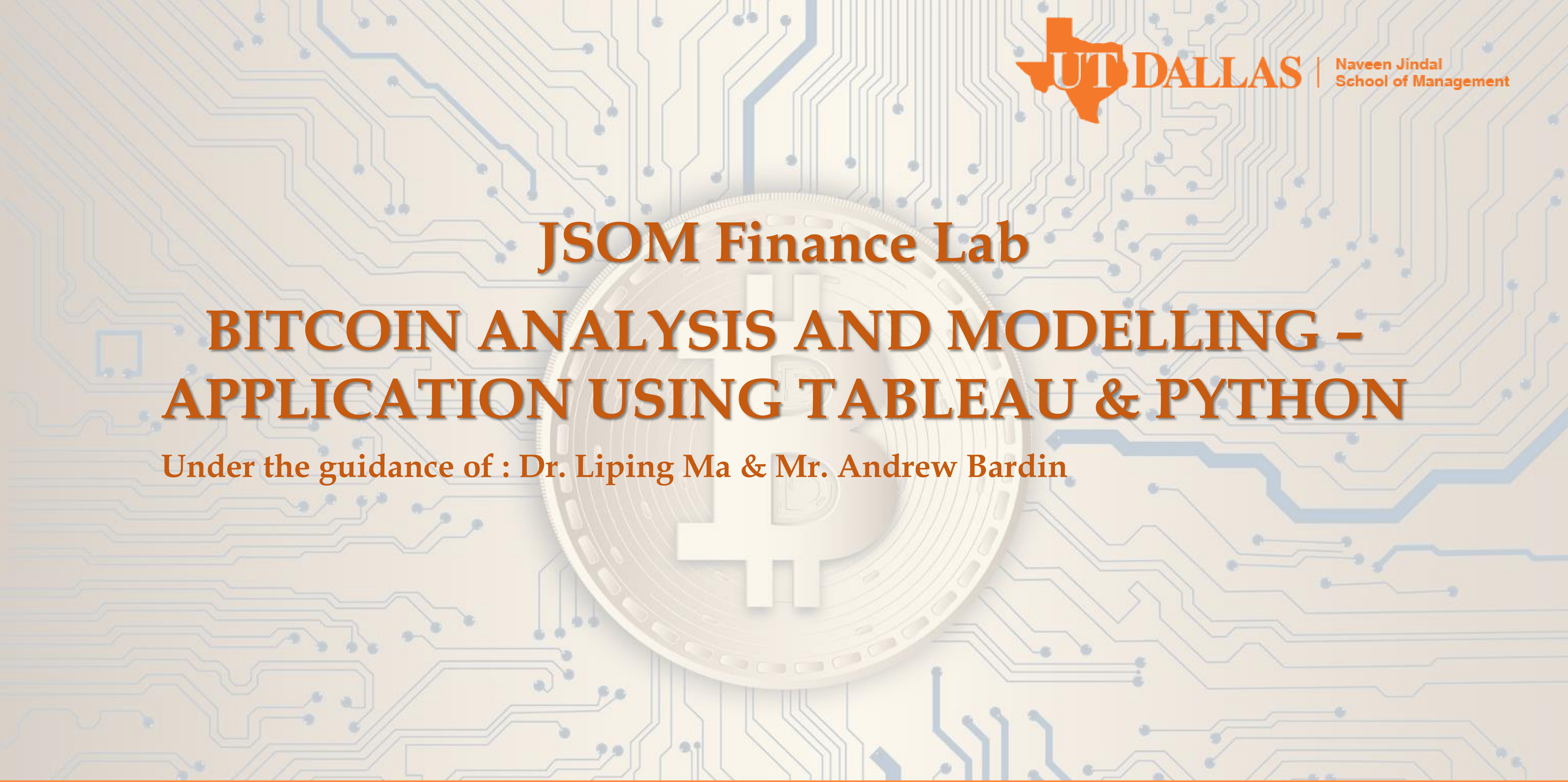
UT DALLAS | Naveen Jindal School of Management



JSOM Finance Lab

BITCOIN ANALYSIS AND MODELLING – APPLICATION USING TABLEAU & PYTHON

Under the guidance of : Dr. Liping Ma & Mr. Andrew Bardin

PROJECT AGENDA

- Cryptocurrency Overview
- Data Collection and Cleaning
- Data Exploration
- Modelling Preparation and Testing
- Conclusion

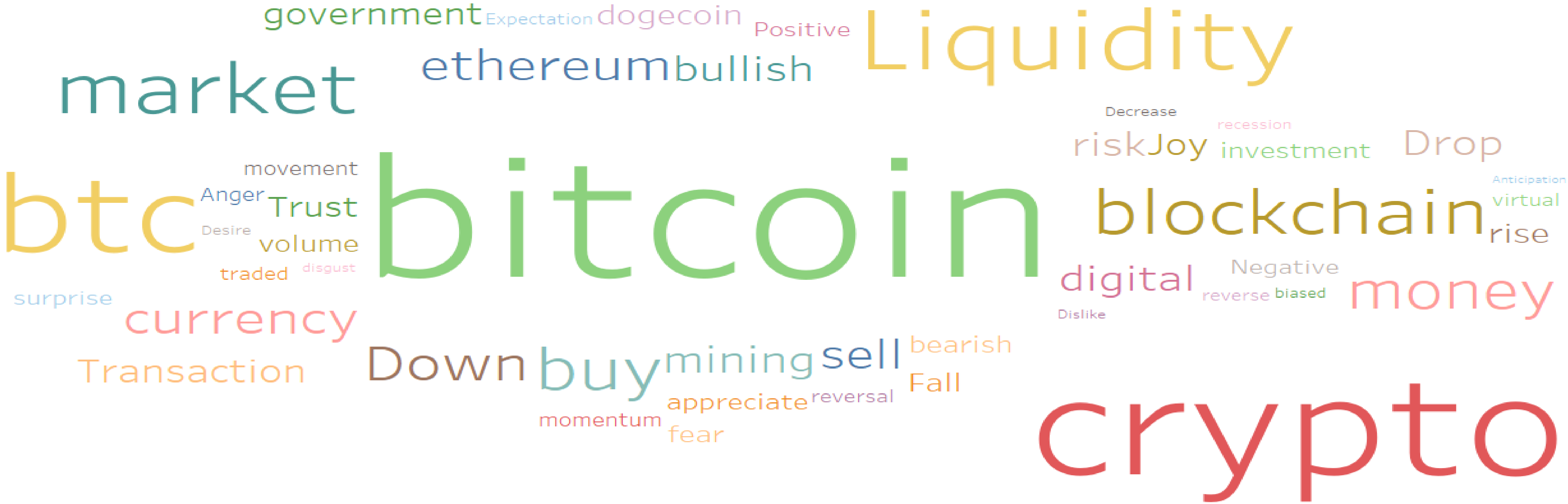
Terminologies

Terms	Description
Polarity	Polarity score lies between (1 and -1). The **overall sentiment** is often inferred as positive, neutral or negative from the sign of the polarity score.
Subjectivity	Subjectivity score lies between (0 and 1), It shows the amount of personal opinion, If a sentence has high subjectivity i.e., close to 1, It resembles that the text contains more personal opinion than factual information.
Nasdaq	The Nasdaq Stock Market is an American stock exchange.
Gold Index	The Gold Price movement during the period of analysis.
Crude Oil	The **Crude Oil price** generally refers to the spot price of a barrel (159 litres) of benchmark crude oil. Oil prices are determined by global supply and demand.
USD	Dollar Value over the period of time.
Risk Free bonds	When the rate of return on the bond would be the risk-free interest rate.
VIX	The VIX is a real-time market index representing the market's expectations for volatility over the coming 30 days.

Limitations and Scope of Analysis

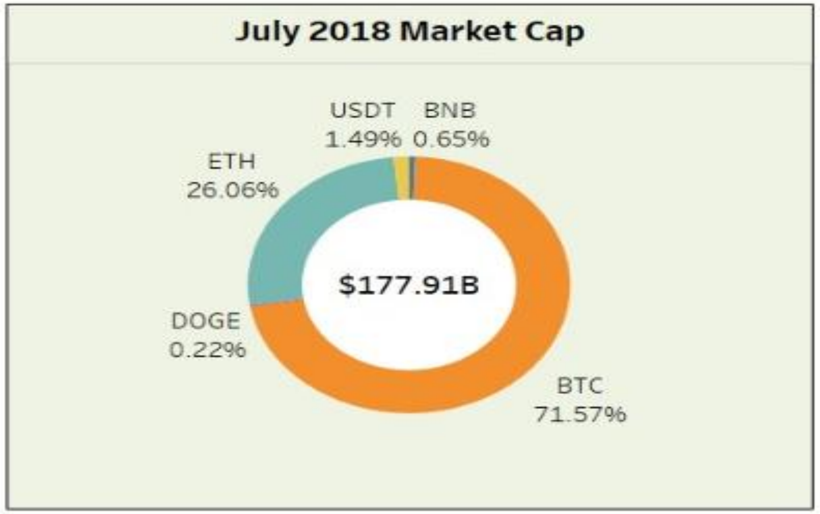
Particulars	Description
Focused Commodity	Bitcoin
No. of Influencers	210
Data Range	June 2021 to May 2022
Polarity	Polarity can’t be considered as a substantial parameter to predict the Bitcoin Movement on a stand-alone basis
Subjectivity	Subjectivity can’t be considered as a substantial parameter to predict the Bitcoin Movement on a stand-alone basis

Crypto Cloud

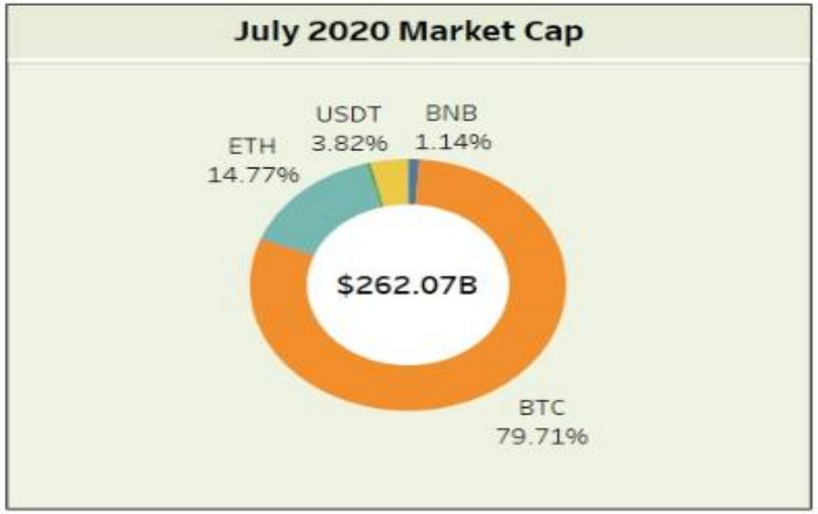


Words. Color shows details about Words. Size shows sum of Count.

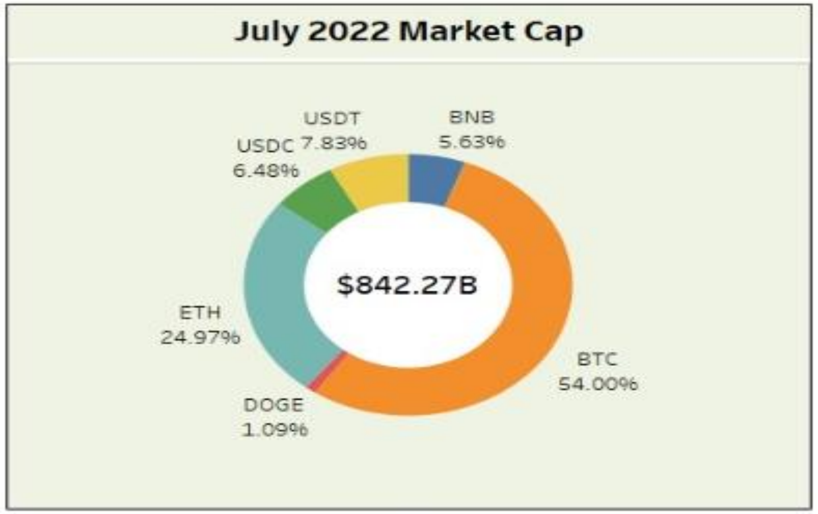
Crypto Market Overview



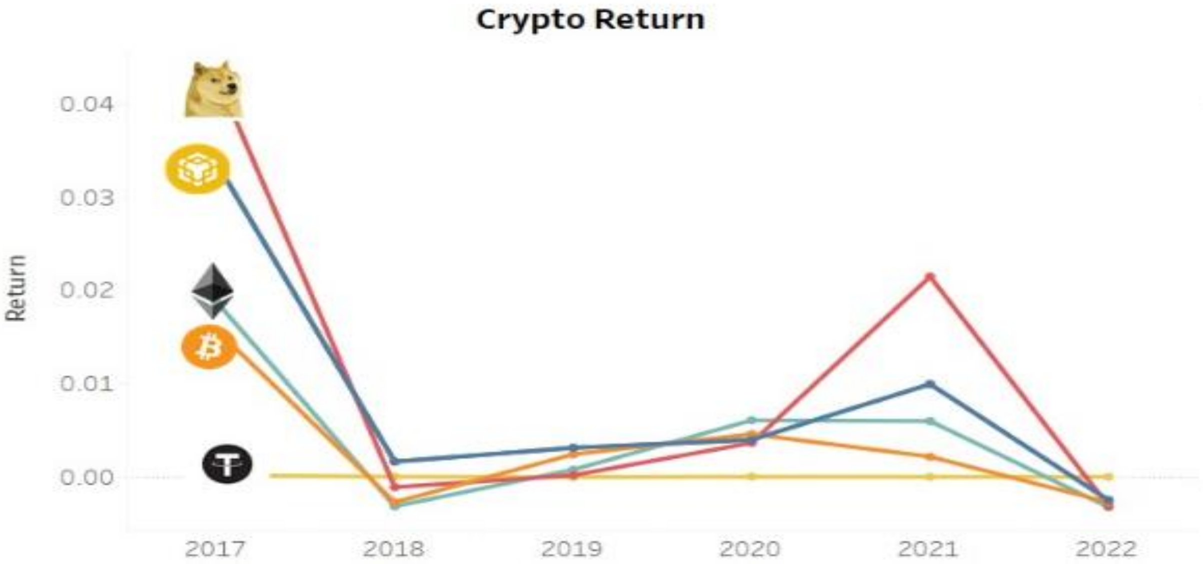
July 2018 Market Cap



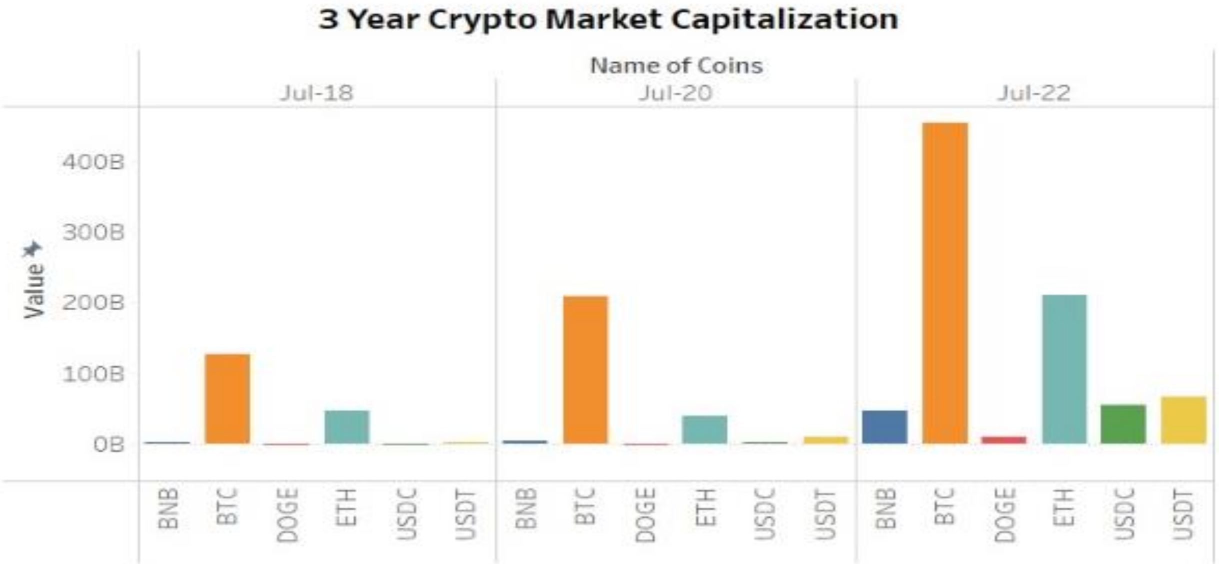
July 2020 Market Cap



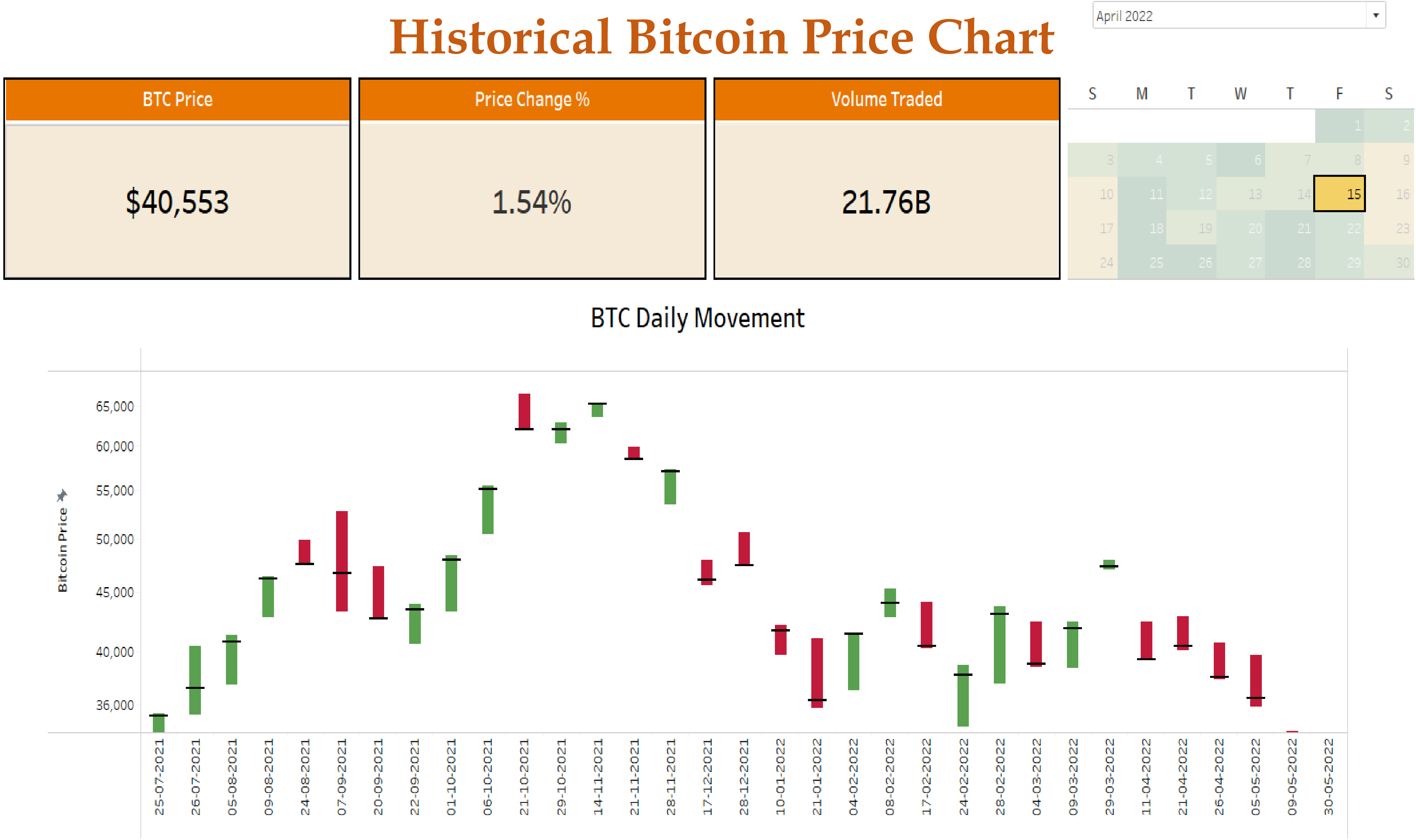
July 2022 Market Cap



Crypto Return



3 Year Crypto Market Capitalization



Historical Bitcoin Price Chart

April 2022 ▾

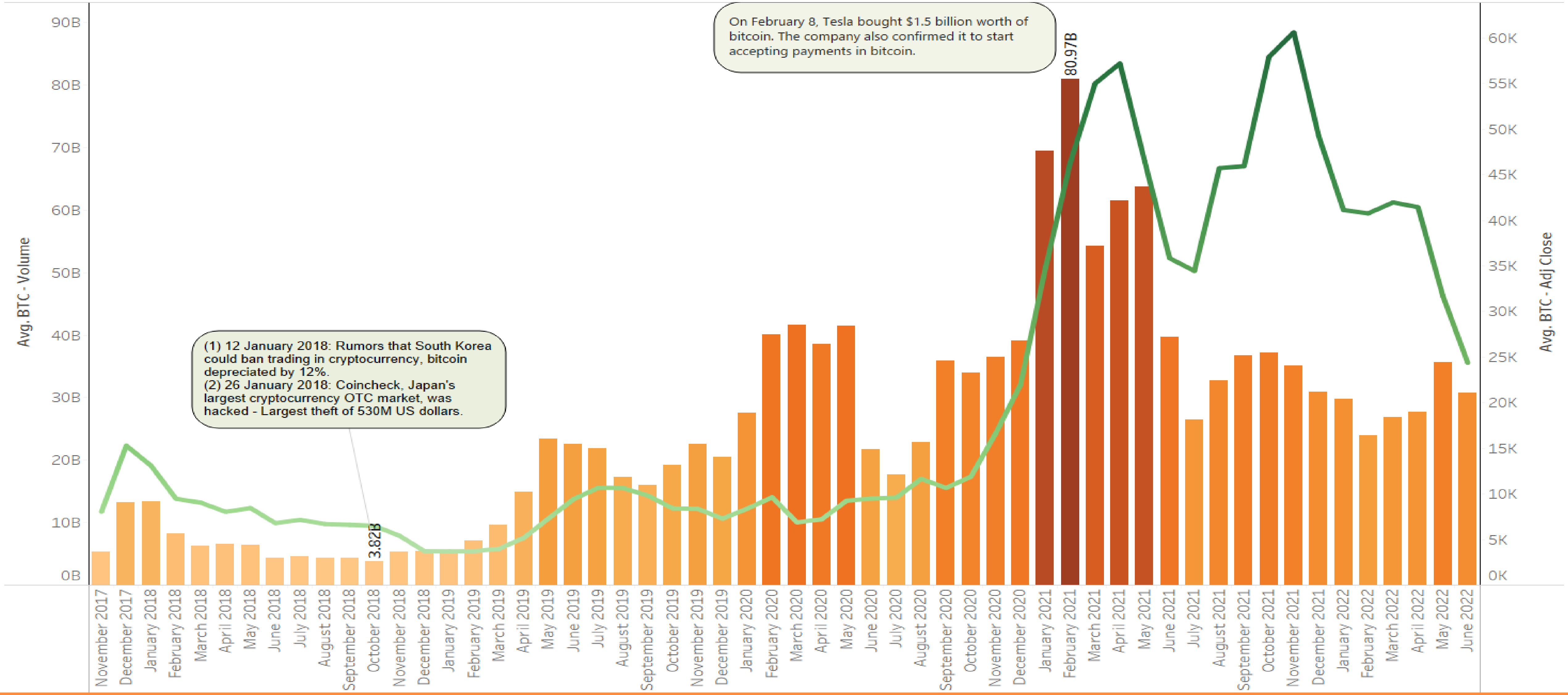
BTC Price	Price Change %	Volume Traded
$40,553	1.54%	21.76B

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	**15**	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

BTC Daily Movement

Bitcoin Price
65,000
60,000
55,000
50,000
45,000
40,000
36,000
25-07-2021
26-07-2021
05-08-2021
09-08-2021
24-08-2021
07-09-2021
20-09-2021
22-09-2021
01-10-2021
06-10-2021
21-10-2021
29-10-2021
14-11-2021
21-11-2021
28-11-2021
17-12-2021
28-12-2021
10-01-2022
21-01-2022
04-02-2022
08-02-2022
17-02-2022
24-02-2022
28-02-2022
04-03-2022
09-03-2022
29-03-2022
11-04-2022
21-04-2022
26-04-2022
05-05-2022
09-05-2022
30-05-2022

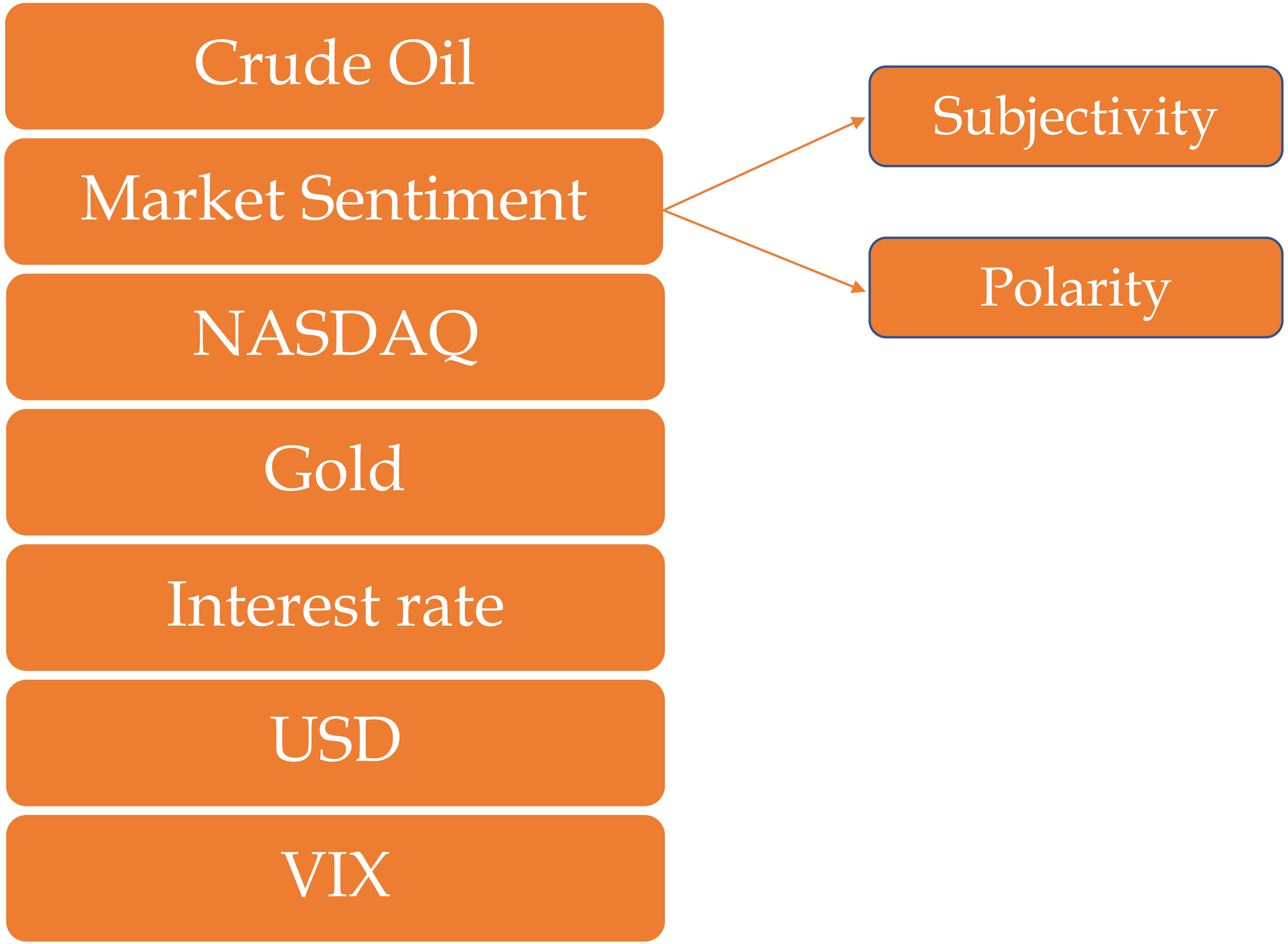
Historical Bitcoin Volume Chart



On February 8, Tesla bought $1.5 billion worth of bitcoin. The company also confirmed it to start accepting payments in bitcoin.

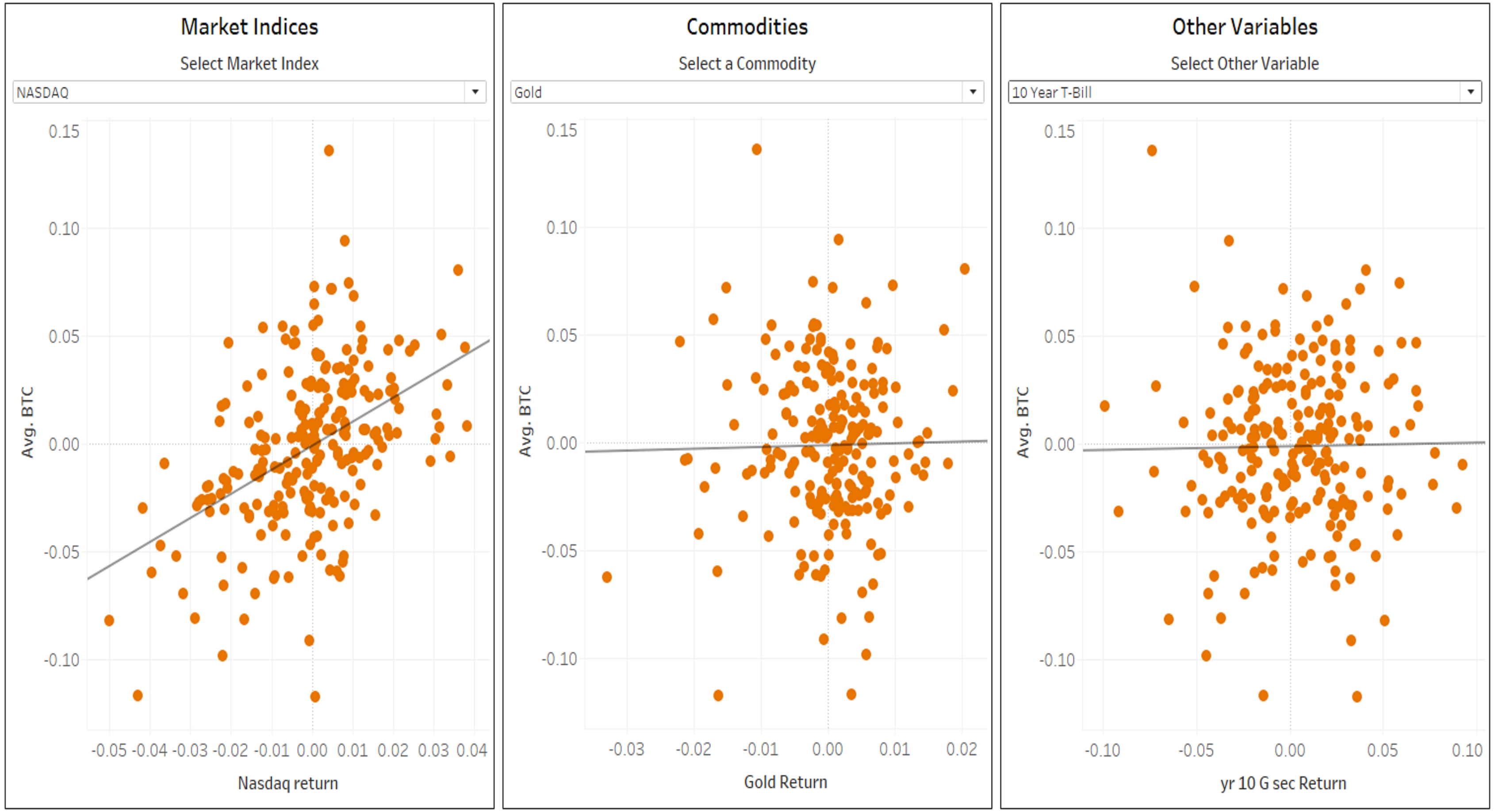
(1) 12 January 2018: Rumors that South Korea could ban trading in cryptocurrency, bitcoin depreciated by 12%.
(2) 26 January 2018: Coincheck, Japan's largest cryptocurrency OTC market, was hacked - Largest theft of 530M US dollars.

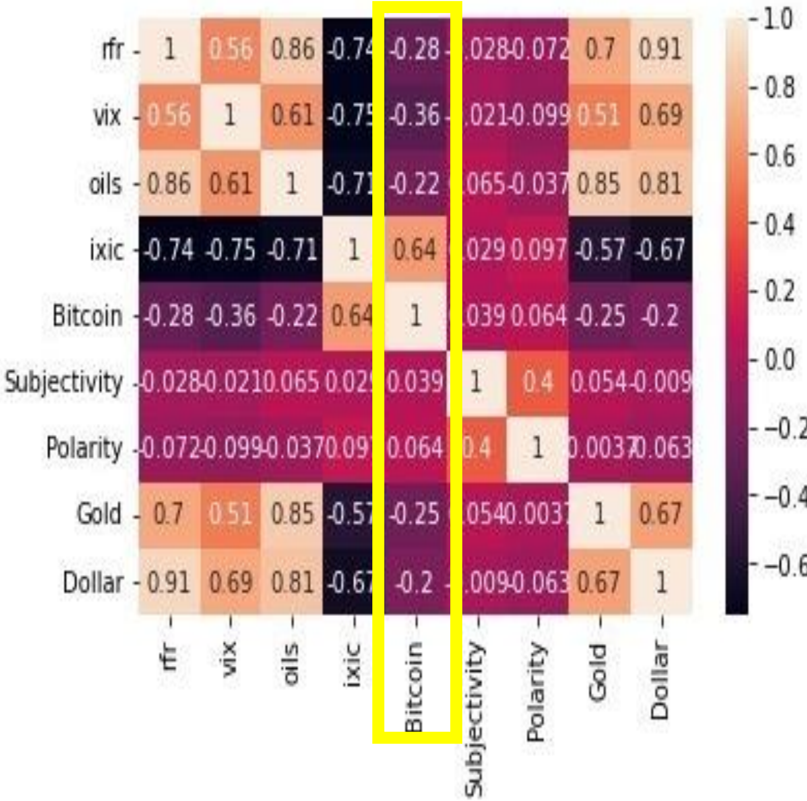
FACTORS INFLUENCING BITCOIN PRICE MOVEMENT?



- Crude Oil
- Market Sentiment
  - Subjectivity
  - Polarity
- NASDAQ
- Gold
- Interest rate
- USD
- VIX

Bitcoin Correlation Analysis



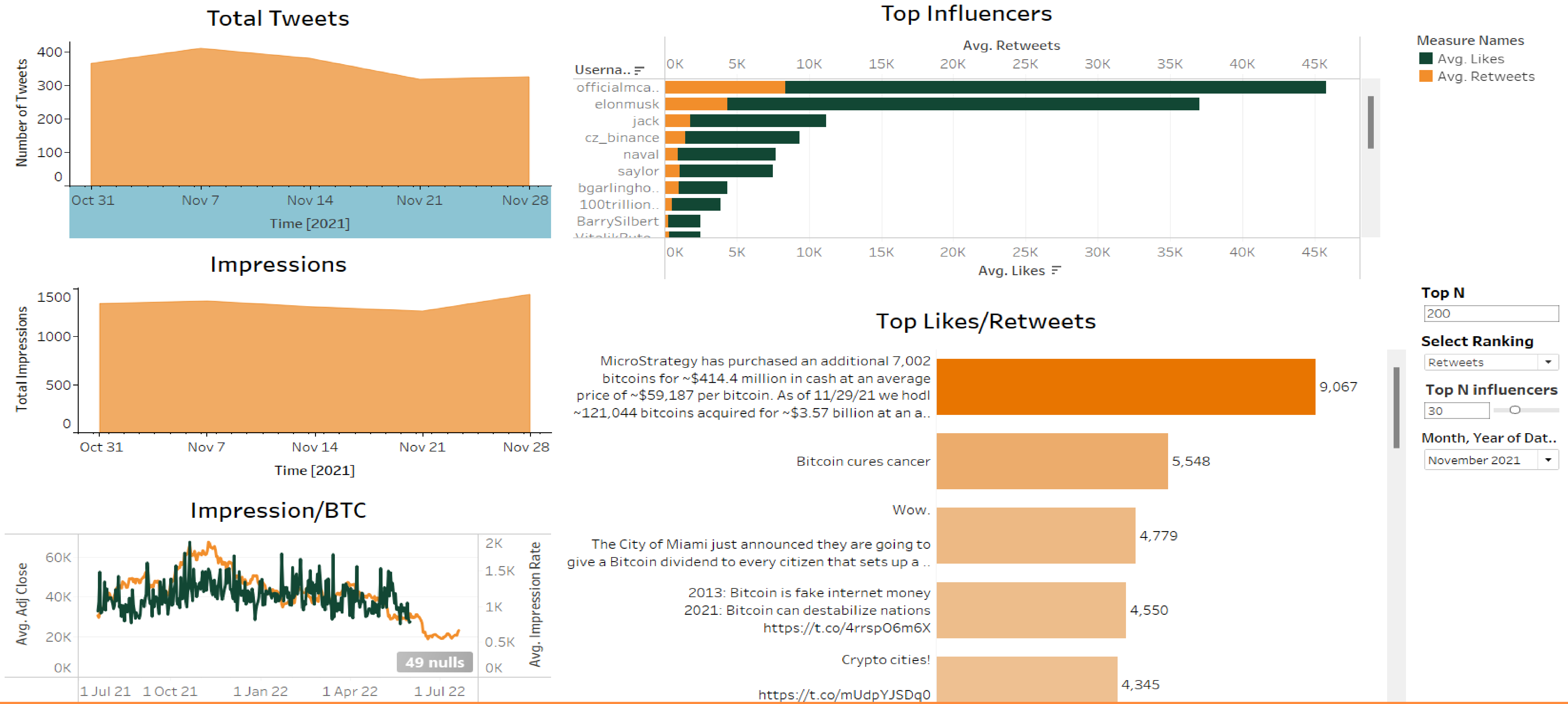


	rfr	vix	oils	ixic	Bitcoin	Subjectivity	Polarity	Gold	Dollar
rfr	1	0.56	0.86	-0.74	-0.28	.028	-0.072	0.7	0.91
vix	0.56	1	0.61	-0.75	-0.36	.021	-0.099	0.51	0.69
oils	0.86	0.61	1	-0.71	-0.22	.065	-0.037	0.85	0.81
ixic	-0.74	-0.75	-0.71	1	0.64	.029	0.097	-0.57	-0.67
Bitcoin	-0.28	-0.36	-0.22	0.64	1	.039	0.064	-0.25	-0.2
Subjectivity	-0.028	-0.021	0.065	0.02	0.039	1	0.4	0.054	-0.009
Polarity	-0.072	-0.099	-0.037	0.09	0.064	0.4	1	0.0037	0.063
Gold	0.7	0.51	0.85	-0.57	-0.25	.054	0.003	1	0.67
Dollar	0.91	0.69	0.81	-0.67	-0.2	.009	-0.063	0.67	1

Data Extraction (Snapshot)

Sno.	Username	Datetime	Text	Likes	Replies	Retweets	Quotes
1	VitalikButerin	05-29-2022	@buchmanster @soulbound_human @Leo_Glisic @TrustlessState @tokenterminal Listened to that one 2 days ago! I think my own view is that I'm ultimately a bit confused by money-mythologizing because the term "money" combines together SoV, MoE and UoA and the crypto space is moving toward those being very very separable.	68	16	8	1
2	VitalikButerin	05-28-2022	@thenim9 @provenauthority @TrustlessState @owocki Need a blockchain anyway eg. if you want a persistent account that can survive key changes. From that point, why not lean on it a bit more?	14	12	1	1
3	VitalikButerin	05-27-2022	@TrustlessState I wasn't referring to you! It's a sentiment I hear from "decentralization but not blockchain" folks all the time.	190	22	6	0

Tweets Overview


Total Tweets
Number of Tweets
400
300
200
100
0
Oct 31
Nov 7
Nov 14
Nov 21
Nov 28
Time [2021]
Impressions
Total Impressions
1500
1000
500
0
Oct 31
Nov 7
Nov 14
Nov 21
Nov 28
Time [2021]
Impression/BTC
Avg. Adj Close
60K
40K
20K
0K
2K
1.5K
1K
0.5K
0K
Avg. Impression Rate
49 nulls
1 Jul 21
1 Oct 21
1 Jan 22
1 Apr 22
1 Jul 22
Top Influencers
Avg. Retweets
Userna..
0K
5K
10K
15K
20K
25K
30K
35K
40K
45K
officialmca..
elonmusk
jack
cz_binance
naval
saylor
bgarlingho..
100trillion..
BarrySilbert
Avg. Likes
Measure Names
Avg. Likes
Avg. Retweets
Top Likes/Retweets
9,067
5,548
4,779
4,550
4,345

MicroStrategy has purchased an additional 7,002 bitcoins for ~$414.4 million in cash at an average price of ~$59,187 per bitcoin. As of 11/29/21 we hodl ~121,044 bitcoins acquired for ~$3.57 billion at an a..

Bitcoin cures cancer

Wow.

The City of Miami just announced they are going to give a Bitcoin dividend to every citizen that sets up a ..

2013: Bitcoin is fake internet money
2021: Bitcoin can destabilize nations
https://t.co/4rrspO6m6X

Crypto cities!

https://t.co/mUdpYJSDq0

Top N
200

Select Ranking
Retweets

Top N influencers
30

Month, Year of Dat..
November 2021

Sentimental Analysis

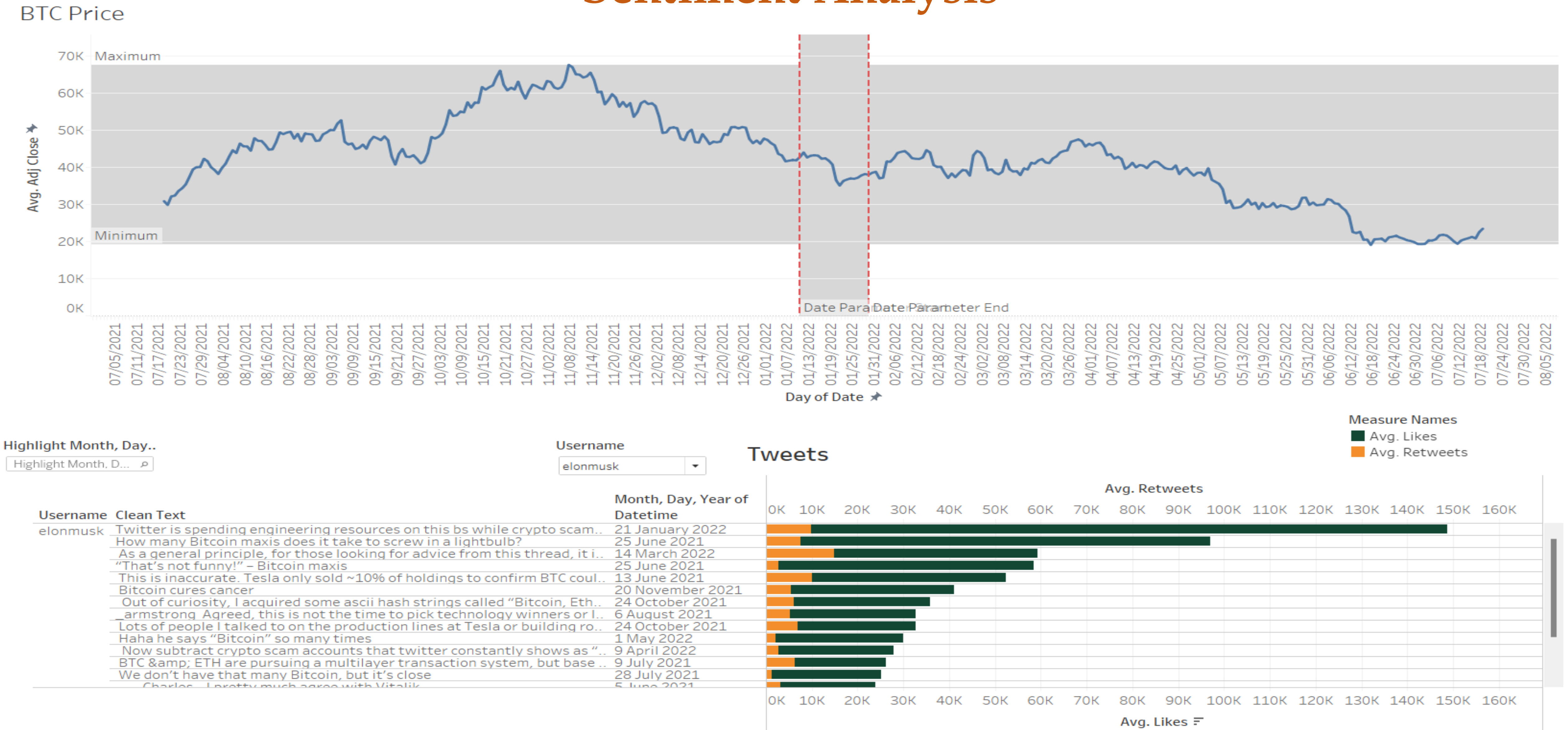
Crypto market sentiment analysis is a psychological evaluation of factors that influence the price movement of cryptocurrency.

Why Sentimental Analysis

The way investors feel about a cryptocurrency can have tangible effects on the market cycles and price of a cryptocurrency

Name	AVG of User_followers	AVG of Likes	AVG of Retweets	AVG of Subjectivity	AVG of Polarity
elonmusk	10,21,30,720	26,852	2,592	0.50	0.29
cz_binance	66,99,067	9,376	1,420	0.31	0.10
jack	64,18,107	11,235	1,756	0.38	0.12
CoinMarketCap	54,85,124	571	183	0.36	0.14
VitalikButerin	41,22,176	2,478	343	0.11	0.36
justinsuntron	33,62,468	1,825	420	0.40	0.23
saylor	26,43,281	7,541	1,024	0.28	0.11
naval	18,50,579	7,685	936	0.39	0.13
100trillionUSD	18,50,507	3,916	560	0.32	0.07
APompliano	16,38,358	2,045	242	0.36	0.22
iamrobertdobbs	15,90,437	317	34	0.42	0.09

Sentiment Analysis


BTC Price
Avg. Adj Close
70K
60K
50K
40K
30K
20K
10K
0K
Maximum
Minimum
Date Para
Date Parameter End
07/05/2021
07/11/2021
07/17/2021
07/23/2021
07/29/2021
08/04/2021
08/10/2021
08/16/2021
08/22/2021
08/28/2021
09/03/2021
09/09/2021
09/15/2021
09/21/2021
09/27/2021
10/03/2021
10/09/2021
10/15/2021
10/21/2021
10/27/2021
11/02/2021
11/08/2021
11/14/2021
11/20/2021
11/26/2021
12/02/2021
12/08/2021
12/14/2021
12/20/2021
12/26/2021
01/01/2022
01/07/2022
01/13/2022
01/19/2022
01/25/2022
01/31/2022
02/06/2022
02/12/2022
02/18/2022
02/24/2022
03/02/2022
03/08/2022
03/14/2022
03/20/2022
03/26/2022
04/01/2022
04/07/2022
04/13/2022
04/19/2022
04/25/2022
05/01/2022
05/07/2022
05/13/2022
05/19/2022
05/25/2022
05/31/2022
06/06/2022
06/12/2022
06/18/2022
06/24/2022
06/30/2022
07/06/2022
07/12/2022
07/18/2022
07/24/2022
07/30/2022
08/05/2022
Day of Date
Highlight Month, Day..
Highlight Month, D...
Username
Tweets
Measure Names
Avg. Likes
Avg. Retweets
Avg. Retweets
0K
10K
20K
30K
40K
50K
60K
70K
80K
90K
100K
110K
120K
130K
140K
150K
160K
Avg. Likes

Username: elonmusk

Username	Clean Text	Month, Day, Year of Datetime
elonmusk	Twitter is spending engineering resources on this bs while crypto scam..	21 January 2022
	How many Bitcoin maxis does it take to screw in a lightbulb?	25 June 2021
	As a general principle, for those looking for advice from this thread, it i..	14 March 2022
	“That’s not funny!” – Bitcoin maxis	25 June 2021
	This is inaccurate. Tesla only sold ~10% of holdings to confirm BTC coul..	13 June 2021
	Bitcoin cures cancer	20 November 2021
	Out of curiosity, I acquired some ascii hash strings called “Bitcoin, Eth..	24 October 2021
	_armstrong Agreed, this is not the time to pick technology winners or l..	6 August 2021
	Lots of people I talked to on the production lines at Tesla or building ro..	24 October 2021
	Haha he says “Bitcoin” so many times	1 May 2022
	Now subtract crypto scam accounts that twitter constantly shows as “..	9 April 2022
	BTC &amp; ETH are pursuing a multilayer transaction system, but base ..	9 July 2021
	We don’t have that many Bitcoin, but it’s close	28 July 2021
	Charles _ I pretty much agree with Vitalik	5 June 2021

OLS Linear Regression Summaries

Dependent Variable	Independent Variable	Est. coefficient	Standard Error	T-value	P-value	R-square
BTC Return	Polarity	0.0513	0.164	0.313	75.5%	0.0%
BTC Return	Subjectivity	0.0784	0.164	0.538	59.1%	0.1%
BTC Return	10-year Treasury Interest Rate	0.0013	0.009	0.143	88.7%	0.0%
BTC Return	Expected Volatility	0.0012	0.001	2.245	0.0%	2.5%
BTC Return	Nasdaq Return	0.0244	0.194	0.126	90.0%	0.0%
BTC Return	Oil Index Return	0.0959	0.098	0.974	33.1%	0.5%
BTC Return	Dollar Index Return	0.5629	0.770	0.731	46.6%	0.3%
BTC Return	Gold Index Return	0.336	0.355	0.946	34.5%	0.4%

Is Linear Regression Viable?

- No, the Linear Regression is not viable.

Q. Why ?

- The Variable themselves independently do not explain significant variation of the dependent variable i.e., Bitcoin

How Binary Logistic Regression works

Inputs: y(dependent variable): 0 or 1;
X(independent variables): Just like Linear Regression

$$\text{Y(Log Odds Ratio)} = \alpha + \widehat{\beta_1} * x_1 + \widehat{\beta_2} * x_2 + \ \ldots$$

$$\text{P (Probability of Y=1)} = \frac{1}{(1 + e^{-Y})}$$

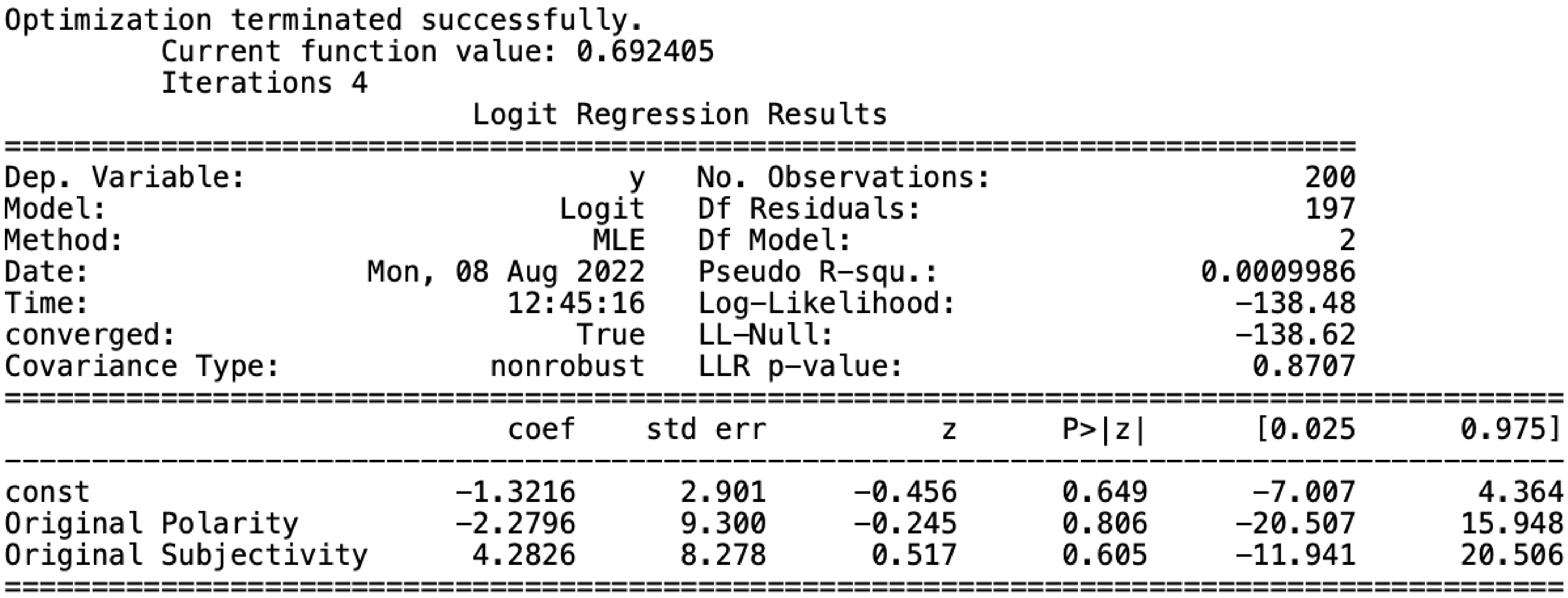
How to make prediction from logistic regression?

When P(Y=1)>50%, i.e. Log Odds Ratio>0, we predict BTC will go up.

When P(Y=1)<50%, i.e. Log Odds Ratio<0, we predict BTC will go down.

Binary Logistic Regression (Model 1)

Independent Variables: Polarity & Subjectivity



```
Optimization terminated successfully.
         Current function value: 0.692405
         Iterations 4
                           Logit Regression Results                           
==============================================================================
Dep. Variable:                      y   No. Observations:                  200
Model:                          Logit   Df Residuals:                      197
Method:                           MLE   Df Model:                            2
Date:                Mon, 08 Aug 2022   Pseudo R-squ.:               0.0009986
Time:                        12:45:16   Log-Likelihood:                -138.48
converged:                       True   LL-Null:                       -138.62
Covariance Type:            nonrobust   LLR p-value:                    0.8707
==========================================================================================
                             coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------------------
const                     -1.3216      2.901     -0.456      0.649      -7.007       4.364
Original Polarity         -2.2796      9.300     -0.245      0.806     -20.507      15.948
Original Subjectivity      4.2826      8.278      0.517      0.605     -11.941      20.506
==========================================================================================
```

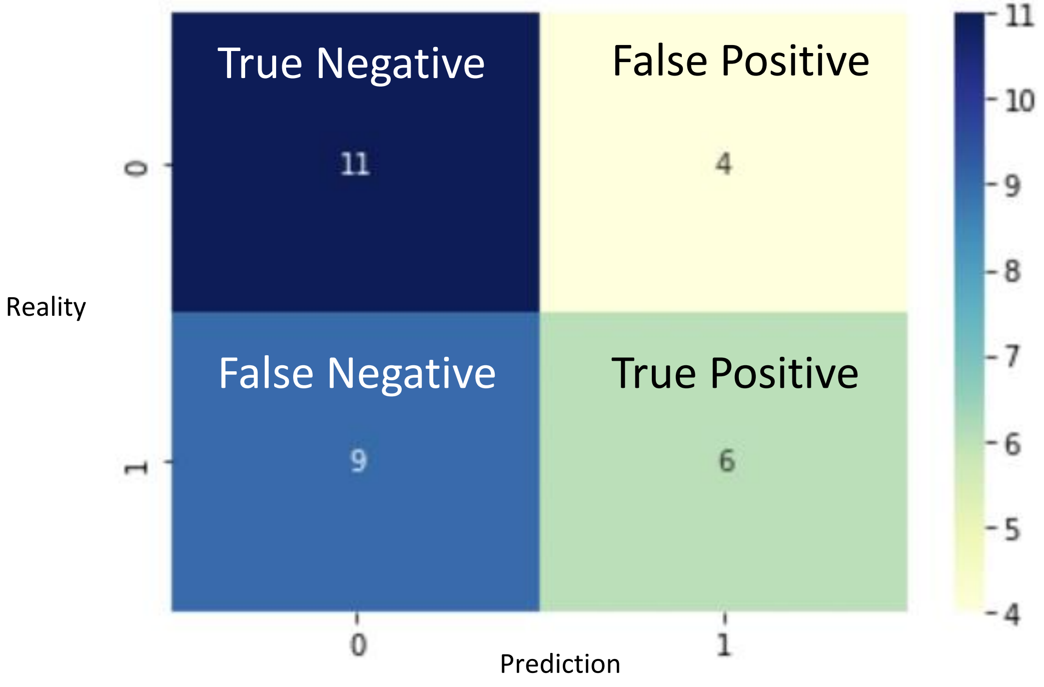
Key Measures: Z test;
LLR test

Training Data Period: Independent variables: 2021-06-16 to 2022-03-30
Dependent Variable: 2021-06-17 to 2022-03-31

Subjectivity	Polarity	Odds ratio	P(Go up)	Predection	BTC	Reality	Correct?
0.369	0.115	-0.002	49.96%	0	1.62%	1	FALSE
0.380	0.128	0.013	50.32%	1	0.36%	1	TRUE
0.342	0.119	-0.129	46.77%	0	-2.31%	0	TRUE
0.337	0.126	-0.166	45.87%	0	-5.29%	0	TRUE
0.326	0.119	-0.195	45.13%	0	0.69%	1	FALSE
0.360	0.129	-0.074	48.15%	0	-2.84%	0	TRUE
0.346	0.117	-0.107	47.33%	0	-6.57%	0	TRUE
0.338	0.104	-0.111	47.23%	0	1.52%	1	FALSE
0.354	0.108	-0.050	48.75%	0	2.56%	1	FALSE
0.346	0.098	-0.065	48.38%	0	-3.04%	0	TRUE
0.371	0.120	-0.006	49.85%	0	2.75%	1	FALSE
0.382	0.102	0.082	52.05%	1	1.64%	1	TRUE
0.341	0.133	-0.164	45.91%	0	-0.31%	0	TRUE
0.374	0.120	0.004	50.11%	1	-2.07%	0	FALSE
0.381	0.106	0.070	51.75%	1	-1.96%	0	FALSE
0.367	0.096	0.031	50.78%	1	2.47%	1	TRUE
0.392	0.113	0.099	52.46%	1	-5.96%	0	FALSE
0.386	0.139	0.014	50.34%	1	2.91%	1	TRUE
0.357	0.134	-0.100	47.50%	0	1.35%	1	FALSE
0.365	0.132	-0.061	48.46%	0	-2.97%	0	TRUE
0.357	0.130	-0.091	47.73%	0	0.16%	1	FALSE
0.349	0.120	-0.098	47.55%	0	-2.04%	0	TRUE
0.369	0.077	0.082	52.05%	1	5.03%	1	TRUE
0.358	0.102	-0.021	49.48%	0	-8.19%	0	TRUE
0.316	0.065	-0.115	47.12%	0	-1.47%	0	TRUE
0.362	0.100	0.002	50.04%	1	-11.71%	0	FALSE
0.358	0.098	-0.012	49.71%	0	2.37%	1	FALSE
0.342	0.096	-0.078	48.04%	0	-6.96%	0	TRUE
0.358	0.087	0.013	50.32%	1	0.38%	1	TRUE
0.337	0.088	-0.078	48.05%	0	0.81%	1	FALSE

Performance in Prediction (Model 1)

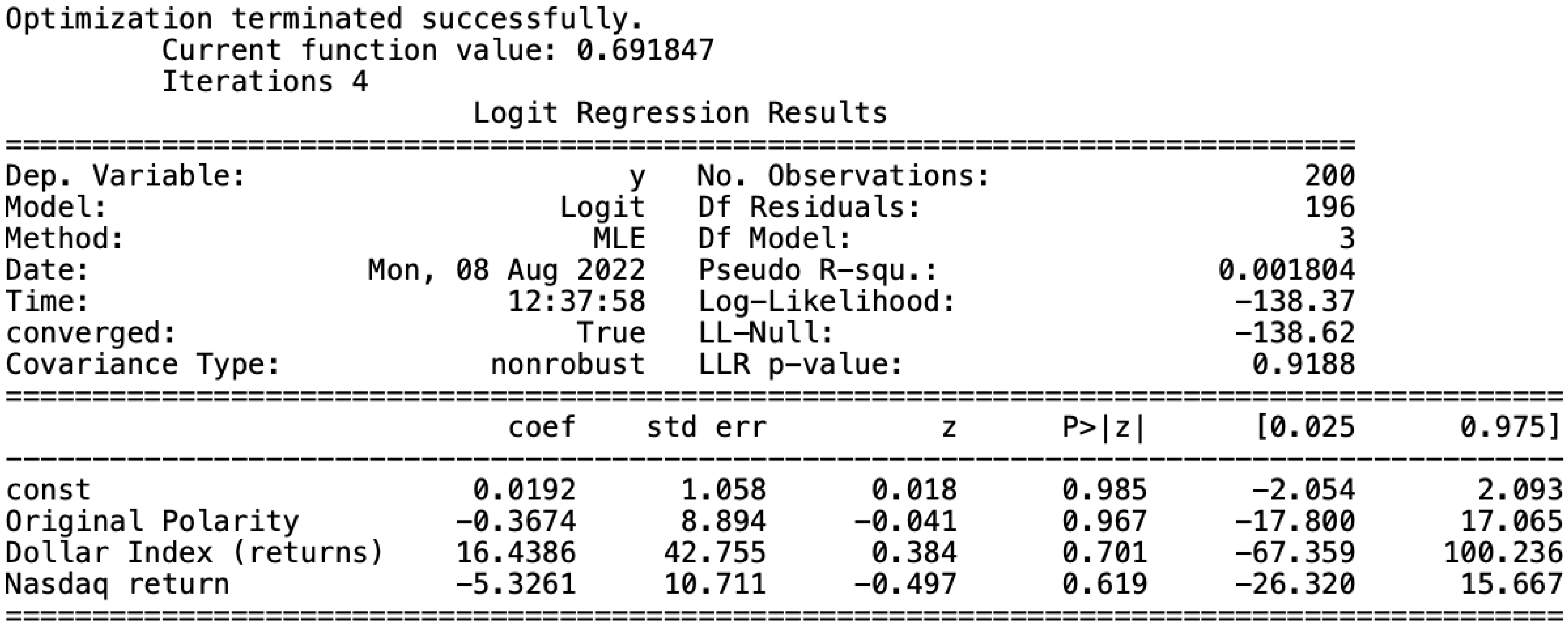
```
Accuracy: 56.666666666666664
```



Testing Data Period: Independent variables: 2022-03-31 to 2022-05-12
Dependent Variable: 2022-04-01 to 2022-05-13

Binary Logistic Regression (Model 2)

Independent Variables: Polarity & Nasdaq & USD

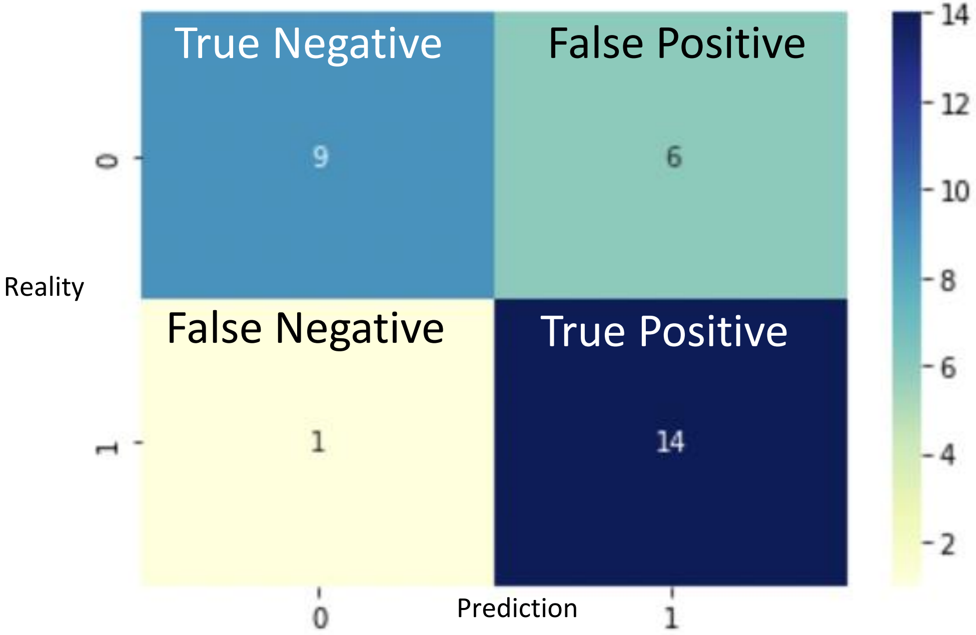


```
Optimization terminated successfully.
         Current function value: 0.691847
         Iterations 4
                           Logit Regression Results
==============================================================================
Dep. Variable:                      y   No. Observations:                  200
Model:                          Logit   Df Residuals:                      196
Method:                           MLE   Df Model:                            3
Date:                Mon, 08 Aug 2022   Pseudo R-squ.:                0.001804
Time:                        12:37:58   Log-Likelihood:                -138.37
converged:                       True   LL-Null:                       -138.62
Covariance Type:            nonrobust   LLR p-value:                    0.9188
==========================================================================================
                             coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------------------
const                      0.0192      1.058      0.018      0.985      -2.054       2.093
Original Polarity         -0.3674      8.894     -0.041      0.967     -17.800      17.065
Dollar Index (returns)    16.4386     42.755      0.384      0.701     -67.359     100.236
Nasdaq return             -5.3261     10.711     -0.497      0.619     -26.320      15.667
==========================================================================================
```

Performance in Prediction (Model 2)

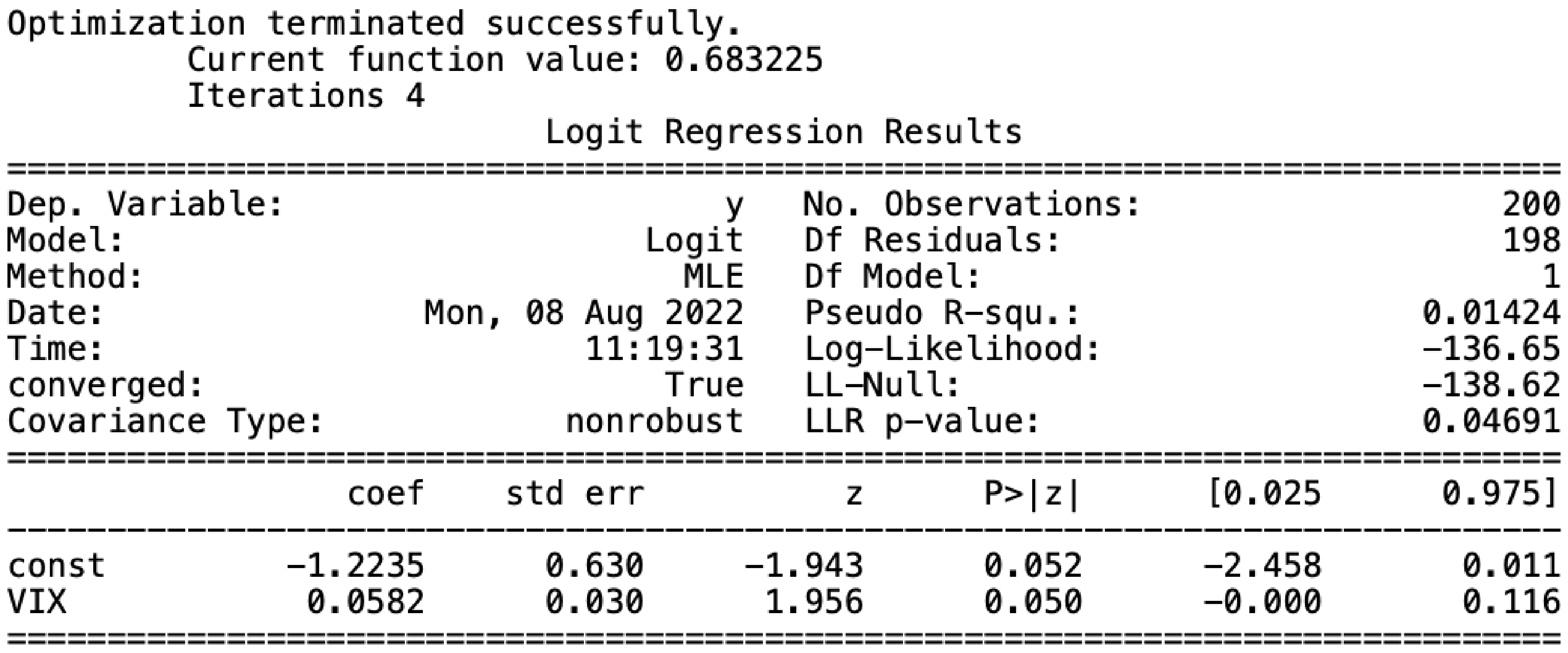
Nasdaq return	Polarity	Dollar Returns	Odds Ratio	P(Go up)	Predection	BTC	Reality	Correct?
-1.54%	0.115	0.49%	0.139	53.48%	1	1.62%	1	TRUE
0.29%	0.128	0.29%	0.005	50.13%	1	0.36%	1	TRUE
1.90%	0.119	0.43%	-0.056	48.61%	0	-2.31%	0	TRUE
-2.26%	0.126	0.47%	0.171	54.27%	1	-5.29%	0	FALSE
-2.22%	0.119	0.13%	0.115	52.88%	1	0.69%	1	TRUE
0.06%	0.129	0.10%	-0.015	49.62%	0	-2.84%	0	TRUE
-1.34%	0.117	-0.02%	0.044	51.11%	1	-6.57%	0	FALSE
-2.18%	0.104	0.09%	0.112	52.80%	1	1.52%	1	TRUE
-0.30%	0.108	0.25%	0.037	50.92%	1	2.56%	1	TRUE
2.03%	0.098	-0.46%	-0.201	45.00%	0	-3.04%	0	TRUE
-2.14%	0.120	0.53%	0.177	54.40%	1	2.75%	1	TRUE
-0.14%	0.102	0.28%	0.035	50.88%	1	1.64%	1	TRUE
2.15%	0.133	0.13%	-0.123	46.93%	0	-0.31%	0	TRUE
-1.22%	0.120	-0.58%	-0.056	48.60%	0	-2.07%	0	TRUE
-2.07%	0.106	0.23%	0.128	53.20%	1	-1.96%	0	FALSE
-2.55%	0.096	0.60%	0.218	55.42%	1	2.47%	1	TRUE
1.29%	0.113	0.62%	0.011	50.28%	1	-5.96%	0	FALSE
-3.95%	0.139	0.56%	0.271	56.73%	1	2.91%	1	TRUE
-0.01%	0.134	0.66%	0.078	51.96%	1	1.35%	1	TRUE
3.06%	0.132	0.56%	-0.100	47.50%	0	-2.97%	0	TRUE
-4.17%	0.130	-0.68%	0.081	52.02%	1	0.16%	1	TRUE
1.63%	0.120	0.51%	-0.027	49.32%	0	-2.04%	0	TRUE
0.22%	0.077	-0.13%	-0.042	48.96%	0	5.03%	1	FALSE
3.19%	0.102	-0.84%	-0.327	41.90%	0	-8.19%	0	TRUE
-4.99%	0.065	1.04%	0.433	60.65%	1	-1.47%	0	FALSE
-1.40%	0.100	0.10%	0.073	51.82%	1	-11.71%	0	FALSE
-4.29%	0.098	-0.01%	0.210	55.24%	1	2.37%	1	TRUE
0.98%	0.096	0.18%	-0.039	49.04%	0	-6.96%	0	TRUE
-3.18%	0.087	-0.05%	0.149	53.71%	1	0.38%	1	TRUE
0.06%	0.088	0.81%	0.116	52.91%	1	0.81%	1	TRUE

```
Accuracy: 76.66666666666667
```



Binary Logistic Regression (Model 3)

Independent Variables: VIX (Expected Volatility)

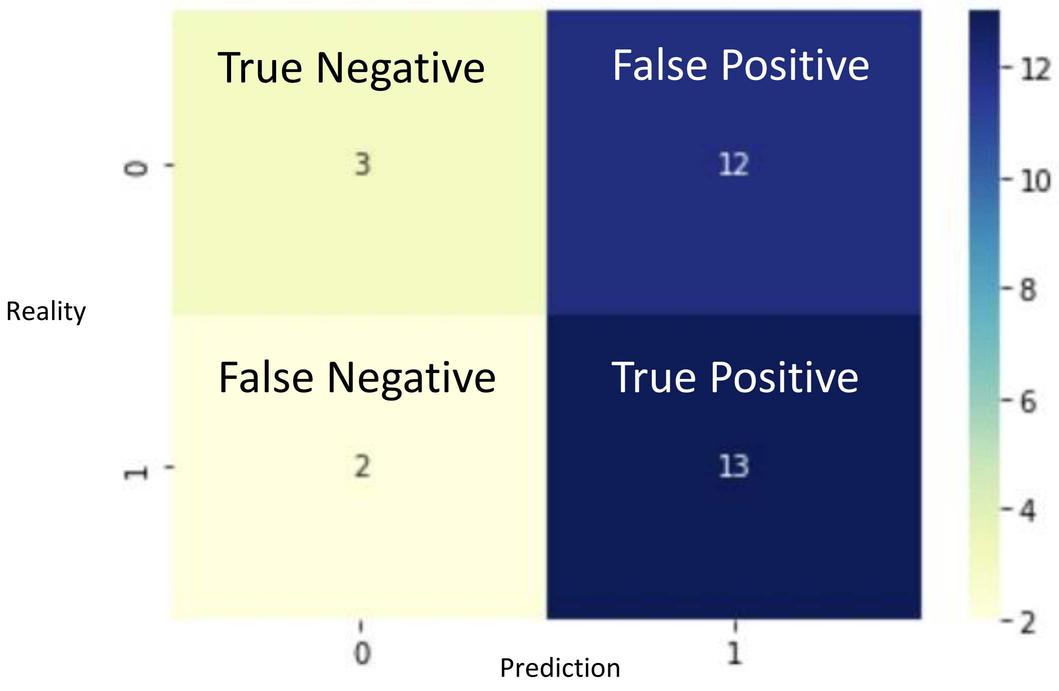


```
Optimization terminated successfully.
         Current function value: 0.683225
         Iterations 4
                           Logit Regression Results
==============================================================================
Dep. Variable:                      y   No. Observations:                  200
Model:                          Logit   Df Residuals:                      198
Method:                           MLE   Df Model:                            1
Date:                Mon, 08 Aug 2022   Pseudo R-squ.:                 0.01424
Time:                        11:19:31   Log-Likelihood:                -136.65
converged:                       True   LL-Null:                       -138.62
Covariance Type:            nonrobust   LLR p-value:                   0.04691
==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
const         -1.2235      0.630     -1.943      0.052      -2.458       0.011
VIX            0.0582      0.030      1.956      0.050      -0.000       0.116
==============================================================================
```

Performance in Prediction (Model 3)

VIX	Odds ratio	P(Go up)	Predection	BTC	Reality	Correct?
20.56	-0.027	49.33%	0	0.01618345	1	FALSE
19.63	-0.081	47.98%	0	0.00363379	1	FALSE
18.57	-0.143	46.44%	0	-0.0231449	0	TRUE
21.03	0.000	50.01%	1	-0.0529457	0	FALSE
22.10	0.063	51.57%	1	0.00685292	1	TRUE
21.55	0.031	50.77%	1	-0.028354	0	FALSE
21.16	0.008	50.20%	1	-0.065747	0	FALSE
24.37	0.195	54.86%	1	0.01519899	1	TRUE
24.26	0.188	54.70%	1	0.02557642	1	TRUE
21.82	0.046	51.16%	1	-0.0303644	0	FALSE
22.70	0.098	52.44%	1	0.02754627	1	TRUE
22.17	0.067	51.67%	1	0.01643529	1	TRUE
21.37	0.020	50.51%	1	-0.0030979	0	FALSE
20.32	-0.041	48.98%	0	-0.0206844	0	TRUE
22.68	0.096	52.41%	1	-0.0196111	0	FALSE
28.21	0.418	60.31%	1	0.02474905	1	TRUE
27.02	0.349	58.64%	1	-0.0595996	0	FALSE
33.52	0.727	67.42%	1	0.02905273	1	TRUE
31.60	0.616	64.92%	1	0.01348391	1	TRUE
29.99	0.522	62.76%	1	-0.0297024	0	FALSE
33.40	0.720	67.27%	1	0.00156456	1	TRUE
32.34	0.659	65.90%	1	-0.0204222	0	FALSE
29.25	0.479	61.75%	1	0.05031268	1	TRUE
25.42	0.256	56.36%	1	-0.0819414	0	FALSE
31.20	0.592	64.39%	1	-0.0147138	0	FALSE
30.19	0.534	63.03%	1	-0.117055	0	FALSE
34.75	0.799	68.97%	1	0.02367869	1	TRUE
32.99	0.697	66.74%	1	-0.0696271	0	FALSE
32.56	0.671	66.18%	1	0.00384232	1	TRUE
31.77	0.626	65.15%	1	0.00806958	1	TRUE

```
Accuracy: 53.333333333333336
```



Did those models perform well?

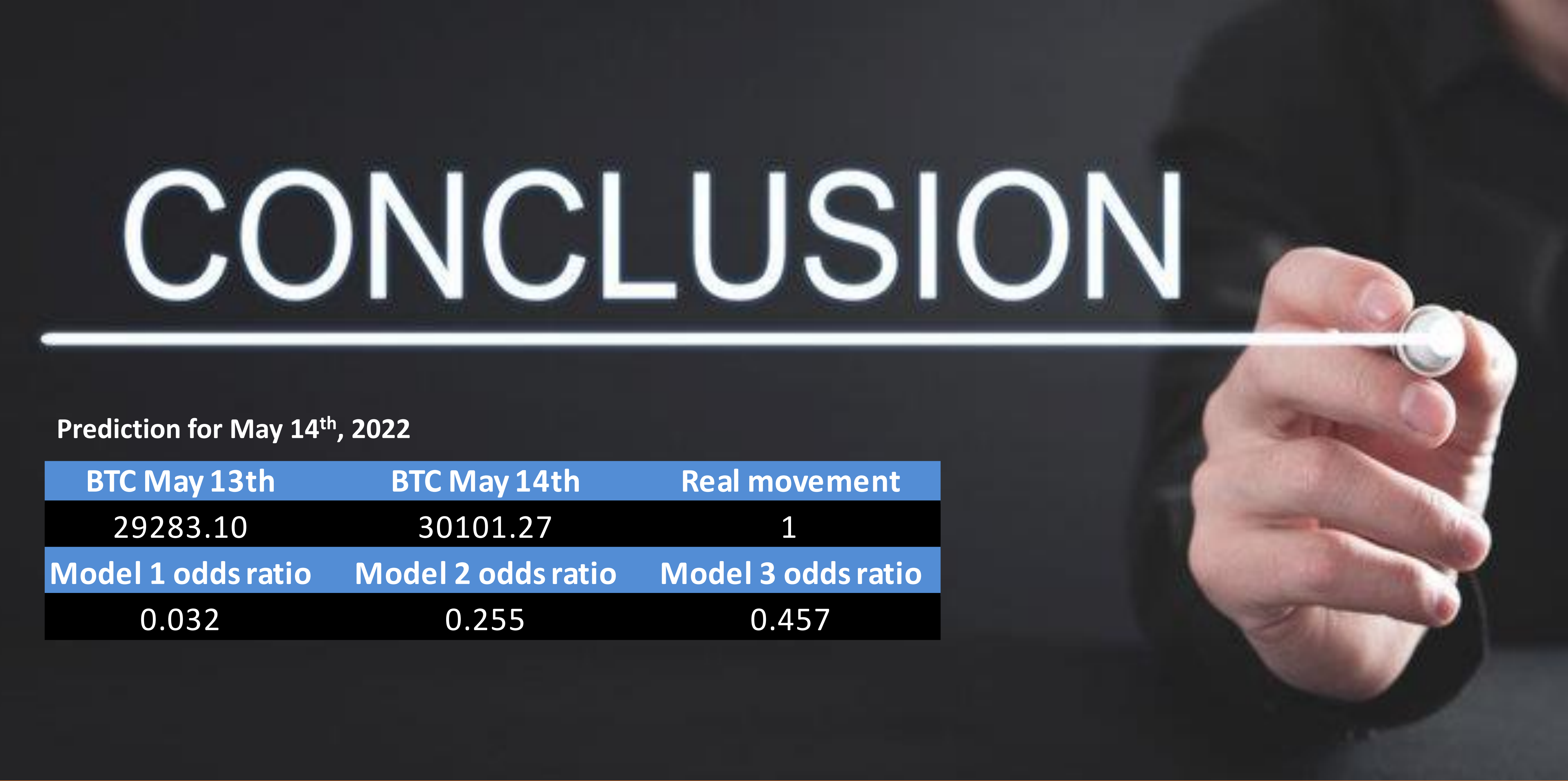
Model 1: Not good in both statistic measures and prediction performance;

Model 2: Performed well in prediction results but not in statistic measure;

Model 3: Significant in statistic measure but not good in prediction outcome.

Any chance to potentially improve modelling?

1. Increase the size of data sample;
2. Boost inputs by other technical method;
3. Try to use other factors as inputs.



CONCLUSION

Prediction for May 14th, 2022

BTC May 13th	BTC May 14th	Real movement
29283.10	30101.27	1
Model 1 odds ratio	**Model 2 odds ratio**	**Model 3 odds ratio**
0.032	0.255	0.457

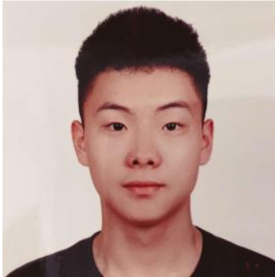
MENTORS

Andrew Bardin

Dr. Liping Ma

FINANCE LAB TEAM

Saiyam Agarwal


Zhifei Yu (Kevin)

Sukrut Balgaonkar

Shambhavi Chattannavar

Pooja Jasuja

Garima Gupta

Sagar Kadam

Ayush Vyas

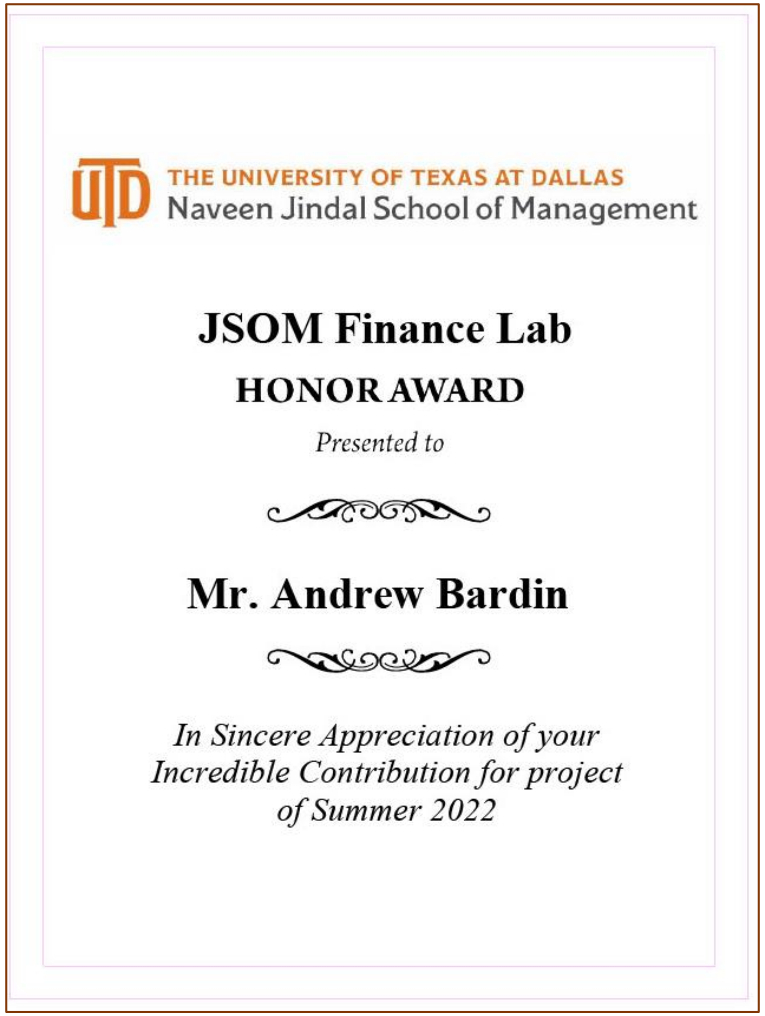
Aarya Shah

Lin Fan

Resources:

- https://www.blog.cointracking.info/best-100-crypto-twitter-accounts-to-follow
- https://coinmarketcap.com/historical/
- https://help.tableau.com/current/pro/desktop/en-us/sortgroup_sets_topn.htm
- https://btprovider.com/highlight-past-dates/
- Twitter Data Extraction - Packages Used

Sno.	Package name	Description
1	snscraper	Retrieve tweets
2	pandas_datareader	Read finance date from Yahoo! Finance
3	regex	Clean tweets
4	textblob	Sentiment analysis
5	matplotlib	Draw plots
6	seaborn	correlation matrix
7	statsmodels	Linear/Logistic Regression
8	sklearn	Linear/Logistic Regression
9	tweepy	extract followers



THE UNIVERSITY OF TEXAS AT DALLAS
Naveen Jindal School of Management

JSOM Finance Lab

HONOR AWARD

Presented to

* * *

Mr. Andrew Bardin

* * *

*In Sincere Appreciation of your
Incredible Contribution for project
of Summer 2022*

THANK YOU