



# Understanding the crypto market using Tweets

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# Introduction

- ❖ Cryptocurrencies are **highly volatile** assets
- ❖ Factors contributing to their fluctuation include:
  - ❖ **Sentiment:** Are people confident/doubtful about this specific crypto?
  - ❖ **Other cryptos:** Does the popularity/perception have an impact?
  - ❖ **Maturity:** Is the crypto accepted & used by other services?
  - ❖ What does Elon Musk say about it?
- ❖ A cryptocurrency has **no inherent value:** its value is the one perceived by the market and its users.
- ❖ Twitter provides a **plethora** of text-based information that can be used to better understand the cryptocurrency market.
- ❖ Tweets contain valuable information about user sentiments, which can be correlated with user-perceived value of a cryptocurrency.



# Some Tweets clearly have an impact



Elon Musk @elonmusk

Tesla stock price is too high imo

11:11 AM · May 1, 2020 · Twitter for iPhone



Elon Musk @elonmusk

Tesla will make some merch buyable with Doge & see how it goes

5:34 AM · Dec 14, 2021 · Twitter for iPhone

TECH

## Tesla shares tank after Elon Musk tweets the stock price is 'too high'

PUBLISHED FRI, MAY 1 2020 11:16 AM EDT | UPDATED FRI, MAY 1 2020 4:01 PM EDT

Source: CNBC

MARKETS

## Dogecoin spikes more than 20% after Elon Musk says Tesla will accept it as payment for merch

PUBLISHED TUE, DEC 14 2021 8:39 AM EST | UPDATED TUE, DEC 14 2021 5:36 PM EST

Source: CNBC



# Presentation Content

- ❖ Introduction
- ❖ Extraction: Pulling tweets & pre-processing
- ❖ Sentiment Analysis: VADER
- ❖ Sentiment Analysis: Predicting Prices
- ❖ Word Cloud: Most frequently mentioned topics
- ❖ Lift values: Association with other cryptos & people

# Pulling Tweets & Pre-processing

- ❖ The Twitter API was used to extract tweets over a specific period of time
- ❖ About 16,000 tweets were extracted over 1 week, which corresponds to ~ 100 tweets/hour
- ❖ Pre-processing the tweets:
  - ❖ Step 1 - Transform a tweet into “normal” text: Remove emojis, mentions (@), hashtags (#) and retweets
  - ❖ Step 2 – Apply conventional text pre-processing: Lowercasing, Removing punctuation & stopwords, etc.

A tweet that looked like this...

```
#100x $doge #cryptonews $bone $btc #erc20 $usdt #entrepreneur  
#Cryptocurrency $xrp #cryptoart #ShibaSwap #SHIBASTRONG #PS5 #CoinMarketCap  
$eth #Mandox #MandoxMilitia #MandoxMissions #goosgang #SaitaMask  
#MandoXCreate  
  
👉 Buy $MANDOX ↗ https://t.co/MtTgDe8lSG https://t.co/v2qzPKIb3v
```

... Now looks like this

```
doge bone btc usdt xrp eth mandox
```

# Sentiment Analysis: VADER

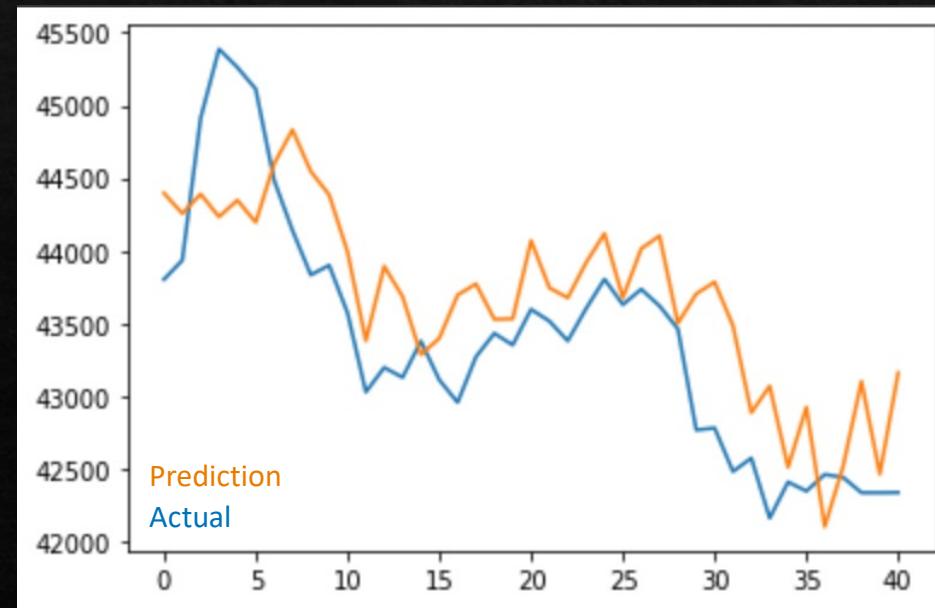
- ❖ To quantify the sentiment of the tweet (negative, neutral, positive perception), we performed a VADER sentiment analysis.
- ❖ Then, a compound polarity for each tweet was obtained

Finished Tweet	neg	neu	pos	compound
new payme trivia quizreward up k payme 35 m payme 30k referral pool start airdrop	0	1	0	0
next listdefipay	0	1	0	0
bobnftdesign nft giveawayhonouring bob marleys birthdayto enter1 follow like amp rt3 tag friends	0	0.663	0.337	0.6808
nftocean airdrop task no referral no airdrop link amp information	0.355	0.645	0	-0.5267
wen btc k	0	1	0	0
start betting favorite epl games leagues game today using usdt btc etherium easy	0	0.651	0.349	0.7096
greetings bullswe negotiating new art designer come new logo new design art	0	0.797	0.203	0.4215

# Sentiment Analysis: Predicting Bitcoin Prices

- ❖ We now have the sentiments... Great. Let's do something cool with them.
- ❖ The compound sentiments have been averaged over each hour. That way, an hourly compound sentiment is associated with an hourly closing price of Bitcoin.
- ❖ A Long Short-Term Memory (LSTM) neural network was trained to predict the price of Bitcoin based on the sentiments of the previous 3 hours.

Price	Sentiment
41603.2	0.300386
41675	0.178428
41591.8	0.171779
41438.2	0.223601
41514.9	0.177892



# What do people talk about when they talk crypto?

- ❖ Predicting the price based on sentiment is **only one thing** we can do with NLP.
- ❖ We can also find the most mentioned topics around bitcoin, using a word cloud.

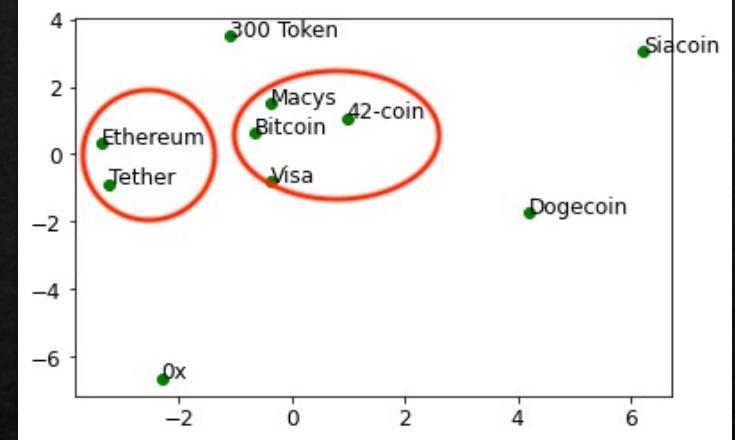


- ❖ Many other topics are mentioned around bitcoin: Buying, airdropping cryptos, NFTs, as well as other cryptocurrencies: \$ZRK (0x), \$AMP, \$ETH
- ❖ The word cloud allows us to see which other topics are worth keeping track of, when discussing cryptocurrencies.

# Lift Values and MDS Plot

Lift values of cryptocurrencies between each other:

Name	Macy's	Bitcoin	Visa	Ethereum	Siacoin	300 Token	Tether	0x	Dogecoin	42-coin
Macy's	0	1.02345164	1.346142542	1.04498164	1.46810716	1.05988119	1.00925018	1.43777081	1.06611769	1.00136907
Bitcoin	0	0	1.211978266	1.47563343	1.39826311	0.22785779	1.0685293	1.32077236	1.57939388	1.46319445
Visa	0	0	0	1.36923806	2.56849099	0.15553728	1.24529212	1.75175172	1.65862313	1.31090729
Ethereum	0	0	0	0	2.12451818	0.34872826	0.89158039	2.09471003	4.4375344	0.98795609
Siacoin	0	0	0	0	0	0.10261386	2.64074974	8.38265735	1.32874037	1.07077336
300 Token	0	0	0	0	0	0	0.43176504	0.60466424	0.38338286	0.40401333
Tether	0	0	0	0	0	0	0	2.0747904	4.38501801	2.0794424
0x	0	0	0	0	0	0	0	0	3.22401828	1.94143317
Dogecoin	0	0	0	0	0	0	0	0	0	0.92321343
42-coin	0	0	0	0	0	0	0	0	0	0



Lift values of cryptocurrencies with influential people

	Macy's	Bitcoin	Visa	Ethereum	Siacoin	300 Token	Tether	0x	Dogecoin	42-coin
@elonmusk	1.222677	1.020133	0.259356	1.008606	0.213587	0.165045	1.008606	0.806885	0.778067	0.302582
@cz_binance	1.456662	1.16533	1.966494	1.737205	1.199604	0.55618	1.13296	1.13296	1.456662	1.699439
@danheld	1.231072	1.723501	0	1.288943	0	0	0	2.320098	3.86683	1.988655
@jack	1.698568	1.188997	0	0.815979	1.295966	0	4.079893	0	1.049115	1.223968
@tyler	2.37408	5.073034	0	0	0	0	0	0	0	0
@lopp	0.306445	0	0	0	0	0	0	0	0	0
@novogratz	0.701006	0	0	0	0	0	0	0	0	0
@cryptomanran	2.208875	9.277277	0	0	0	0	0	0	0	0
@muneeb	2.334202	1.307153	0	0	0	0	0	0	0	11.437589
@aantonop	1.475885	3.443733	0	0	0	0	0	0	0	0

Influential people include Elon Musk, Jack Dorsey, Twitter's Ex-CEO, and Changpeng Zhao, Binance's CEO.

# Conclusion



- ❖ Text analytics allow us to extract valuable insights from tweets to get a better understanding of the crypto market.
- ❖ Sentiment analysis allows us to **quantify the polarity of tweets** and determine to what extent do they reflect a negative, neutral or positive emotion.
- ❖ Those sentiments can be used to **predict the price of cryptocurrencies, to an extent.**
- ❖ A word cloud allows us to see **which topics are frequently mentioned** when people talk crypto.
- ❖ Lift values and MDS plots show us the **level of association** of some cryptocurrencies and influential people.