

Assignment 4 - Youtube Network Analysis

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Case Study 1: Are people watching videos related to Bitcoin?

Introduction

Cryptocurrency is a form of a digital payment that work using the underlying technology "blockchain". Blockchain was invented in 2008 to serve as the ledger (a record of accounts and their transactions) of the cryptocurrency called "bitcoin". Even though there are more than 4,000 cryptocurrencies in existence as of January 2021, Bitcoin is still by far the most popular cryptocurrency. Despite the global pandemic, the cryptocurrency market has witnessed a boom. Bitcoin especially has been on a bull run for a long time, and it surpassed the 1 trillion dollars mark.

As a part of this assignment, we explored videos on Youtube related to Bitcoin and Cryptocurrencies. In our exploration, we also came across Coinbase, which is an American company that operates as cryptocurrency exchange platform. Coinbase has been in news because it launched its IPO (Initial Public Offering). On April 14, 2021, the U.S. cryptocurrency exchange Coinbase went public, with its shares opening at USD 381 on the Nasdaq stock exchange. Coinbase was set, initially, to open at USD 250 per share. We want to investigate the sentiment of the videos on Youtube related to cryptocurrencies in the current climate where bitcoin and other cryptocurrencies such as Dogecoin are trending. We try to answer, whether there is a relationship between the number of views a video gets and its sentiment.

We perform the sentiment analysis on the description of the videos that we found out are related to cryptocurrencies on YouTube. We conclude that, videos with a positive sentiment, had maximum views. It is evident that people are watching more and more videos about cryptocurrencies on Youtube, especially the ones that are positively talking about Bitcoin and Coinbase and other things.

Using the data extracted from April 2021, we perform our analysis. For sentiment analysis, the text file of the desired result is exported to a csv from Neo4j and utilised for analysis in Python.

Visualising the Bitcoin Bubble on YouTube since 2020

Videos with Hashtag Bitcoin. We explored the videos uploaded from 2020 with the hashtag "bitcoin" and found a relatively smaller graph with a total of 13 videos which were

uploaded by only 10 channels. The yellow nodes represent the Channel, the blue nodes represent the videos uploaded by the channels and the red node is the hashtag. All the videos mention the hashtag, bitcoin. Also, more hashatgs related to bitcoin were also discovered.



Fig. 1. Channels and their Videos related to the hashtag "bitcoin"

As Bitcoin has been making news, we see that, most of the channels are news channels, including Al Jazeera and Reuters. There are videos from few niche channels too, whose works focuses only on Bitcoins, called Coin Bureau. Trader University is one such channel, which posts about trading (financial). There are two channels, that have more than two posts, with the hashtag "bitcoin". Trader University has three videos and Yahoo Finance has two.

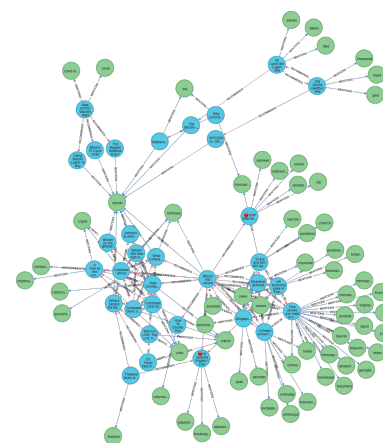
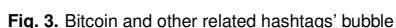


Fig. 2. Recommended Videos and the hashtags associated with them

Recommendations of Videos with Hashtag Bitcoin. While exploring the videos recommended by "bitcoin" videos, an interesting finding was that hashtags such as crypto, cryptocurrencies,coinbase, coinbaseipo, crypto currency which are similar to bitcoin were observed. The blue

Interestingly, the hashtags observed above were the same that we discovered from the initial 13 videos with hashtag bitcoin. The hashtags were used the least (only once) were “Cryptocurrencies”, “Cryptocurrency”, “coinbaseipo” and “ipocoinbase”. The most frequently used hashtags were “Coinbase” and “crypto”, both have been recommended thrice.

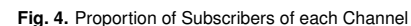
Bitcoin Bubble. The bitcoin bubble is defined as the connection between the videos that have one of the seven hashtags and the recommended videos of which also have these seven hashtags (discovered above). In the graph, green nodes represent channels and orange nodes represent videos having one of the seven hashtags. Yahoo finance has uploaded a total of four videos that were posted over a short span of time around 12th - 13th April, 2021. It's interesting to note that only one of its videos namely "Coinbase will be huge... it's a cash engine right now: Bullpen Capital Founder" recommends all the other videos uploaded by it. Also, it is one of the videos in the bubble which recommends all the videos except "Bitcoin hits record". No video from Trade University which appeared previously are present in this bubble.



Some interesting findings about channel's reach and the popularity of their videos on bitcoin:

- of subscribers, and hence, can be said to have most reach. Al Jazeera is followed by Meet Kevin and Coin Bureau.

- Even though better reach of the channel can result in more views/likes but we can not find a conclusive relation between reach of the channels and their popularity of their videos. However, we noticed that channels with less subscribers got more likes. It might be due to the fact they post unique content or click bait videos.



- Fig. 5.** Proportion of Views of each Videos

Before performing sentiment analysis, data pre-processing has been done. The title and description of the video has been cleaned by removing numbers, special characters, symbols and stop words. Python "TextBlob" package was used in an attempt to clean the text of the nine videos in the bitcoin bubble.

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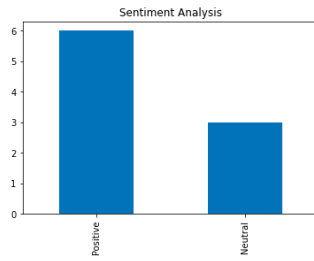


Fig. 6. Sentiment Analysis score

Sentiment analysis results in maximum videos depicting positive sentiment (6 out of 9) and 3 videos turned out to be of neutral sentiment. The two videos that have the highest positive polarity are posted by Al Jazeera and Meet Kevin respectively. Out of the four videos of the channel Yahoo Finance, three videos have a neutral sentiment.

Conclusion

After selecting our subgraph, which is the videos with hashtags related to bitcoin and cryptocurrencies, and their recommended videos related to the same hashtags, we analysed the number of views they got.

The most viewed videos were What's behind the Bitcoin hype? | Start Here by Al Jazeera, "Bitcoin on the BRINK?This could change EVERYTHING!!" by Coin Bureau and "Coinbase Just Doubled | Why it Might 5x FAST | Coinbase IPO" by Meet Kevin.

After performing the sentiment analysis on these videos description, it is found that all three of these videos have shown positive sentiment. In fact, the two most positive videos among the nine videos are by Al Jazeera and Meet Kevin respectively. We can safely conclude that most of the videos uploaded related to bitcoin have positive sentiment.

Case Study 2: Misinformation network on Youtube

Introduction

Misinformation is false, inaccurate, or misleading information communicated with an intention to deceive. The primary reason for entities to indulge in these activities is to turn a profit. Some of them are politically motivated, engaged in disinformation to foster specific viewpoints among a population and, others are engaged for their entertainment. In a recent study by [BMJ Global Health](#), it was suggested that more than one out of four most viewed videos on Youtube contains inaccurate information. Another study claimed that over a quarter of videos viewed on Youtube contain misleading and misinformative videos about coronavirus. In the context of the pandemic, the misinformative videos can affect all aspects of life, especially people's mental health. Numerous fabricated stories related to the virus are shared widely without much background or quality check. All aspects of false information of the disease such as how the virus originated, its cause, treatment and mechanism of spread are being circulated and absorbed quickly, altering

people's behaviour, leading them to take higher risk, making the current situation much more severe.

In the scope of this assignment, we would like to explore the misinformative videos available on Youtube. The first question that pops up is: are there any channels that are actively involved in uploading misleading videos? If yes, which type of content is being uploaded by them? How far is their reach? Are those videos popular? To answer these questions, we explored the data collected from Youtube during April 2021. Due to the plethora of data, we have considered only those videos which were uploaded after January 1, 2019.

Do all misleading videos converge to one?

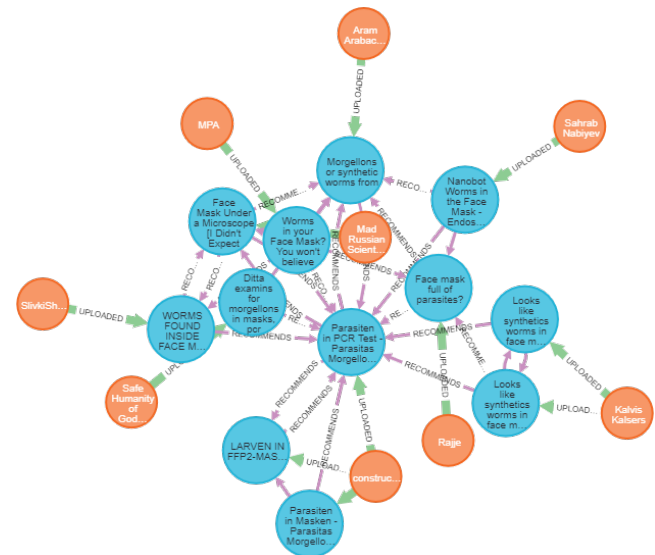


Fig. 7. Misleading videos

In the entire dataset, there are only 9 channels namely Kalvis Kalsers, construcaonativ, Mad Russian Scientist, Sahrab Nabiye, MPA, Safe Humanity of Godland, Rajje, Aram Arabachyan, Slivishow EN that have uploaded misleading videos on Youtube. While exploring the channels who were involved in the spread of misinformation, we found an interesting fact that there is a connection between all the misleading videos uploaded by different channels. All the misleading videos recommend each other and all of them end with only one video: "Parasiten in PCR Test". For instance, if one begins with one misinformative video, that person might continue to see other misinformative videos if he/she follows Youtube's recommendation system. It is evident in the graph that all miendpointvideo's end point is one video: "Parasiten in PCR Test", i.e., all other videos recommend this video but this video doesn't recommend any other misleading video.

Anything special about these channels?

Since, there are only 9 channels who are responsible for spreading the misleading video, we decided to do a deeper analysis on the channels with high subscribers (> 50,000). Out of these 9 channels, there were only 2 channels with

subscribers greater than 50,000 namely “SlivkiShow EN” (14,90,000) and “Russian Mad Scientist”(88,300). On individually investigating the channels, we found the following results:

1. **SlivkiShow EN** Out of 24, only one is a misinformative video: "WORMS FOUND INSIDE FACE MASKS?! EMERGENCY VIDEO!" with 40,000+ views which is very low in comparison to the popularity of the channel and a strange thing was observed that none of the non-misinformative videos of this channel recommend the misinformative video. On further investigation, the content shared by this channel involves clickbait videos and thus, supports a huge amount of subscribers.



Fig. 8. Videos of channel SlivkiShow EN



Fig. 9. Videos of channel Mad Russian Scientist

2. *Mad Russian Scientist*

The second most popular channel also has one misleading video: “Face Mask Under a Microscope [I Didn’t Expect This]” in the whole cohort of videos uploaded by it. Similar to Slivishow EN, this channel’s misleading video is not recommended by any of the other videos uploaded by this channel. However, the content of the channel is rather random and is not confined to any specific domain.