Low	Close	Volume
2013-03-04 13:00:00	27.22	28.98	27.22	28.82	6305746
2013-03-05 13:00:00	28.89	29.87	28.84	29.55	7647808

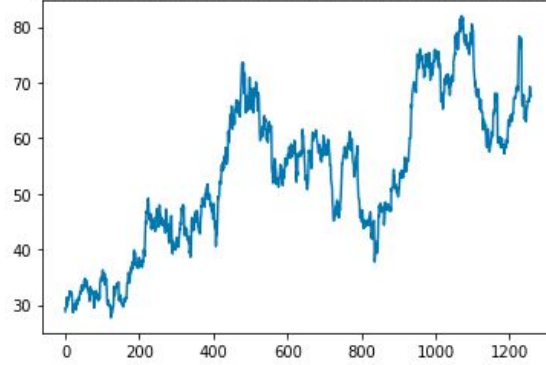
Stock Data - II

Snapchat stock price from 2017-03-02 to 2018-03-07



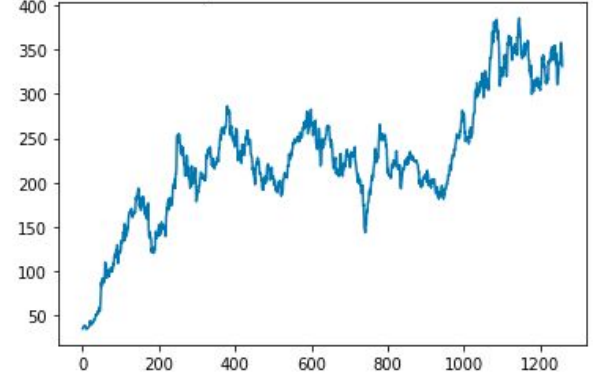
Snapchat

United Airlines stock price from 2013-03-04 to 2018-03-01



United Airlines

Tesla stock price from 2013-03-13 to 2018-03-01



Tesla

Leveraging Twitter Advanced Search

Twitter, Inc. (US) | <https://twitter.com/search?l=&q=United Airlines&src=typd&lang=en>

Problem

- Restrictions on Twitter API

Solution

- Twitter Advanced Search
- Building the Query
- Search Options Availability

Advanced search

Words

All of these words

This exact phrase

Any of these words

None of these words

These hashtags

Written in

All languages

People

From these accounts

To these accounts

Mentioning these accounts

Places

Near this place

[Add location](#)

Dates

From this date

to

Search

Creating Requests and Handling the Response

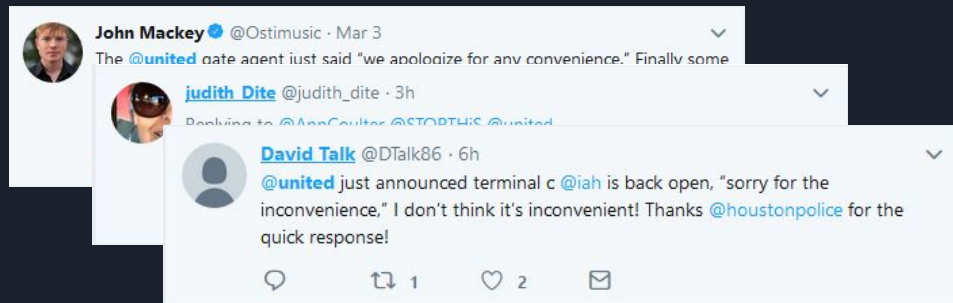
- Scrolling down on the timeline
- Getting all the available Tweets, a page at a time

```
https://twitter.com/i/search/timeline?f=tweets&q=%20UnitedAirlines&src=typd&max_position=
https://twitter.com/i/search/timeline?f=tweets&q=%20UnitedAirlines&src=typd&max_position=TWEET-971649831532941313-971660154713370624
https://twitter.com/i/search/timeline?f=tweets&q=%20UnitedAirlines&src=typd&max_position=TWEET-971637063589142528-971660154713370624
https://twitter.com/i/search/timeline?f=tweets&q=%20UnitedAirlines&src=typd&max_position=TWEET-971609516654575616-971660154713370624
https://twitter.com/i/search/timeline?f=tweets&q=%20UnitedAirlines&src=typd&max_position=TWEET-971593417695182848-971660154713370624
https://twitter.com/i/search/timeline?f=tweets&q=%20UnitedAirlines&src=typd&max_position=TWEET-971578083332558848-971660154713370624
https://twitter.com/i/search/timeline?f=tweets&q=%20UnitedAirlines&src=typd&max_position=TWEET-971566620320595968-971660154713370624
Search Query: {'maxTweets': 100, 'within': '15mi', 'querySearch': 'UnitedAirlines'}
```

```
<div class="js-tweet-text-container">
  <p class="TweetTextSize js-tweet-text tweet-text" data-aria-label-part="0" lang="en">
    Unbelievable we have to do an emergency landing in UTAH on way to Seattle
    <a class="twitter-atreply pretty-link js-nav" href="/united" dir="ltr" data-mentioned-user-id="260907612">united</a>
    we have a very sick woman on plane my mom
    <a class="twitter-atreply pretty-link js-nav" href="/NiniTravolta" dir="ltr" data-mentioned-user-id="373505369">NiniTravolta</a>
    <s>@</s>
    <b>NiniTravolta</b>
    </a>
    and a doctor are treating her now. This is surreal. Praying.
  </p>
</div>
```


Modeling the Tweet for Analysis

- Parsing the content
- Tweet Model
- Using Generators vs The Standard Method



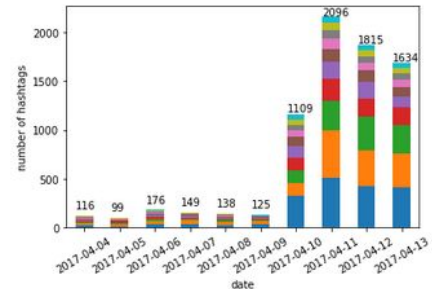
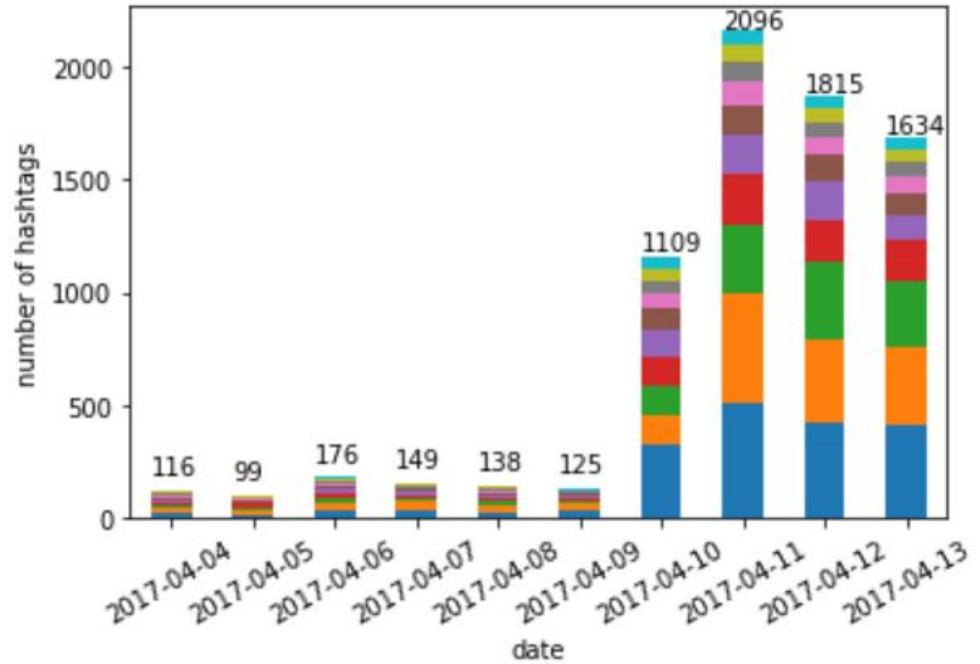
```
<div class="ProfileTweet-action ProfileTweet-action--retweet js-toggleState js-toggleKt">
  <button class="ProfileTweet-actionButton js-actionButton js-actionRetweet" data-modal="ProfileTweet-retweet" type="button" aria-describedby="profile-tweet-action-retweet-count-aria-971516400111112193">
    <div class="IconContainer js-tooltip" title="Retweet">
      <img alt="Retweet icon" data-bbox="365 605 375 615"/>
    </div>
    <span class="ProfileTweet-actionCount">
      <span class="ProfileTweet-actionCountForPresentation" aria-hidden="true">2</span>
    </span>
  </button>
  <div class="content">
    <div class="stream-item-header">
      <div class="js-tweet-text-container">
        <p class="TweetTextSize js-tweet-text tweet-text" data-aria-label-part="0" lang="en">
          The captain of my
          <a class="twitter-atreply pretty-link js-nav" href="/united" dir="ltr" data-mentioned-user-id="260907612">@united</a>
          flight today handed us his card as we boarded. Talk about taking leadership and responsibility for his service before we even take off. He then went on to praise his crew's expertise and skill. Now that's how it's done.
          <a class="twitter-hashtag pretty-link js-nav" href="/hashtag/leadership?src=hash" data-query-source="hashtag_click" dir="ltr">#leadership</a>
          <a class="twitter-hashtag pretty-link js-nav" href="/hashtag/friendlyskies?src=hash" data-query-source="hashtag_click" dir="ltr">#friendlyskies</a>
        </p>
      </div>
    </div>
    <div class="stream-item-footer">

```

Hashtags

United Airlines Top 10 Tweets
+ Counts per Day

- Hashtag Distribution
- Trendwatching
- Huge increase in hashtag volume
- Reveals interesting hashtags (#BoycottUnited, #flight3411, #UnitedAirlinesAssault)



[{"2017-04-04", "uoff2017", 21}, {"2017-04-04", "uoffer", 21}, {"2017-04-04", "unitedAIRLINES", 14}, {"2017-04-04", "uUnitedAirlines", 14}, {"2017-04-04", "uUnitedatHispanicize", 10}, {"2017-04-04", "uSocialMedia", 10}, {"2017-04-04", "UnitedAirlines", 10}, {"2017-04-04", "utrael", 9}, {"2017-04-04", "uunitedairlines", 7}, {"2017-04-04", "Hiszp17", 6}, {"2017-04-05", "uUnitedAirlines", 17}, {"2017-04-05", "uoff2017", 16}, {"2017-04-05", "uoffer", 16}, {"2017-04-05", "unitedAIRLINES", 14}, {"2017-04-05", "uSocialMedia", 9}, {"2017-04-05", "uunitedairlines", 9}, {"2017-04-05", "UIRP", 7}, {"2017-04-05", "uAirlines", 6}, {"2017-04-05", "uunitedairlines", 5}, {"2017-04-05", "UnitedAirlines", 5}, {"2017-04-06", "uoff2017", 32}, {"2017-04-06", "uoffer", 32}, {"2017-04-06", "uyyz", 24}, {"2017-04-06", "uUnitedAirlines", 24}, {"2017-04-06", "Hiszp17", 15}, {"2017-04-06", "unitedAIRLINES", 14}, {"2017-04-06", "UnitedatHispanicize", 13}, {"2017-04-06", "UnitedAirlines", 11}, {"2017-04-06", "uSocialMedia", 11}, {"2017-04-06", "uUA547", 11}, {"2017-04-07", "uoff2017", 37}, {"2017-04-07", "uoffer", 37}, {"2017-04-07", "UnitedAirlines", 15}, {"2017-04-07", "uUnitedAirlines", 15}, {"2017-04-07", "utrael", 14}, {"2017-04-07", "unitedAIRLINES", 9}, {"2017-04-07", "uSocialMedia", 8}, {"2017-04-07", "united", 7}, {"2017-04-07", "neveragain", 7}, {"2017-04-07", "BringmemyStella", 7}, {"2017-04-08", "uoff2017", 29}, {"2017-04-08", "uoffer", 29}, {"2017-04-08", "unitedAIRLINES", 16}, {"2017-04-08", "UnitedAirlines", 13}, {"2017-04-08", "uunitedairlines", 13}, {"2017-04-08", "uAirlines", 12}, {"2017-04-08", "uunitedairlines", 11}, {"2017-04-08", "travel", 8}, {"2017-04-08", "utrael", 7}, {"2017-04-08", "fail", 6}, {"2017-04-09", "uoff2017", 33}, {"2017-04-09", "uoffer", 33}, {"2017-04-09", "UnitedAirlines", 15}, {"2017-04-09", "unitedAIRLINES", 9}, {"2017-04-09", "uunitedairlines", 9}, {"2017-04-09", "travel", 8}, {"2017-04-09", "united", 7}, {"2017-04-09", "utrael", 7}, {"2017-04-09", "stroopwafel", 4}, {"2017-04-09", "uUnitedAirlines", 4}, {"2017-04-10", "unitedAIRLINES", 330}, {"2017-04-10", "UnitedAirlines", 130}, {"2017-04-10", "United", 128}, {"2017-04-10", "uunitedAIRLINES", 125}, {"2017-04-10", "united", 124}, {"2017-04-10", "uUnitedAirlines", 94}, {"2017-04-10", "BoycottUnited", 69}, {"2017-04-10", "flight3411", 56}, {"2017-04-10", "BoycottUnitedAirlines", 53}, {"2017-04-10", "BoycottUnited", 48}, {"2017-04-11", "unitedAIRLINES", 505}, {"2017-04-11", "UnitedAirlines", 492}, {"2017-04-11", "uUnitedAirlines", 306}, {"2017-04-11", "uunitedAIRLINES", 223}, {"2017-04-11", "uBoycottUnitedAirlines", 171}, {"2017-04-11", "BoycottUnitedAirlines", 120}, {"2017-04-11", "uunitedairlines", 112}, {"2017-04-11", "NewUnitedAirlinesMottos", 85}, {"2017-04-11", "ucnnbrk", 72}, {"2017-04-11", "united", 69}, {"2017-04-12", "unitedAIRLINES", 429}, {"2017-04-12", "UnitedAirlines", 360}, {"2017-04-12", "uUnitedAirlines", 346}, {"2017-04-12", "uunitedAIRLINES", 185}, {"2017-04-12", "uunitedairlines", 174}, {"2017-04-12", "uBoycottUnited", 120}, {"2017-04-12", "BoycottUnitedAirlines", 73}, {"2017-04-12", "united", 65}, {"2017-04-12", "uunitedairlines", 63}, {"2017-04-12", "uUnited", 63}, {"2017-04-13", "uUnitedAirlines", 418}, {"2017-04-13", "unitedAIRLINES", 341}, {"2017-04-13", "UnitedAirlines", 292}, {"2017-04-13", "uunitedAIRLINES", 183}, {"2017-04-13", "uunitedairlines", 104}, {"2017-04-13", "uBoycottUnitedAirlines", 99}, {"2017-04-13", "united", 76}, {"2017-04-13", "uUnited", 64}, {"2017-04-13", "UnitedAirlinesAssault", 57}, {"2017-04-13", "uunited", 53}]



Sentiment Analysis

Used 'VADER-Sentiment-Analysis' package to get sentiment data five days before and after the key events for each single tweet we got.

Why this package: 1. Designed to analyze Twitter. 2. Source paper cited over 300 times according to Google Scholar.

negative	neutral	positive	compound
0.52	0.224	0.256	-0.7096
0.227	0.455	0.318	0.3818

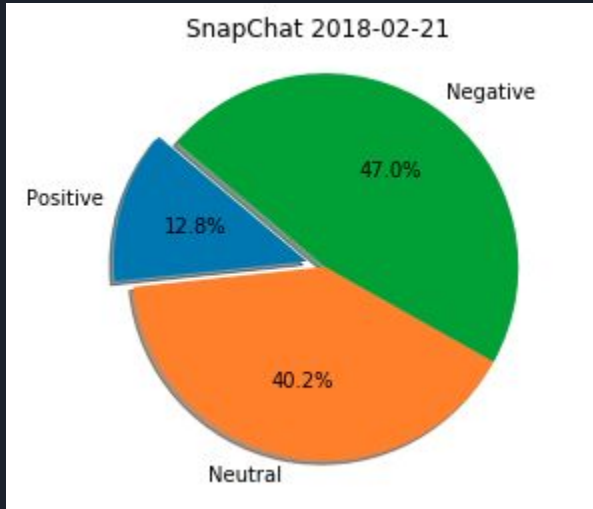
Each parameter range from -1 to 1.

Results - Sentiment Analysis

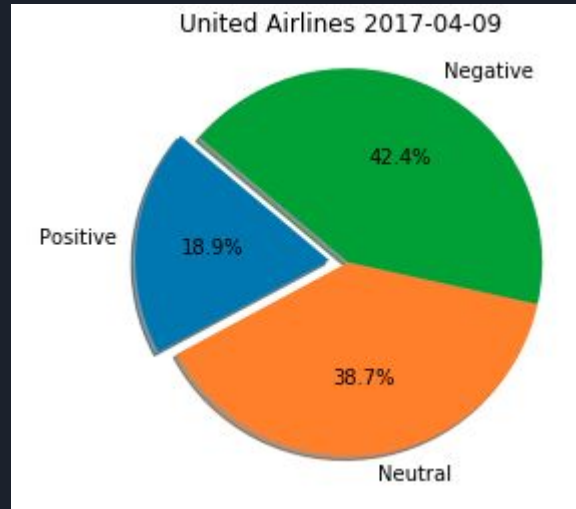
Compound < -.5 → Negative: Green

Compound > +.5 → Positive: Blue

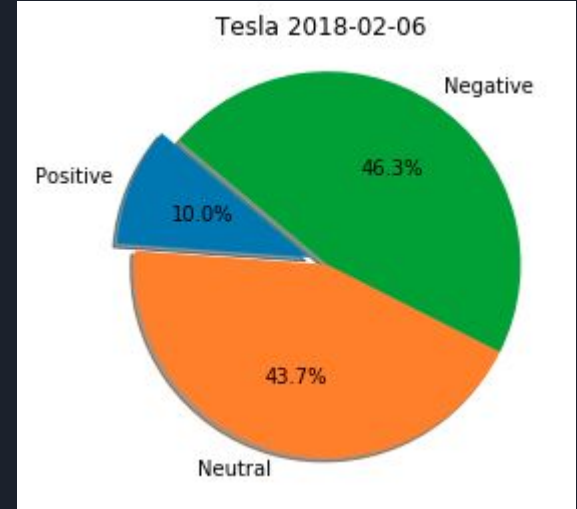
Sentiment analysis on Key Events Day



Snapchat

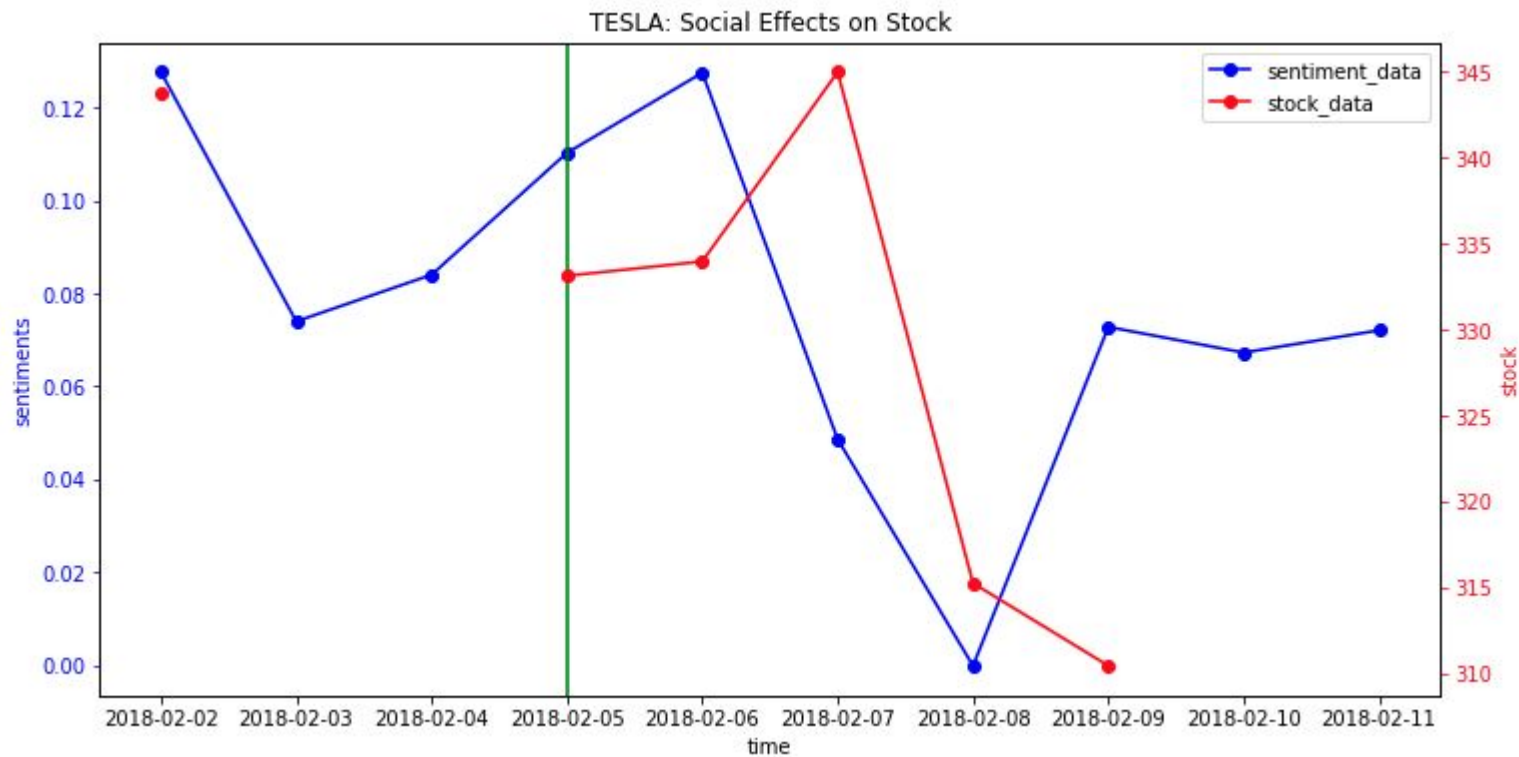


United Airlines

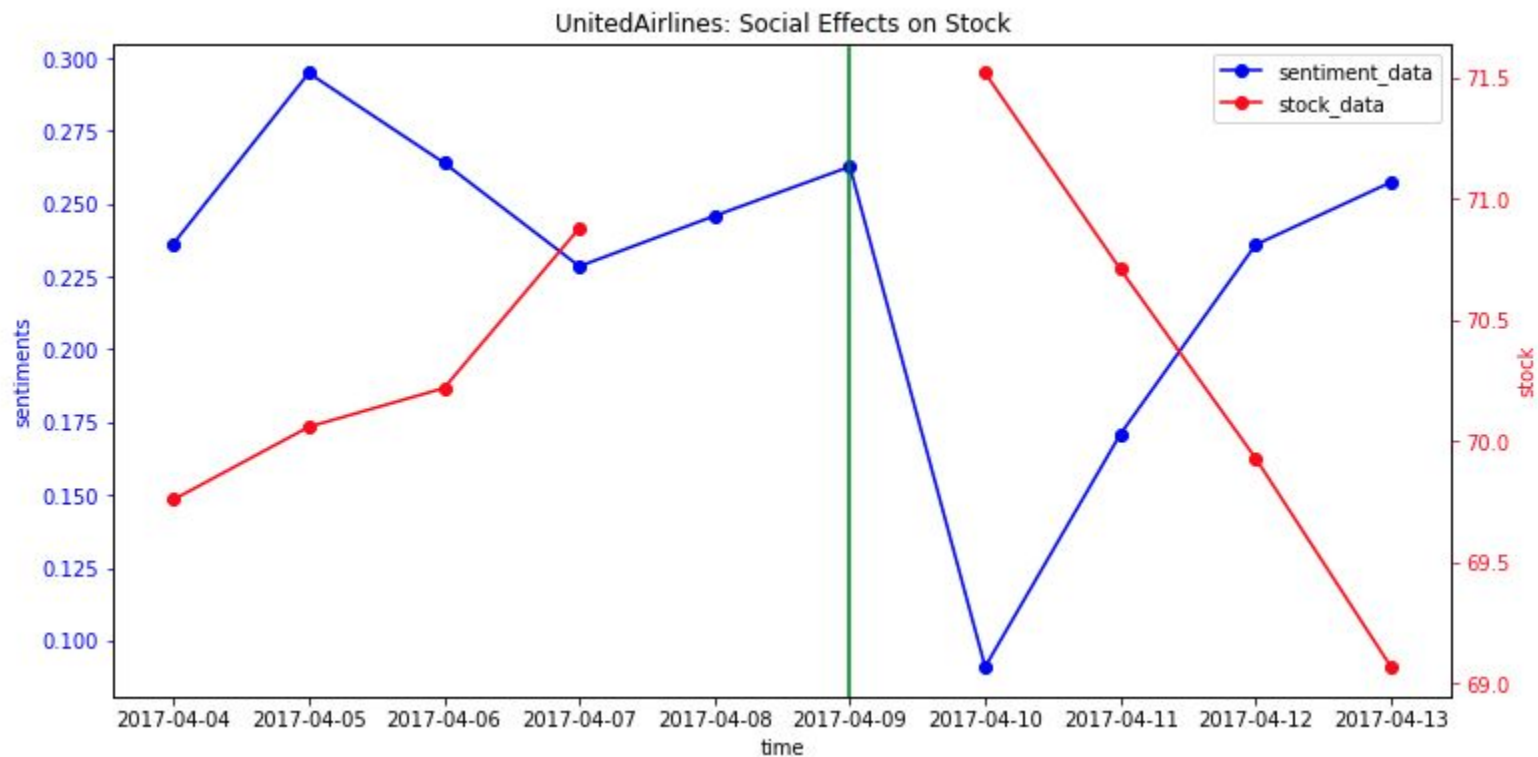


Tesla

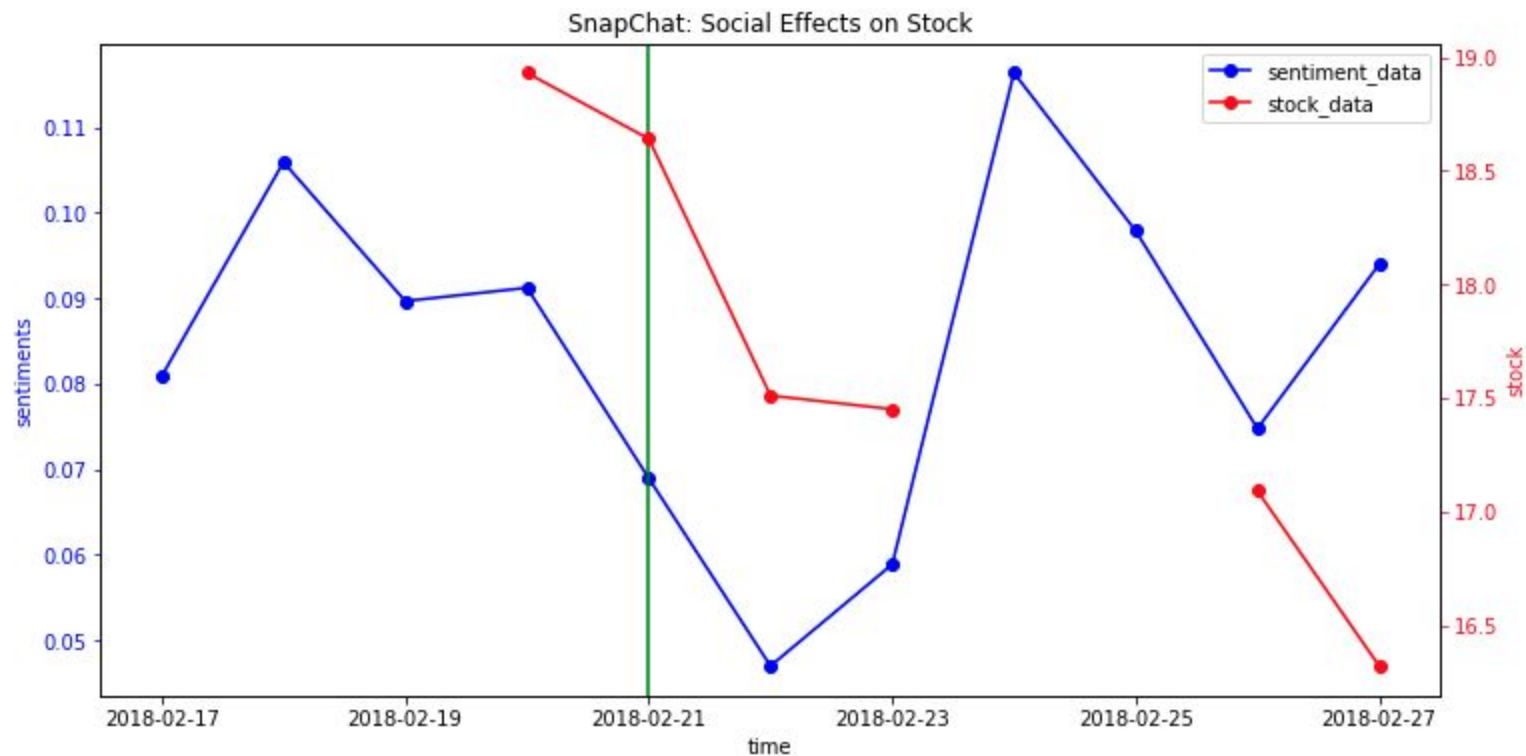
Results - Visualization (Stock, Sentiment)



Tesla: Red-- Stock, Blue-- Sentiment



United Airlines: Red-- Stock, Blue-- Sentiment



Snapchat: Red-- Stock, Blue-- Sentiment



Conclusion

Successfully predict the social media effect on stock market. The stock price dropped after negative tweet increased.

Limitations:

- Twitter Crawler: Due to slow response from Twitter, it takes hours to get data on a single company.
- Sentiment Analysis: Could use more data



Thank You



Appendix: Interested data

1. Snapchat: From 2018-02-21 to 2018-03-02. (Feb 21, 2018 Snapchat stock loses \$1.3 billion after Kylie Jenner tweet)
2. Tesla: From 2018-02-02 to 2018-02-11. (Feb 6, 2018, SpaceX sent a Tesla Roadster to space)
3. United Airlines: From 2017-04-04 to 2017-04-14 . (April 9, 2017 United Airlines scandal, beat passenger)