

Cryptocurrency Opinions on Twitter

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ABSTRACT

Cryptocurrencies are a relatively new topic and a topic that still has potential growth in the future. Due to its recency, however, abundant datasets about the topic are hard to come by, which is where social media comes in handy. To analyze opinions towards cryptocurrencies, the most recent 1000 tweets were related to five different cryptocurrencies were pulled and run through a sentiment analysis for further conclusions on how the general public feels about these new technologies. The final nested bubble chart visualization provides a number of effective insights about the current state of cryptocurrency.

Keywords: Blockchain, cryptocurrencies, sentiment analysis

1 INTRODUCTION

Blockchain is a reasonably new technology with potential to change multiple industries and fields. It can impact art and culture through its tracked transactions, making any piece of work traceable back to the original creator [1]. It can impact the medical and machinery industry through integrating licenses into the network when distributing products. It can also impact currencies as the public have seen recently with the hot topic of crypto-currencies and their trading trends.

With new technology comes a lingering curiosity on what the public thinks about the topic that became so popular overnight. What cryptocurrency brings to the table includes: faster and cheaper transactions, a migration towards unbanking with electronic money, funds protected from identity theft, and transactions that don't need the trust of the other participating parties. However, those involved with the current banking industry may be less supportive of the technological changes as it threatens their career. Digital money also has the risk of depending on machinery and possibly being hacked.

William Goetzmann from Yale's School of Management discusses that "Money isn't a material reality-- it is a mental construct" and that different currencies only have value if society as a whole believes that there is value in it [2]. Cryptocurrencies may become the dominant currency

over time if the public finds value in it. If not, then there is a chance that it remains a less explored concept. For a basic investigation on this theory, recent tweets from Twitter were filtered and analyzed for a quick look on what social media users thought about the top five popular cryptocurrencies.

2 RELATED WORK

A number of larger businesses have already started investigations on what people think about the new discovery of blockchain. Deloitte held a global blockchain survey and shared multiple conclusions on what they've found. Between the years 2018 and 2019, more organizations have decided to invest in adding blockchain to their strategic priorities and the technical barriers that come with the changes are viewed less as an obstacle. However, the opinion that blockchain is overhyped grew to a 43% of the respondents [3].

PricewaterhouseCoopers (PwC) also had a survey on businesses' views on blockchain in 2018. Just a little under half of respondents believe that trust is the main factor that would delay the adoption of blockchain into society along with regulatory uncertainty. Only 15% of companies have live blockchain projects, but 32% of companies do have projects in development [4].

In regards to cryptocurrencies specifically, the one that has had the most publicity is Bitcoin: introduced in 2009 and with a trading history that peaked at \$266.00 per coin right before dropping its by 50% after the first major cryptocurrency exchange hack with Mt. Gox in 2014. This behavior relates back to Goetzmann's belief that Bitcoin is currently a bad currency as its worth fluctuates between \$25.00 and \$100.00, unable to provide the people with a stable value.

However, despite the fickle performance of Bitcoin, others were motivated to produce competitors, and the world of digital currencies expanded to Litecoin, Ripple, Ethereum, and more. Bitcoin was also able to recover back to its initial price two years later near the end of 2016 [2][5][6].

3 METHODS

To find the public's opinions on various cryptocurrencies, the social media outlet Twitter was utilized to obtain tweets related to a set of keywords which were then run through a sentiment analysis to see whether positive, negative, or neutral emotions were expressed when individuals were talking about the filtered topics. The planned and final visualization of the data is a nested bubble chart in D3 for viewers to compare each cryptocurrency between each other along with the sentiment subcategories within each cryptocurrency.

3.1 Data Collection and Preprocessing

The top five cryptocurrencies selected were based off the number of appearances each cryptocurrency had throughout multiple articles found online that analyzed popularity and prices. The final list of selected cryptocurrencies include: Bitcoin, Ethereum, Litecoin, Ripple, and Bitcoin Cash. The following figure is the Python dictionary of the different keywords that were used to filter tweets with, primarily being case sensitive variations of each cryptocurrency's name and abbreviation.

```
"currency": "Bitcoin BTC",
"keywords": ["Bitcoin", "bitcoin", "btc", "btc"]

"currency": "Ethereum ETH",
"keywords": ["Ethereum", "ethereum", "ETH", "eth"]

"currency": "Ripple XRP",
"keywords": ["Ripple", "ripple", "xrp", "xrp"]

"currency": "Litecoin LTC",
"keywords": ["LiteCoin", "litecoin", "LTC", "ltc"]

"currency": "Bitcoin Cash BCH",
"keywords": ["BitcoinCash", "bitcoincash", "bch", "bch"]
```

Figure 1: Python dictionary storing key/value pairs of each cryptocurrency's name and related keywords to filter on.

Tweet data was obtained in separate sets filtered by each set of cryptocurrency keywords, resulting in groups of tweets related to Bitcoin, tweets related to Ethereum, etc. Each set of tweets were then run through a function that calculated the fraction of positive, negative, and neutral tweets of the current set against the total number of tweets found throughout all cryptocurrencies. This was to ensure that the ratios of each leaf node are properly sized within the overall picture such that each leaf node fraction from each cryptocurrency adds up to a total of 100.

$$\text{Positive Bitcoin Opinions} = \frac{\# \text{ of positive Bitcoin tweets}}{\text{total \# tweets of all 5 cryptocurrencies}}$$

Figure 2: Example equation on how the fraction value was calculated for Bitcoin tweets with positive sentiment.

Dataset is static and was last updated on December 14, 2019 at 11:12 UTC-6. The values displayed are the statistics of the last 1000 tweets related to the provided keywords. Tweet obtainment and sentiment analysis was performed with the help of Tweepy [7].

3.2 Visualization Building

The initial decision to use a nested bubble chart was based off the ability to visualize the varying scales of each leaf node within an overarching bigger picture. Visualizing each grouping also allows viewers to compare the different levels of data, i.e. comparing the popularity of two cryptocurrencies and comparing the positive popularity of two cryptocurrencies together. With the aid of online documentation, an additional interactive implementation to the visualization was the feature of zooming in on certain bubbles [8]. Users may compare the fractions of the cryptocurrencies overall, or they may focus the visualization into one specific cryptocurrency and explore the related sentiment fractions.

For a number of the test data, each cryptocurrency would be talked about in roughly equal amounts, making it difficult to make out any differences within the visualization as each encompassing circle appeared to have the same scale. To resolve this dilemma, numerical percentages were added onto each bubble's label. Additional values were also calculated for each cryptocurrency to comply with the nested chart's recursive nature.

4 CONCLUSIONS

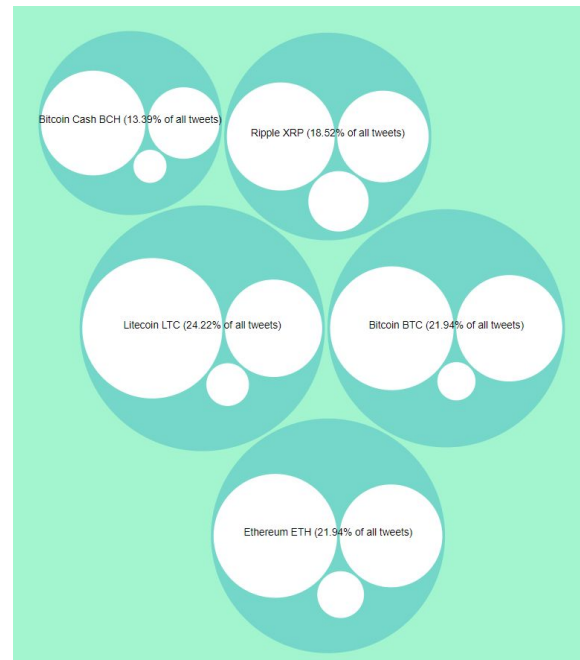


Figure 3: Full view of the final visualization. Percentages for each cryptocurrency are: Litecoin 24.22%, Bitcoin

21.94%, Ethereum 21.94%, Ripple 18.52%, and Bitcoin Cash 13.39%.

While the dataset is only a small one and reflects the opinions of just a small moment in time, a number of conclusions can still be found within the calculated numbers. There are not any drastic differences between how often each cryptocurrency is talked about, although a ranking is still apparent. Litecoin is at the top with most tweets related to it, living up to its reputation as Bitcoin's main rival [5].



Figure 4: Zoomed in view of sentiment analysis on Bitcoin related tweets. Percentages for each sentiment are: Positive 8.83%, Negative 1.14%, Neutral 11.97%.

Despite the major drops in value in the past, Bitcoin has been able to regain reputation as the number of positive tweets are almost 8x more than the negative tweets.

When looking through each cryptocurrency's statistics within the visualization, most currencies have mostly neutral feeling tweets about them but more positive tweets than negative tweets. Positive emotions within Bitcoin tweets also show that the future of cryptocurrency still has potential despite past hacking incidents. Goetzmann states that currencies work if the people believe that there is value within a certain item, and with these trends visible for the present, society is continuing forward with investing in cryptocurrencies, albeit more cautiously than before.

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