2022

Stock vs Sentiment

An analysis of company success as a function of public sentiment

2022

WHOA!

jgrajales@wesleyan.edu

Majors: Astronomy and Computer Science

TABLE OF CONTENTS

01 **Relevance**
Review of motivating factors

02 **Procedure and Data Analysis**
Consideration of the variables and datasets

03 **Spotlights**
A closer look at significant events extensively covered in the media

04 **Conclusion and Improvements**
Future developments for greater insight

2022

01

Relevance

Review of motivating factors

2022

“It is not the strongest of the species that survives, nor the most intelligent. It is the one that is most adaptable to change.”

—Charles Darwin

Motivating Factors

COVID-19

Analyze the impact pandemic had on tech

Corporate Response

Efficacy of responses

Public Needs

Reflection of public interests and values

Future Success

Implications on emerging tech

Restructuring Status Quo

Long-term Covid induced changes

Companies

SAMSUNG

zoom

2022

02

Procedure and Data Analysis

Consideration of the variables and datasets

PROJECT AND STRATEGY DEFINITION

- Linear Regression on Stock Price as a function of public sentiment
- Use tweets as a proxy for public perception and perform sentiment analysis

Procedure

STEPS	WEEK 1	2	3	4	5	6	7	8	9	10	11	12
1. Twitter Developer Access												
2. Explore text analysis packages												
3. Library Tutorials												
4. Gather tweets by period and per company												
5. Perform text analysis												
6. Gather stock data												
7. Regressions and Case Studies												
8. Present												

2 Weeks

3 Weeks

Data Analysis - Deep Dive

Text Analysis

Textblob + re + WordCloud

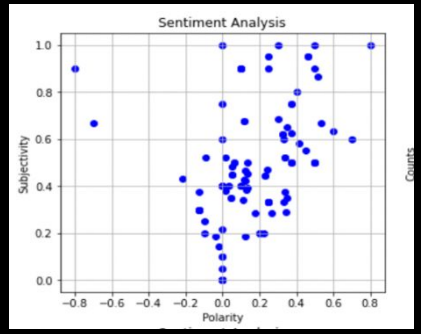
Stock Data

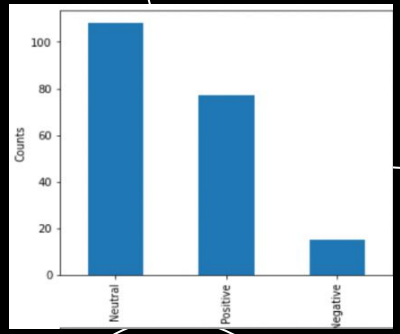
Merge data sets per period
→ Observe stock over time

Regression

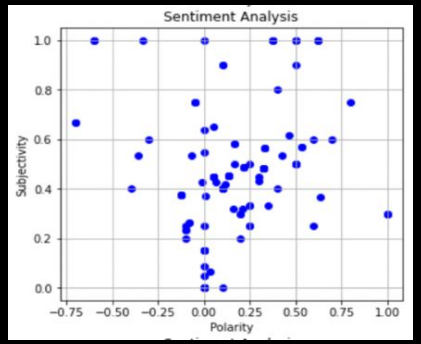
Stock ~ sentiment score

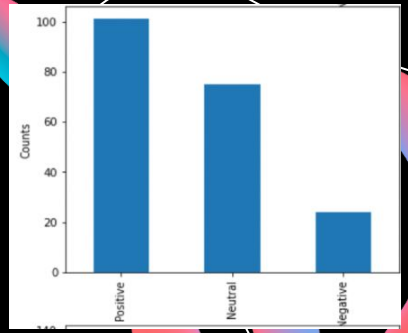
October 2019



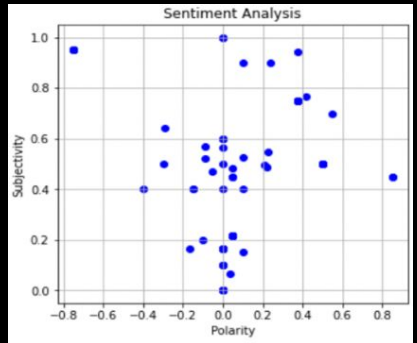


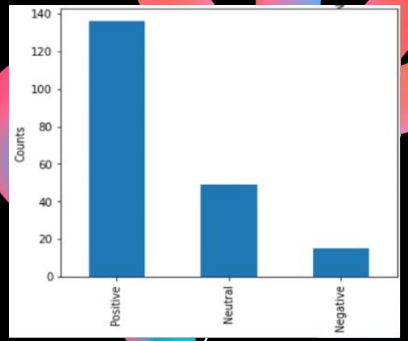
October 2020





December 2021





Regression

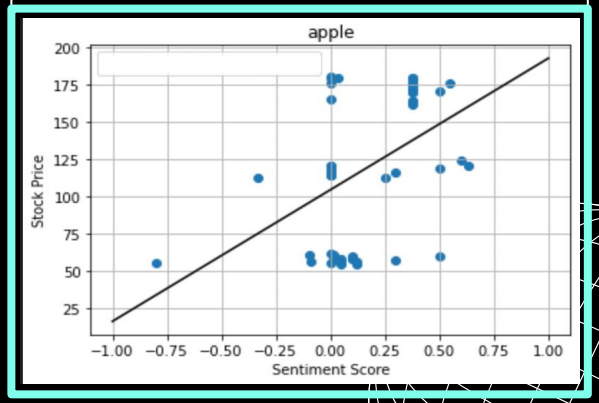
Is Apple Stock Price related to Public Sentiment?

Yes.

Dataset

	d$text	All Stock	Date	Tweets	Subjectivity	Polarity	Analysis
0	@DOB_INC @Soren_Ltd we also have a worthless p...	56.147499	2019-10-01	_INC _Ltd we also have a worthless podcast	0.900000	-0.800000	Negative
1	Apple Inc. (AAPL) surprised the market with Q2...	54.740002	2019-10-02	Apple Inc. (AAPL) surprised the market with Q2...	0.450000	0.050000	Positive
2	Apple Inc. (AAPL) surprised the market with Q1...	55.205002	2019-10-03	Apple Inc. (AAPL) surprised the market with Q1...	0.677273	0.118182	Positive
3	Apple Inc. (AAPL) surprised the market with Q2...	56.752499	2019-10-04	Apple Inc. (AAPL) surprised the market with Q2...	0.450000	0.050000	Positive
4	Apple Inc. (AAPL) surprised the market with Q2...	56.764999	2019-10-07	Apple Inc. (AAPL) surprised the market with Q2...	0.677273	0.118182	Positive
5	Apple Inc. (AAPL) surprised the market with Q2...	56.099998	2019-10-08	Apple Inc. (AAPL) surprised the market with Q2...	0.750000	0.000000	Neutral

Model



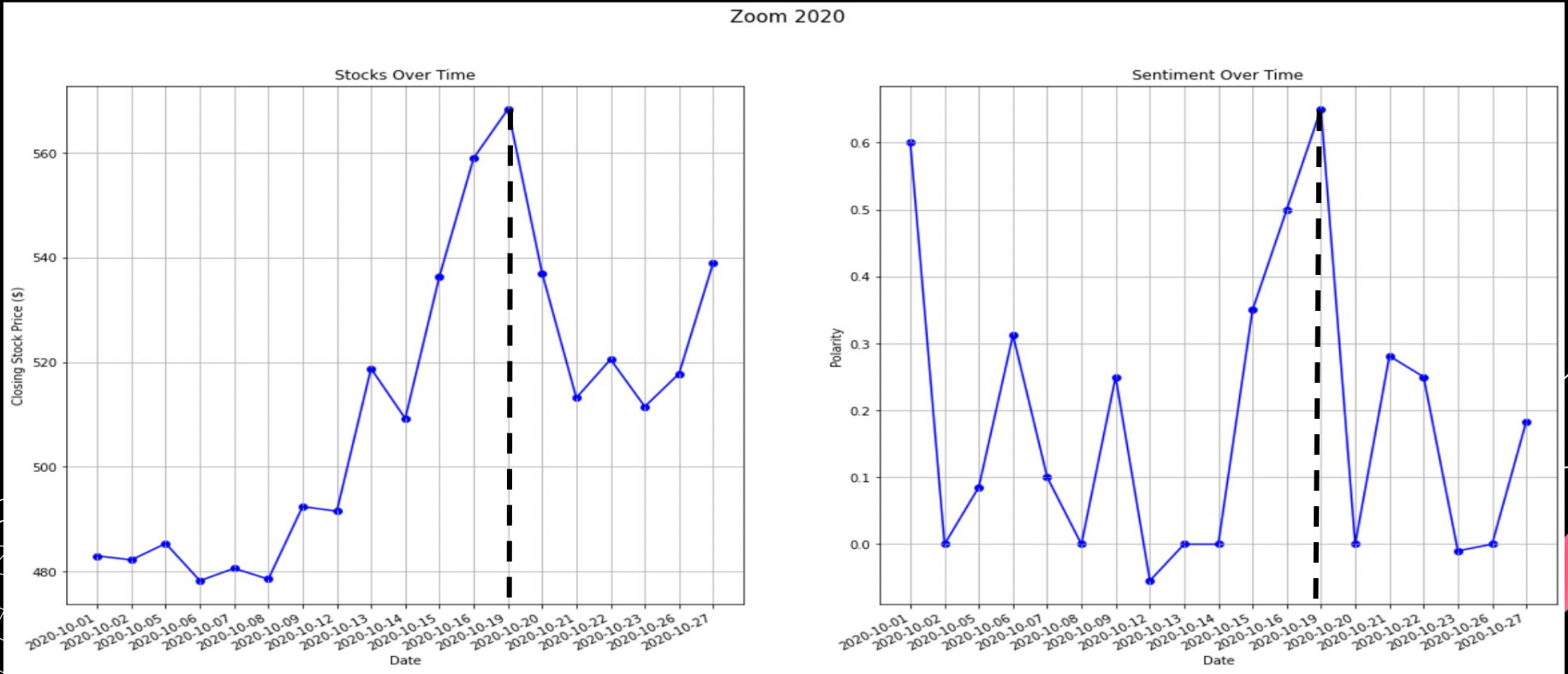
2022

03

Spotlights

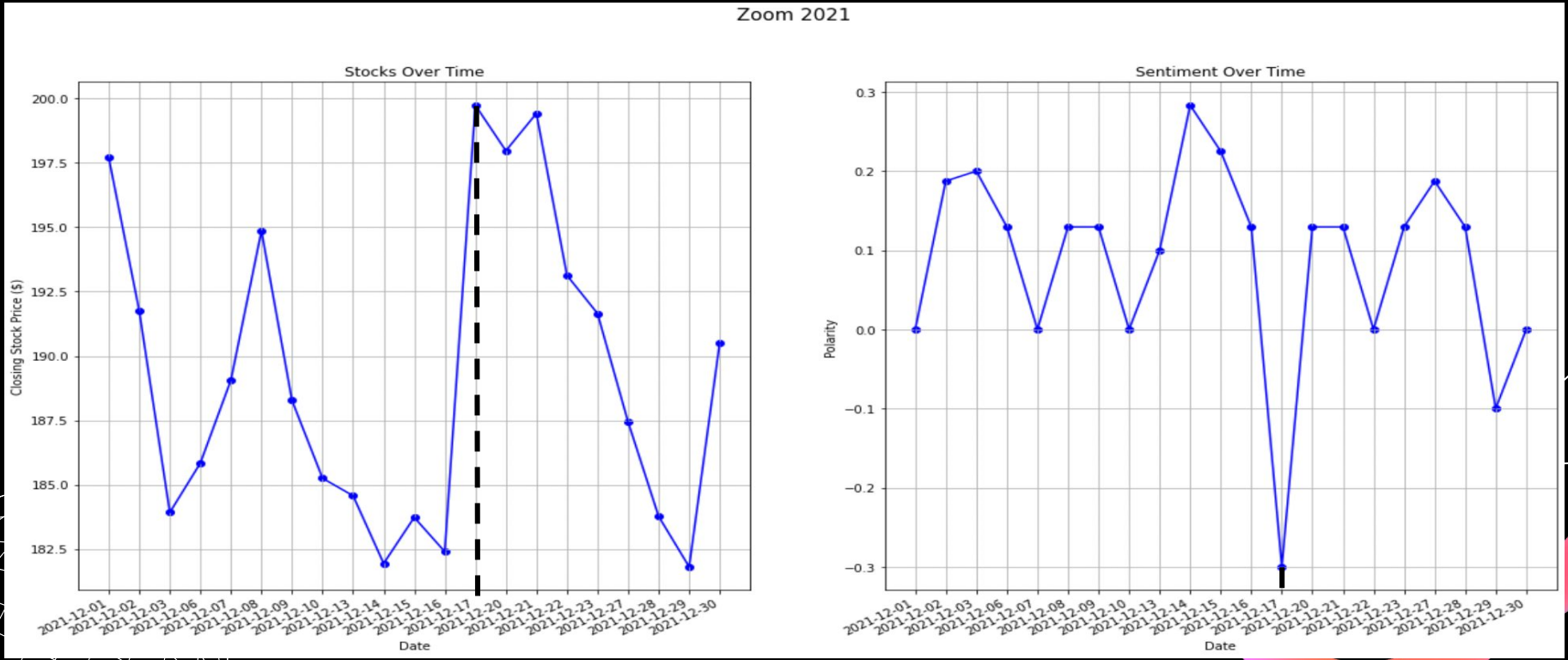
Chronological view of sentiment and stock over time

Zoom 2020



Positive Agreement in Stock and Sentiment peak

Zoom 2021



Negative Agreement in Stock and Sentiment peak

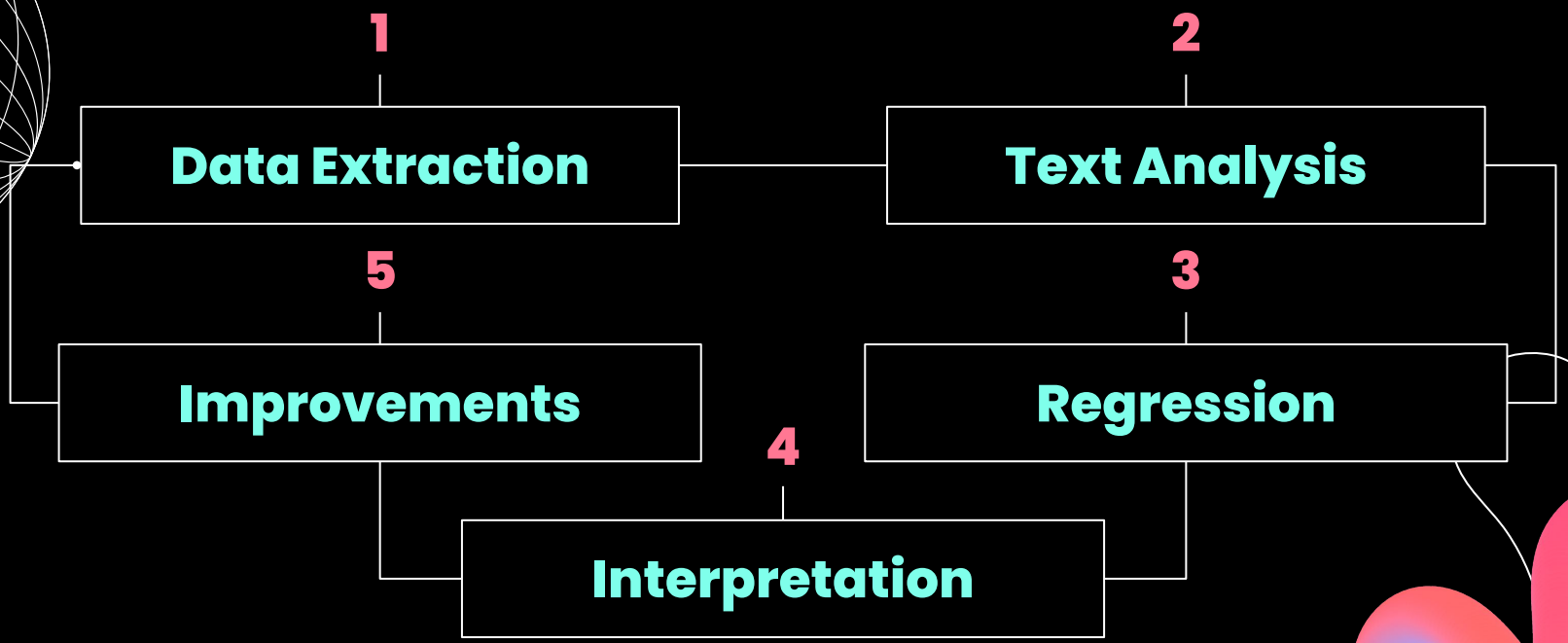
2022

04

Conclusion and Improvements

Review of results and future developments

Results


1
Data Extraction
2
Text Analysis
3
Regression
4
Interpretation
5
Improvements

Improvements

Twitter API

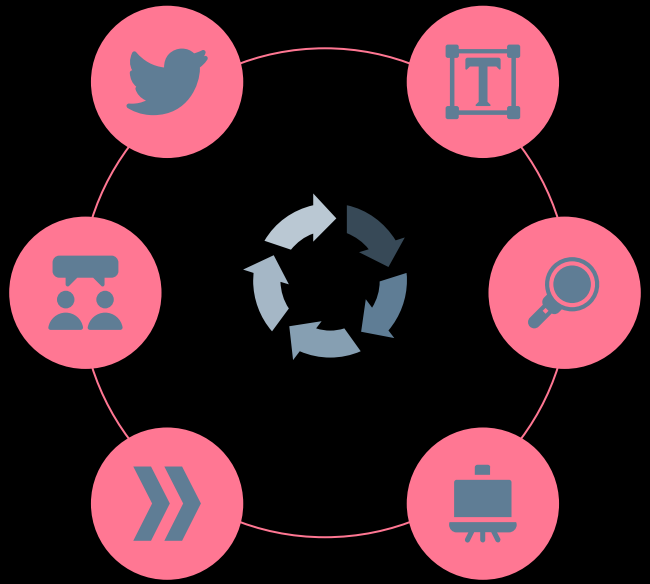
Poor resources and educational tools

Aggregate Sentiment

More tweets per period

Longitudinal Studies

Extend observation periods



Text Libraries

Linguistic nuance and its implications on polarity

Queries

Specificity of regular expressions

Methods of Analysis

Time Series Analysis

2022

THANKS

Want to collaborate on a future project?
jgrajales@wesleyan.edu

CREDITS: This presentation template was created by **Slidesgo**, including icons by **Flaticon**, infographics & images by **Freepik**

Regression

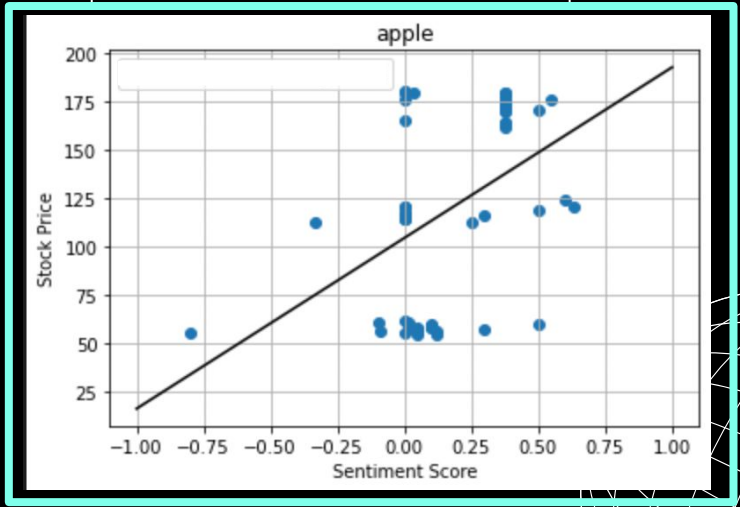
Is Apple Stock Price related to Public Sentiment?

Yes.

Statistics

```
==============================================================================
Model:                            OLS   Adj. R-squared:                  0.191
Dependent Variable:                ()   AIC:                         613.4614
Date:                2022-05-01 13:13   BIC:                         617.6164
No. Observations:                  59   Log-Likelihood:                -304.73
Df Model:                           1   F-statistic:                    14.67
Df Residuals:                      57   Prob (F-statistic):           0.000321
R-squared:                      0.205   Scale:                        1856.5
------------------------------------------------------------------------------
             Coef.    Std.Err.     t     P>|t|    [0.025   0.975]
------------------------------------------------------------------------------
const       104.7236   6.6201  15.8190  0.0000  91.4671  117.980
Polarity     88.1529  23.0166   3.8300  0.0003  42.0629  134.243
------------------------------------------------------------------------------
Omnibus:                    9.622   Durbin-Watson:                   0.374
Prob(Omnibus):              0.008   Jarque-Bera (JB):                3.200
Skew:                      -0.188   Prob(JB):                        0.202
Kurtosis:                   1.923   Condition No.:                   4
==============================================================================
```

Model



Regression

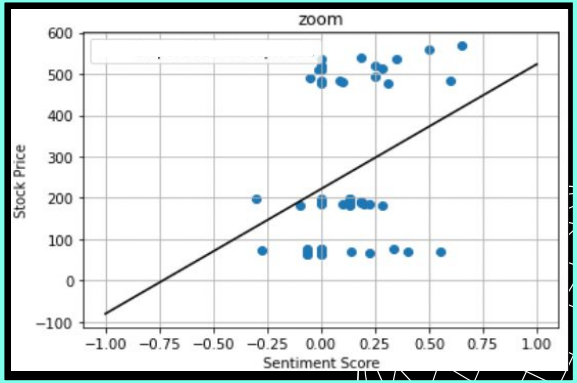
Is Zoom Stock Price related to Public Sentiment?

Yes.

Dataset

	d$text	All Stock	Date	Tweets	Subjectivity	Polarity	Analysis
0	Zoom zoom zoom\nMake my heart go,\nBoom boom!\...	75.809998	2019-10-01	Zoom zoom zoom\nMake my heart go,\nBoom boom!\...	0.666667	0.333333	Positive
1	Zoom in and you'll see an ice cream cart with ...	73.849998	2019-10-02	Zoom in and you'll see an ice cream cart with ...	0.617143	-0.272857	Negative
2	There's only a few days left to get one of the...	76.830002	2019-10-03	There's only a few days left to get one of the...	0.366667	-0.066667	Negative
3	Or, what I imagine my guinea pigs see when the...	76.529999	2019-10-04	Or, what I imagine my guinea pigs see when the...	0.000000	0.000000	Neutral
4	@rgay Me trying to decide if you should squint...	76.989998	2019-10-07	Me trying to decide if you should squint at t...	0.500000	0.000000	Neutral
5	all pop punk bitches know is crowdsurf buy con...	73.589996	2019-10-08	all pop punk bitches know is crowdsurf buy con...	0.000000	0.000000	Neutral

Model



Regression

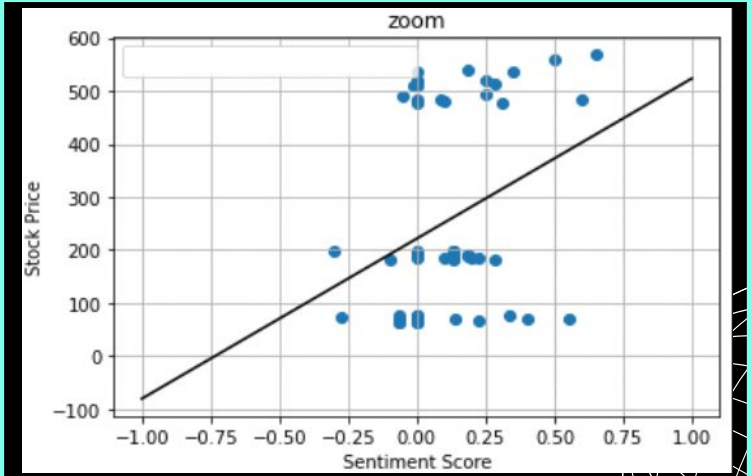
Is Zoom Stock Price related to Public Sentiment?

Yes.

Statistics

```
                            Results: Ordinary least squares
==================================================================
Model:              OLS              Adj. R-squared:     0.077
Dependent Variable: ()               AIC:                781.0742
Date:               2022-05-01 12:46 BIC:                785.2292
No. Observations:   59               Log-Likelihood:     -388.54
Df Model:           1                F-statistic:        5.832
Df Residuals:       57               Prob (F-statistic): 0.0190
R-squared:          0.093            Scale:              31804.
------------------------------------------------------------------
             Coef.    Std.Err.    t     P>|t|    [0.025    0.975]
------------------------------------------------------------------
const       221.4668   26.9164  8.2279  0.0000  167.5676  275.3660
Polarity    302.1342  125.1056  2.4150  0.0190   51.6146  552.6538
------------------------------------------------------------------
Omnibus:               12.381       Durbin-Watson:          0.237
Prob(Omnibus):         0.002        Jarque-Bera (JB):       5.173
Skew:                  0.476        Prob(JB):               0.075
Kurtosis:              1.906        Condition No.:          5
==================================================================
```

Model



Regression

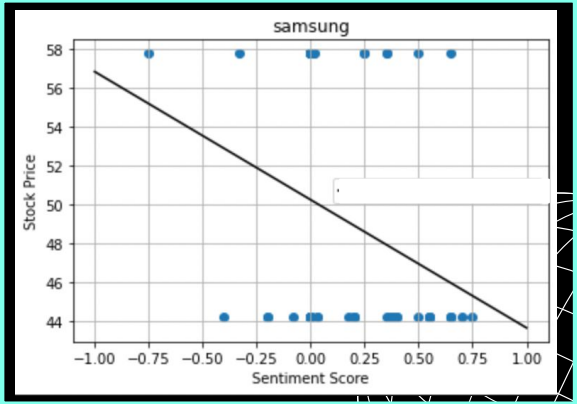
Is Samsung Stock Price related to Public Sentiment?

Yes.

Dataset

	d$text	All Stock	Date	Tweets	Subjectivity	Polarity	Analysis
0	free phone thank u Samsung https://t.co/PCHskz...	44.200001	2019-10-01	free phone thank u Samsung	0.800000	0.400000	Positive
1	@rflawhite @XboxSupport Razer and any headphon...	44.200001	2019-10-02	Razer and any headphones I try including Sam...	0.000000	0.000000	Neutral
2	Does someone has Samsung S7 that can gift me t...	44.200001	2019-10-03	Does someone has Samsung S7 that can gift me t...	0.200000	0.200000	Positive
3	@FortniteGame The Glow skin isn't showing in m...	44.200001	2019-10-04	The Glow skin isn't showing in my store on my...	0.000000	0.000000	Neutral
4	Galaxy Fold's immersive display and optimized ...	44.200001	2019-10-07	Galaxy Fold's immersive display and optimized ...	0.416667	0.375000	Positive
5	Spectacular LED video displays of Samsung amon...	44.200001	2019-10-08	Spectacular LED video displays of Samsung amon...	0.950000	0.550000	Positive

Model



Regression

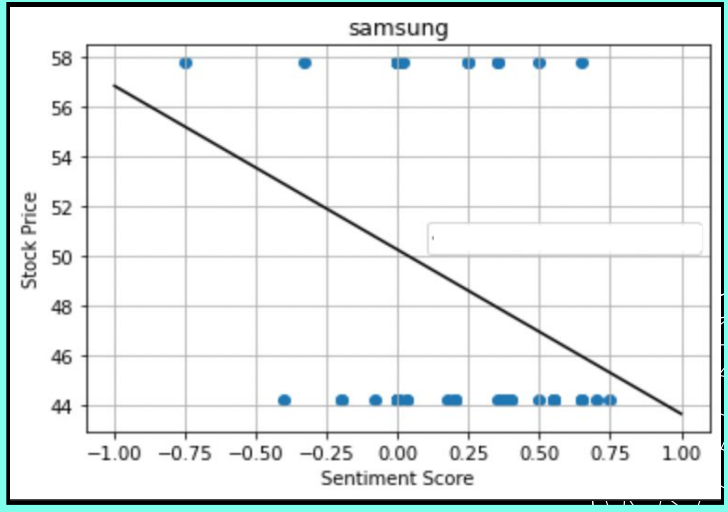
Is Samsung Stock Price related to Public Sentiment?

Yes.

Statistics

```
==============================================================================
Model:                      OLS                Adj. R-squared:        0.075
Dependent Variable:         ()                 AIC:                   386.4389
Date:                       2022-05-01 13:21   BIC:                   390.5940
No. Observations:           59                 Log-Likelihood:        -191.22
Df Model:                   1                  F-statistic:           5.722
Df Residuals:               57                 Prob (F-statistic):    0.0201
R-squared:                  0.091              Scale:                 39.592
------------------------------------------------------------------------------
               Coef.    Std.Err.     t      P>|t|     [0.025     0.975]
------------------------------------------------------------------------------
const         50.2231    0.9606   52.2824  0.0000    48.2995   52.146
Polarity      -6.5875    2.7538   -2.3922  0.0201   -12.1018   -1.073
------------------------------------------------------------------------------
Omnibus:                  35.678        Durbin-Watson:           0.273
Prob(Omnibus):            0.000         Jarque-Bera (JB):        7.222
Skew:                     0.508         Prob(JB):                0.027
Kurtosis:                 1.619         Condition No.:           3
==============================================================================
```

Model



Regression

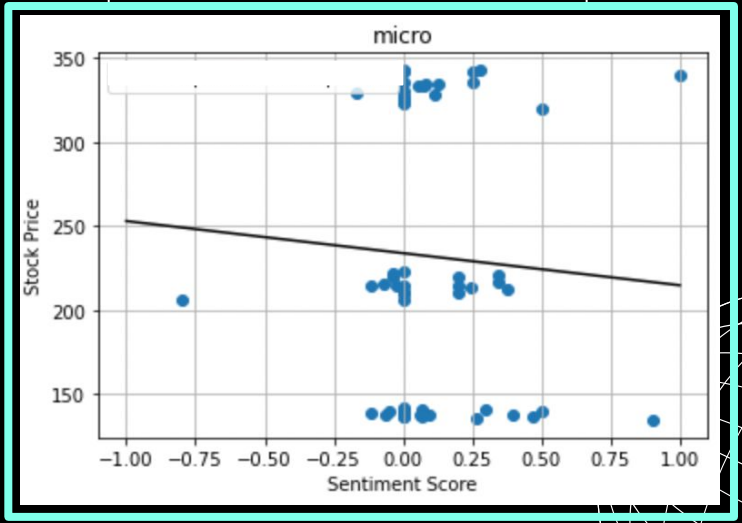
Is Microsoft Stock Price related to Public Sentiment?

No.

Statistics

```
==============================================================================
Model:                 OLS              Adj. R-squared:     -0.014
Dependent Variable:    ()               AIC:                689.7219
Date:                  2022-05-01 13:17 BIC:                693.8769
No. Observations:      59               Log-Likelihood:     -342.86
Df Model:              1                F-statistic:        0.2259
Df Residuals:          57               Prob (F-statistic): 0.636
R-squared:             0.004            Scale:              6761.6
------------------------------------------------------------------------------
             Coef.    Std.Err.     t     P>|t|    [0.025    0.975]
------------------------------------------------------------------------------
const      233.8118   11.3824  20.5415  0.0000  211.0189  256.604
Polarity   -19.0745   40.1292  -0.4753  0.6364  -99.4319   61.282
------------------------------------------------------------------------------
Omnibus:                74.218       Durbin-Watson:          0.058
Prob(Omnibus):          0.000        Jarque-Bera (JB):       6.237
Skew:                   0.209        Prob(JB):               0.044
Kurtosis:               1.463        Condition No.:          4
==============================================================================
```

Model



Regression

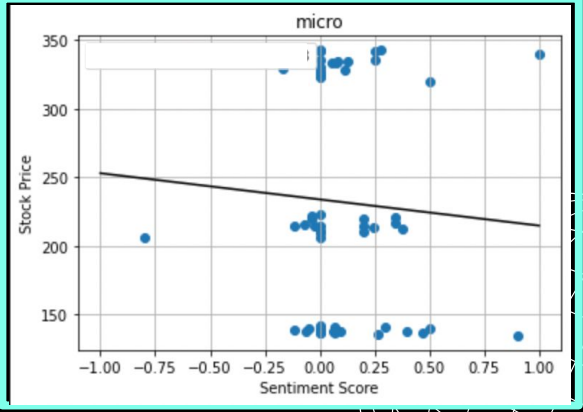
Is Microsoft Stock Price related to Public Sentiment?

No.

Dataset

	d$text	All Stock	Date	Tweets	Subjectivity	Polarity	Analysis
0	The original 1983 #Microsoft mouse. Yours for ...	137.070007	2019-10-01	The original 1983 Microsoft mouse. Yours for $...	0.750000	0.468750	Positive
1	#ICYMI: Get insights on how to create incredib...	134.649994	2019-10-02	ICYMI: Get insights on how to create incredibl...	0.900000	0.900000	Positive
2	@Microsoft \nDear : Microsoft\n\nMOD(;) on p...	136.279999	2019-10-03	\nDear : Microsoft\n\nMOD(;) on program " P...	0.575000	0.070000	Positive
3	Puzzled by the many pieces to Microsoft Excel?...	138.119995	2019-10-04	Puzzled by the many pieces to Microsoft Excel?...	0.571970	0.092424	Positive
4	@geshan I think @azure SQL DB might have somet...	137.119995	2019-10-07	I think SQL DB might have something to say o...	0.000000	0.000000	Neutral
5	In today's modern workplace, teamwork is key &...	135.669998	2019-10-08	In today's modern workplace, teamwork is key &...	0.720000	0.265000	Positive

Model



Regression

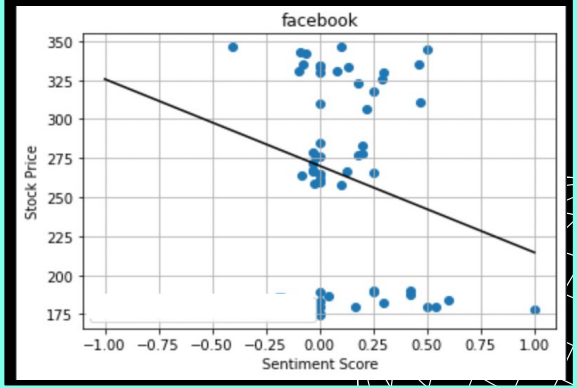
Is Facebook Stock Price related to Public Sentiment?

No.

Dataset

	d$text	All Stock	Date	Tweets	Subjectivity	Polarity	Analysis
0	That same one day party is been held and pllay...	175.809998	2019-10-01	That same one day party is been held and pllay...	0.083333	0.000000	Neutral
1	I took this screen shot off Facebook. I hope J...	174.600006	2019-10-02	I took this screen shot off Facebook. I hope J...	0.000000	0.000000	Neutral
2	Still going strong on stream. Come chill!\nhtt...	179.380005	2019-10-03	Still going strong on stream. Come chill!\n	0.733333	0.541667	Positive
3	Employers Used Facebook to Keep Women and Olde...	180.449997	2019-10-04	Employers Used Facebook to Keep Women and Olde...	0.416667	-0.166667	Negative
4	What do you think? https://t.co/91PEWDk1xU	179.679993	2019-10-07	What do you think?	0.000000	0.000000	Neutral
5	The best of luck to our senior girls today in ...	177.750000	2019-10-08	The best of luck to our senior girls today in ...	0.300000	1.000000	Positive

Model



Regression

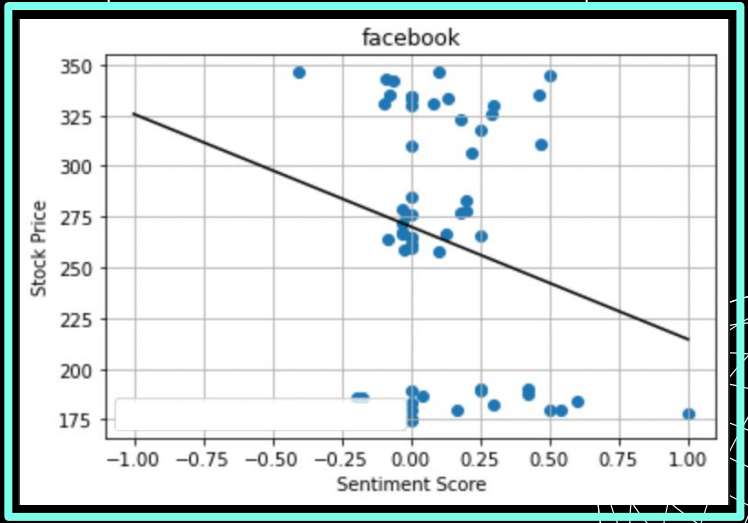
Facebook Stock Price related to Public Sentiment?

No.

Statistics

```
==============================================================
Model:              OLS              Adj. R-squared:     0.028
Dependent Variable: ()               AIC:                654.4446
Date:               2022-05-01 12:45 BIC:                658.5996
No. Observations:   59               Log-Likelihood:     -325.22
Df Model:           1                F-statistic:        2.661
Df Residuals:       57               Prob (F-statistic): 0.108
R-squared:          0.045            Scale:              3718.6
--------------------------------------------------------------
           Coef.    Std.Err.     t     P>|t|     [0.025    0.975]
--------------------------------------------------------------
const     270.1139    8.9070  30.3260  0.0000   252.2779  287.9499
Polarity  -55.5458   34.0509  -1.6313  0.1084  -123.7315   12.6400
--------------------------------------------------------------
Omnibus:                20.993       Durbin-Watson:          0.114
Prob(Omnibus):          0.000        Jarque-Bera (JB):       4.345
Skew:                   -0.190       Prob(JB):               0.114
Kurtosis:               1.726        Condition No.:          4
==============================================================
```

Model



Regression

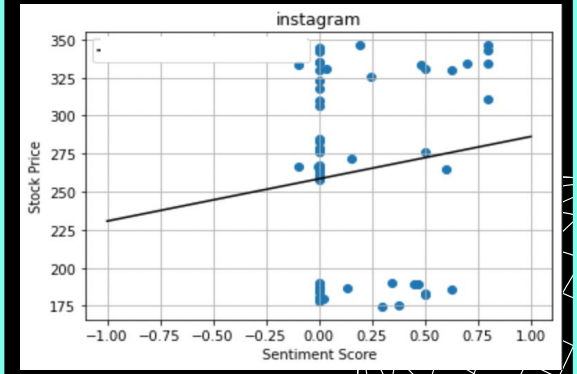
Is Instagram Stock Price related to Public Sentiment?

No.

Dataset

	d$text	All Stock	Date	Tweets	Subjectivity	Polarity	Analysis
0	Oracle!!!! en Occidental Vacation Club First C...	175.809998	2019-10-01	Oracle!!!! en Occidental Vacation Club First C...	0.666667	0.375000	Positive
1	my Instagram post has been up for 10 minutes a...	174.600006	2019-10-02	my Instagram post has been up for 10 minutes a...	0.900000	0.300000	Positive
2	[IG] 190927 —bazaarthailand update\n\n🔗 https:...	179.380005	2019-10-03	[IG] 190927 —bazaarthailand update\n\n🔗 \n\nLA...	0.000000	0.000000	Neutral
3	[IG] 190927 — voguetaiwan IG update (2):\n \n🔗...	180.449997	2019-10-04	[IG] 190927 — voguetaiwan IG update (2):\n \n🔗...	0.000000	0.000000	Neutral
4	[IG] 190927 —Vogue Hong Kong IG update (1) : \...	179.679993	2019-10-07	[IG] 190927 —Vogue Hong Kong IG update (1) : \...	0.000000	0.000000	Neutral
5	[IG] 190927 —Vogue Hong Kong IG update (2) : \...	177.750000	2019-10-08	[IG] 190927 —Vogue Hong Kong IG update (2) : \...	0.000000	0.000000	Neutral

Model



Regression

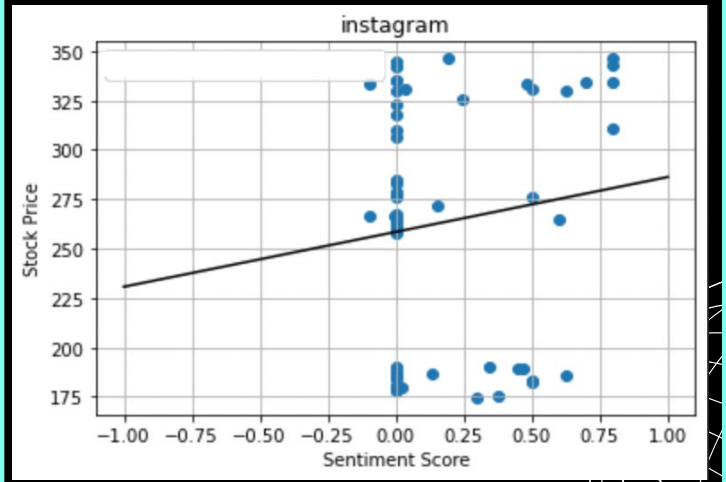
Is Instagram Stock Price related to Public Sentiment?

No.

Statistics

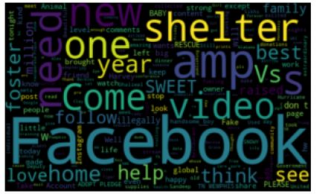
```
==============================================================
Model:              OLS              Adj. R-squared:     -0.002
Dependent Variable: ()               AIC:                656.2280
Date:               2022-05-01 12:51 BIC:                660.3830
No. Observations:   59               Log-Likelihood:     -326.11
Df Model:           1                F-statistic:        0.8846
Df Residuals:       57               Prob (F-statistic): 0.351
R-squared:          0.015            Scale:              3832.7
--------------------------------------------------------------
            Coef.    Std.Err.     t     P>|t|    [0.025    0.975]
--------------------------------------------------------------
const      258.4741    9.6858  26.6858  0.0000  239.0786  277.869
Polarity    27.7791   29.5357   0.9405  0.3509  -31.3650   86.923
--------------------------------------------------------------
Omnibus:                37.662       Durbin-Watson:          0.055
Prob(Omnibus):          0.000        Jarque-Bera (JB):       5.670
Skew:                   -0.289       Prob(JB):               0.059
Kurtosis:               1.595        Condition No.:          4
==============================================================
```

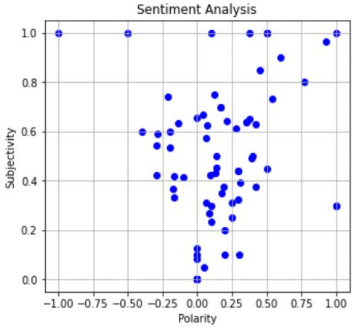
Model

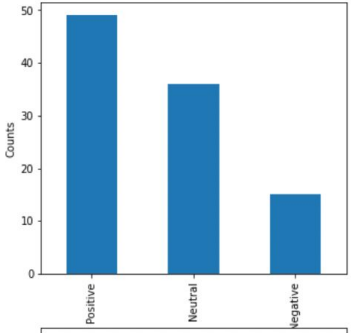


Facebook OR Meta

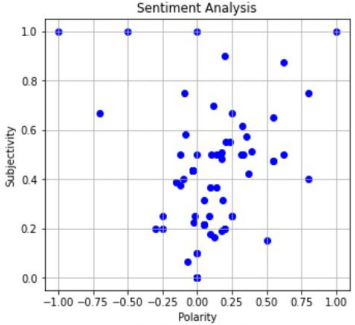
October 2019

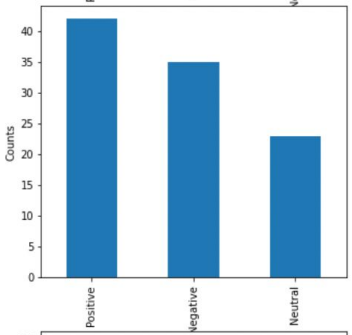




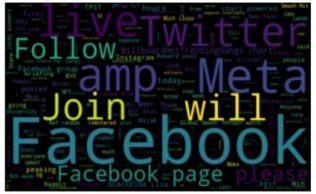


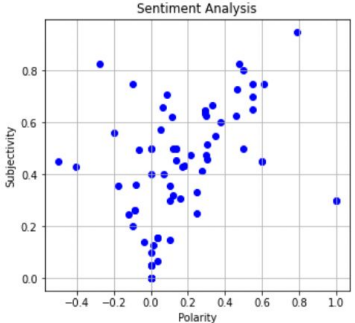
October 2020

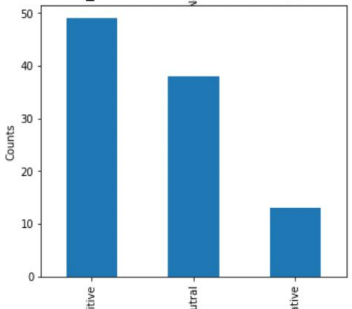




December 2021

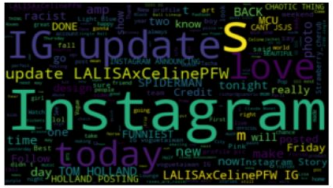


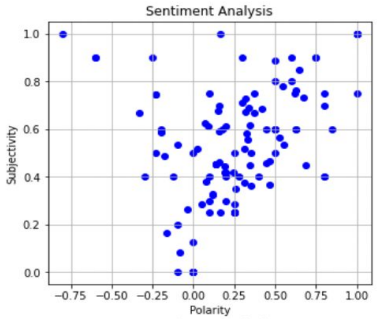


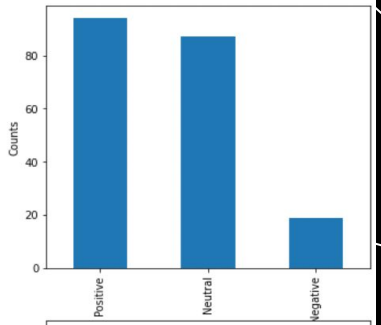


instagram

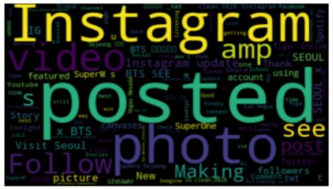
October 2019

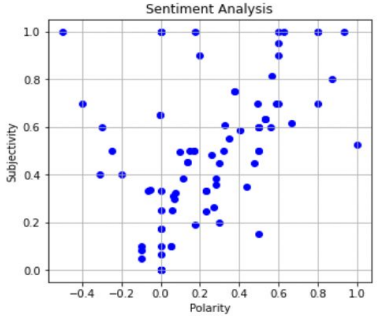


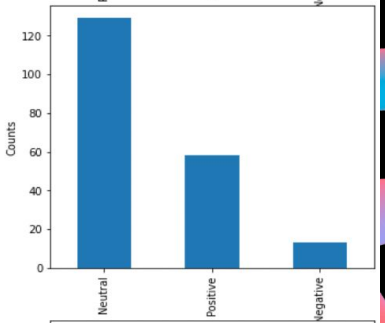




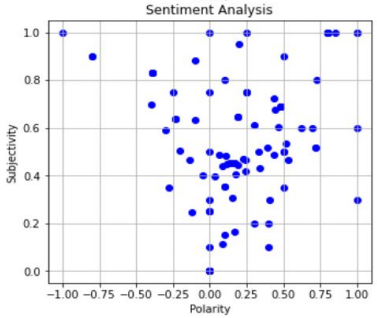
October 2020

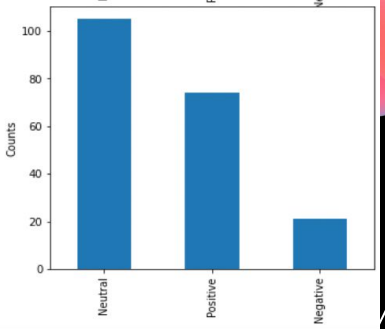






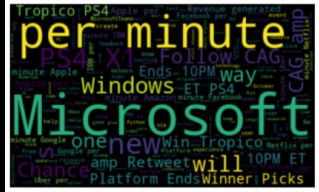
December 2021

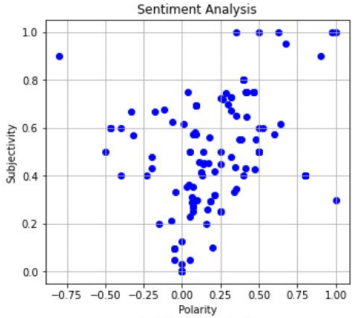


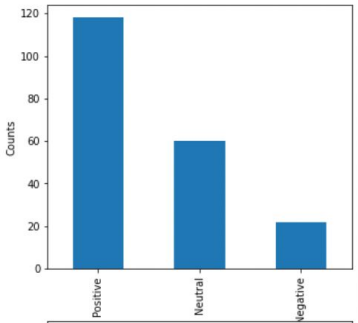


Microsoft

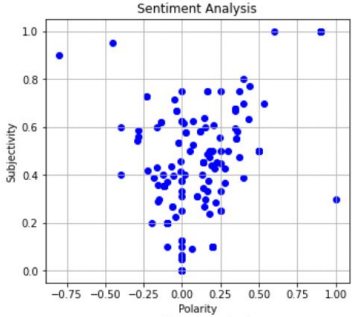
October 2019

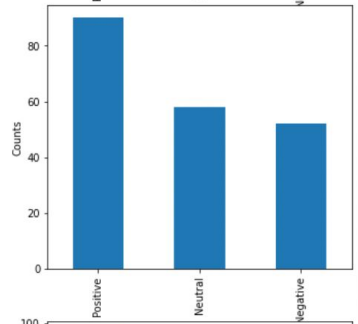




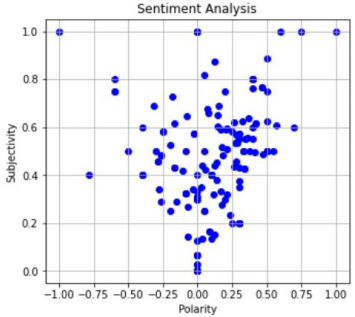


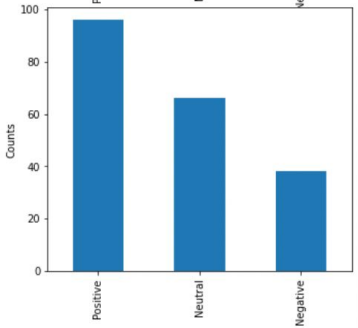
October 2020



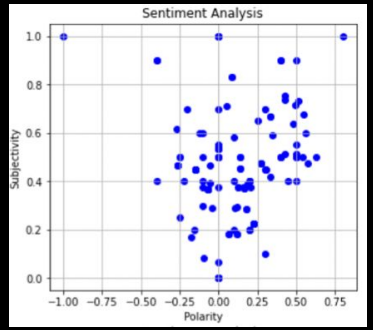


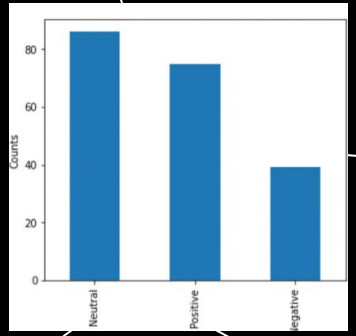
December 2021



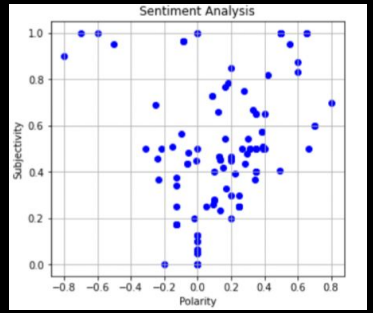


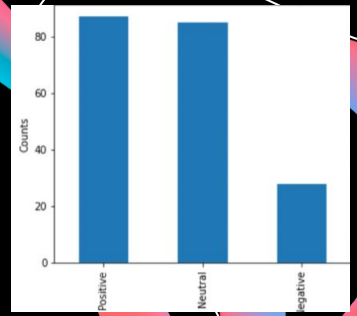
October 2019



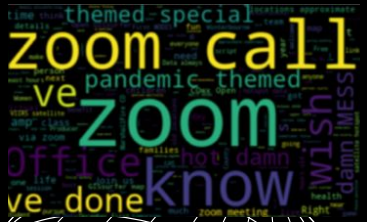


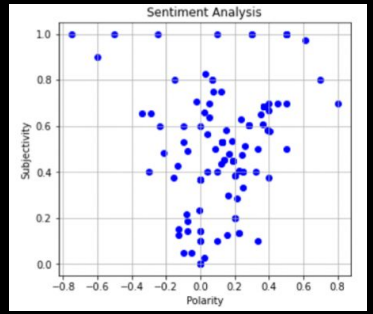
October 2020

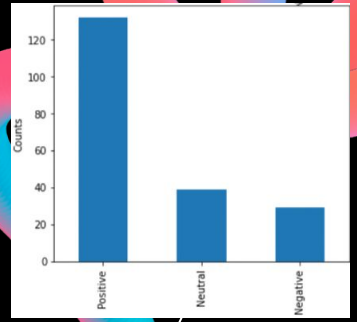




December 2021

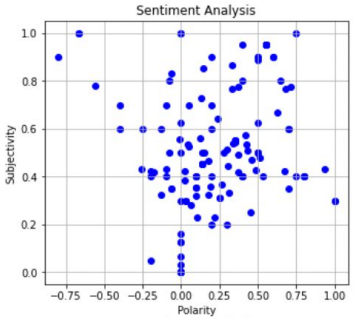


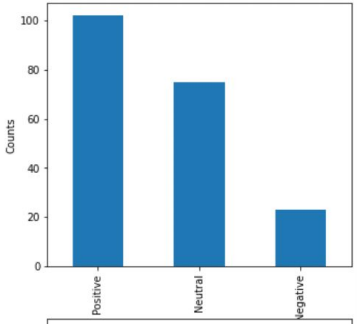




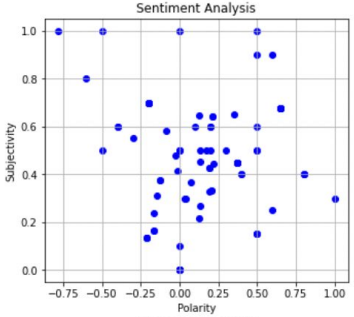
Samsung

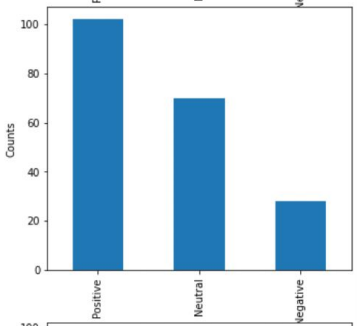
October 2019



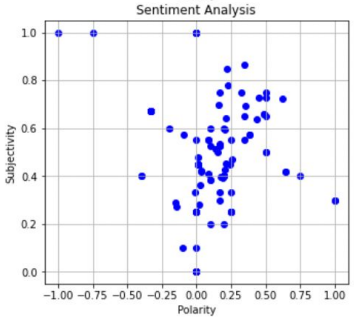


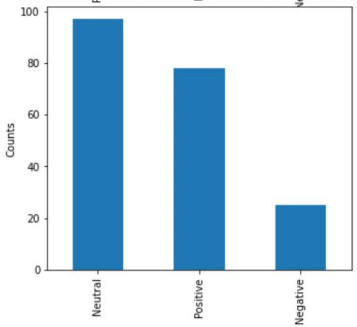
October 2020



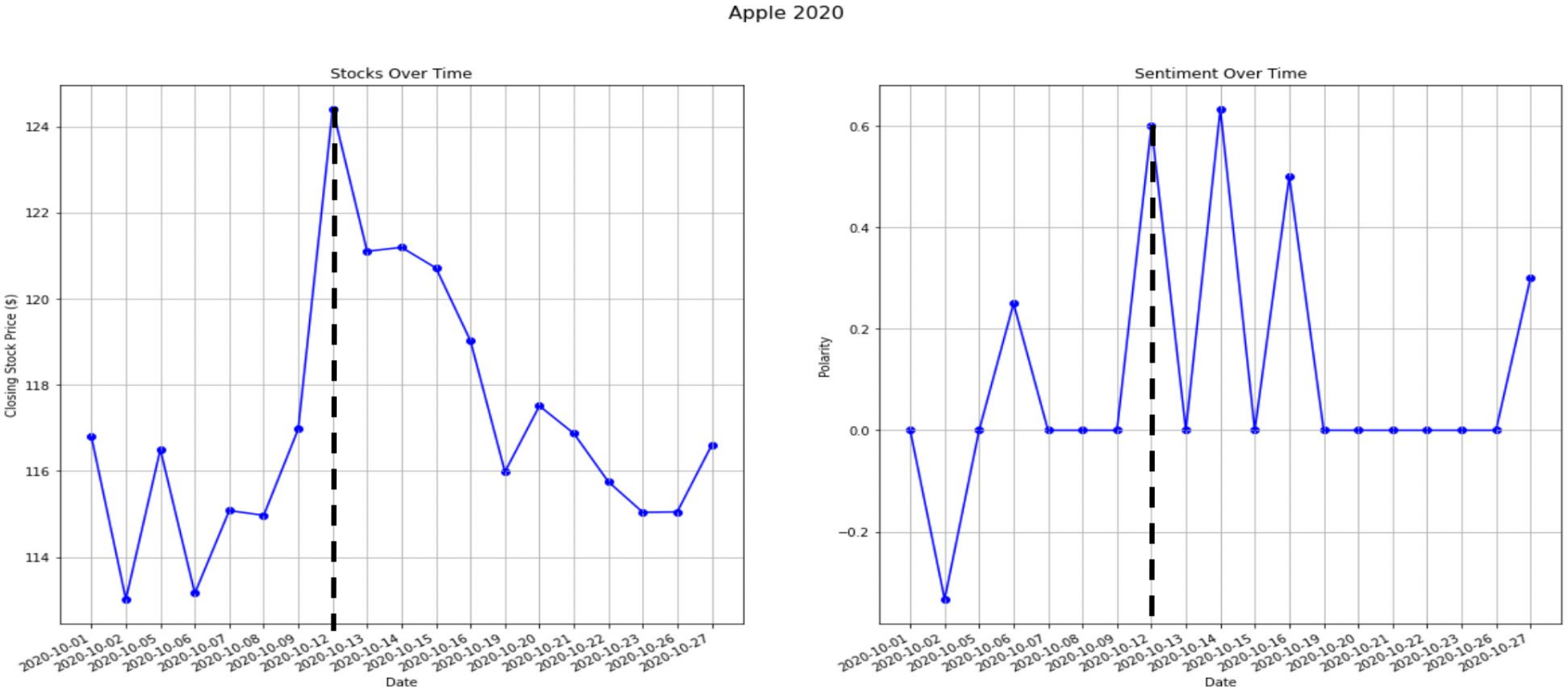


December 2021



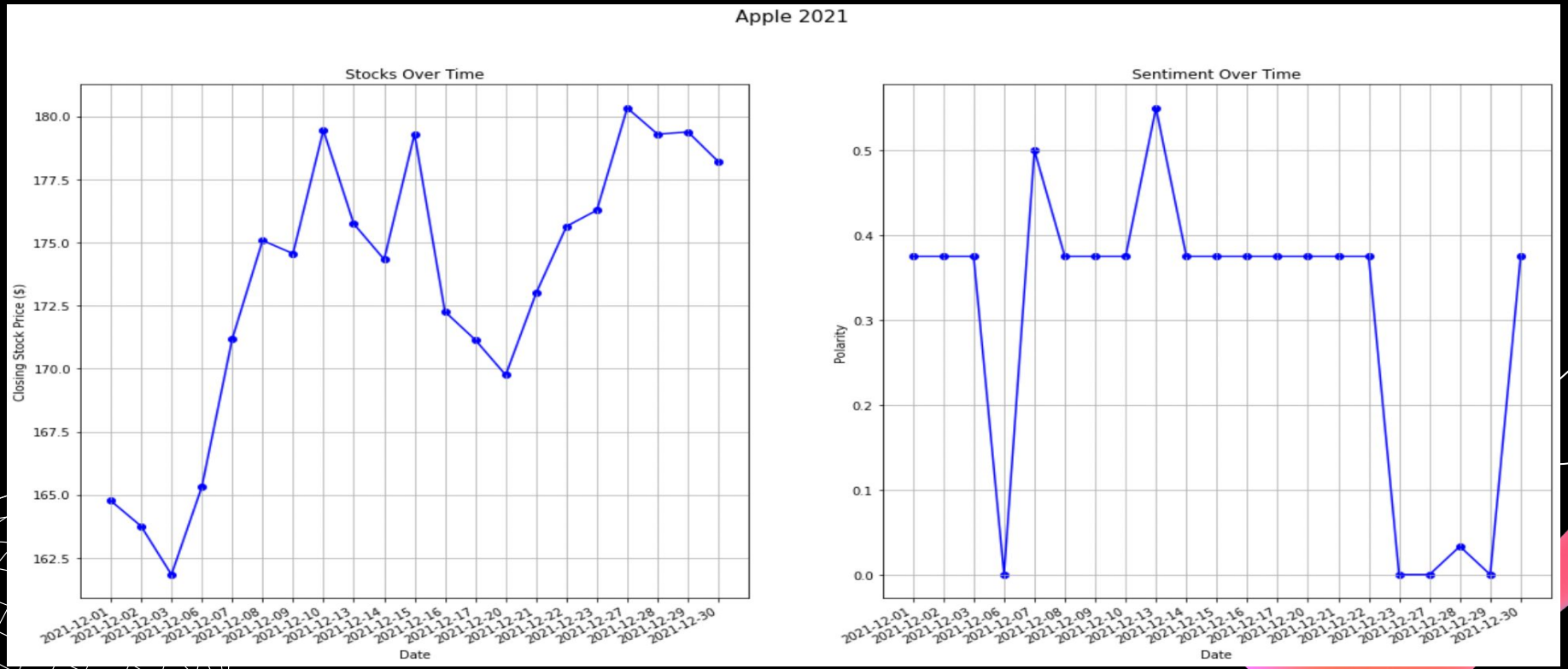


Apple 2020



Inconclusive

Apple 2021



Inconclusive