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Deciphering Crypto Twitter

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Thilanka Munasinghe¹, Aparna Gupta¹ and Oshani Seneviratne¹ – Rensselaer Polytechnic Institute¹

May 24, 2024

Outline

1 The rise of cryptocurrency

2 Methodology

3 Results

4 Takeaways

5 Acknowledgements



The rise of cryptocurrency

- Bitcoin was released in 2009.



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- Ethereum was released in 2015.



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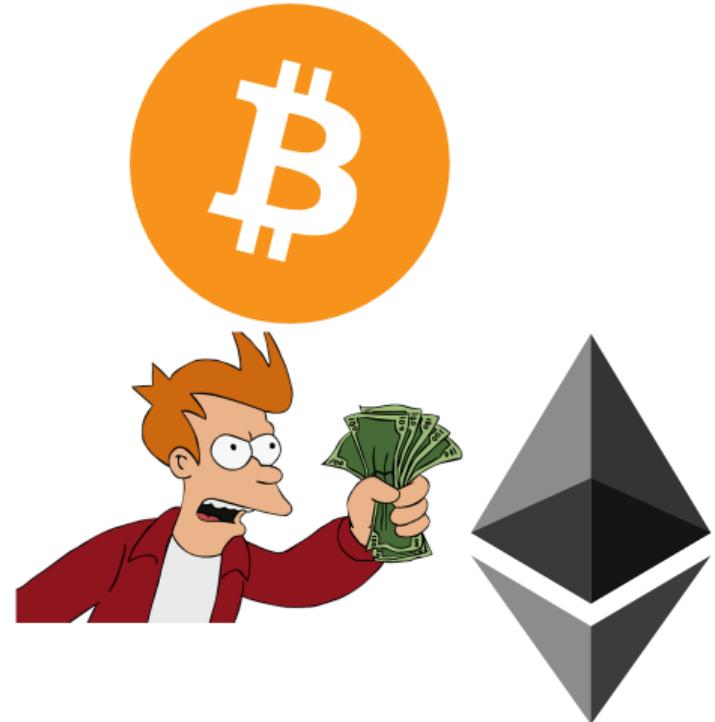
The rise of cryptocurrency

- Bitcoin was released in 2009.
- Ethereum was released in 2015.
- ICO craze of 2017.



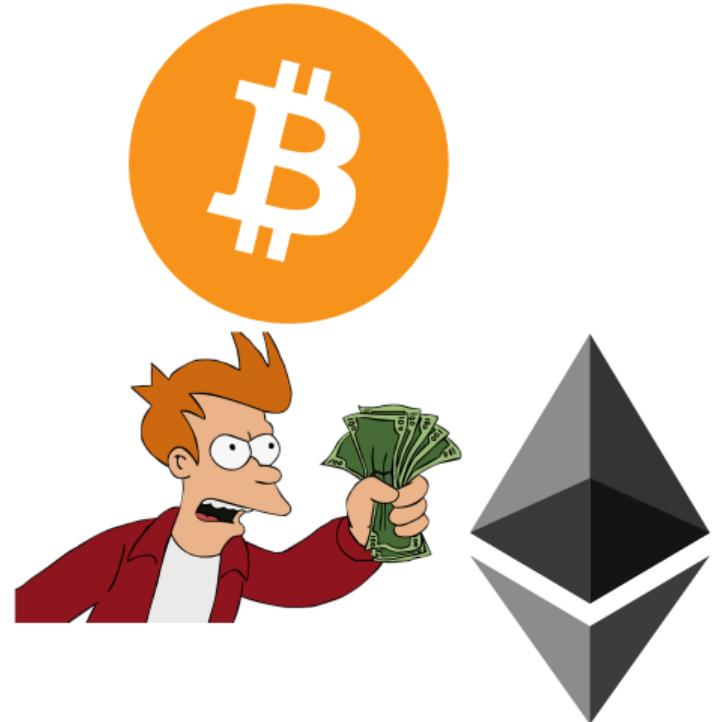
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The rise of cryptocurrency

But all was not well..



The rise of cryptocurrency

2022, 2023 were rough years for crypto

[1] C. DeVon, "Crypto investors lost nearly \$4 billion to hackers in 2022," *CNBC*, Feb. 2023. [Online]. Available: <https://www.cnbc.com/2023/02/04/crypto-investors-lost-nearly-4-billion-dollars-to-hackers-in-2022.html>

[2] S. Witley, "Crypto hack lawsuits rise as theft victims try untested claims," *Bloomberg Law*, Jan. 2023. [Online]. Available: <https://news.bloomberglaw.com/privacy-and-data-security/crypto-hack-lawsuits-rise-as-theft-victims-try-untested-claims>



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2022, 2023 were rough years for crypto

\$4 Billion stolen in 2022 [1]

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\$4 Billion stolen in 2022 [1]

20 lawsuits filed in 2023 [2]

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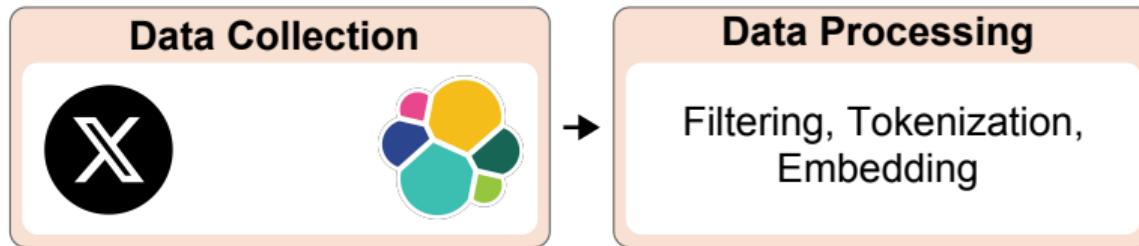


Methodology

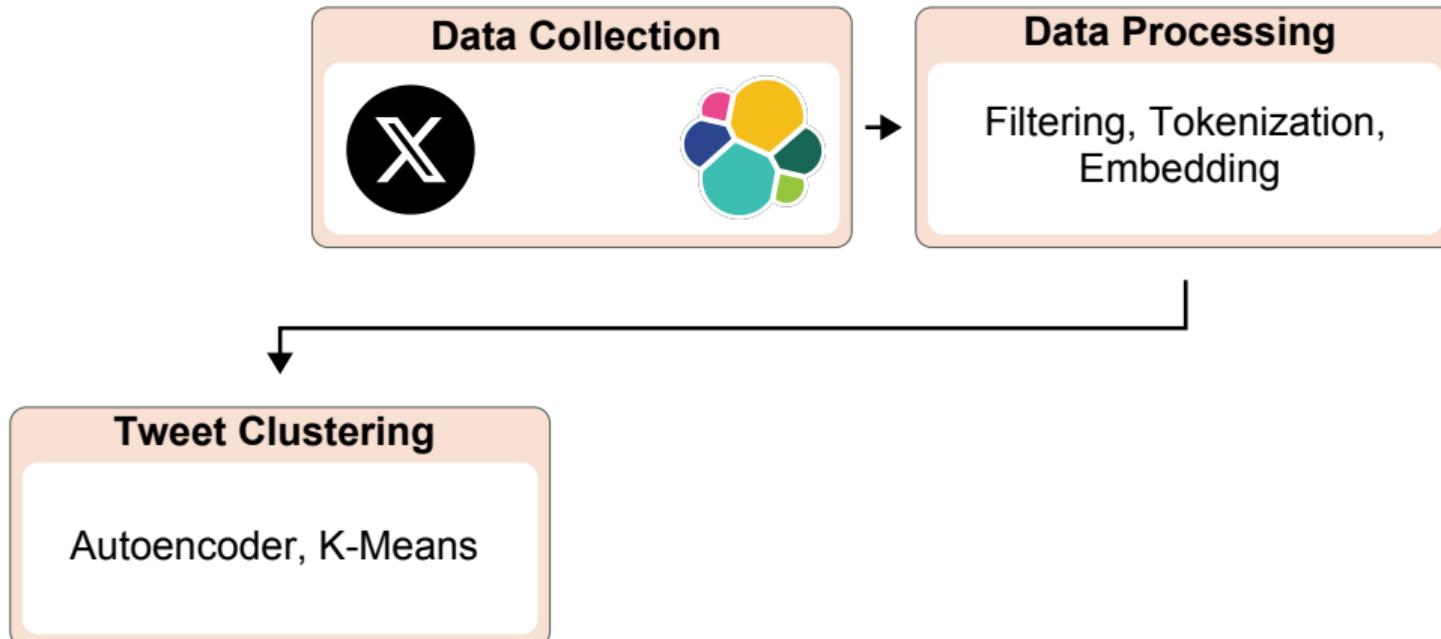
Data Collection



Methodology



Methodology

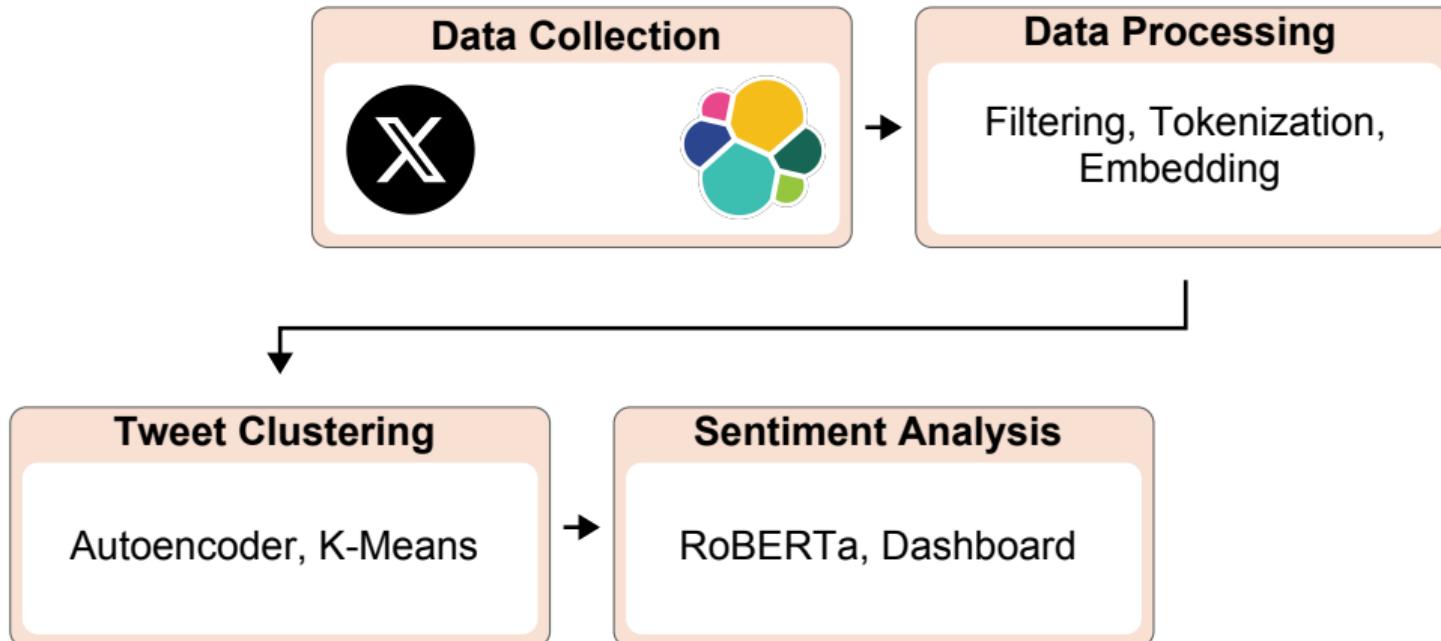


Cluster Identification

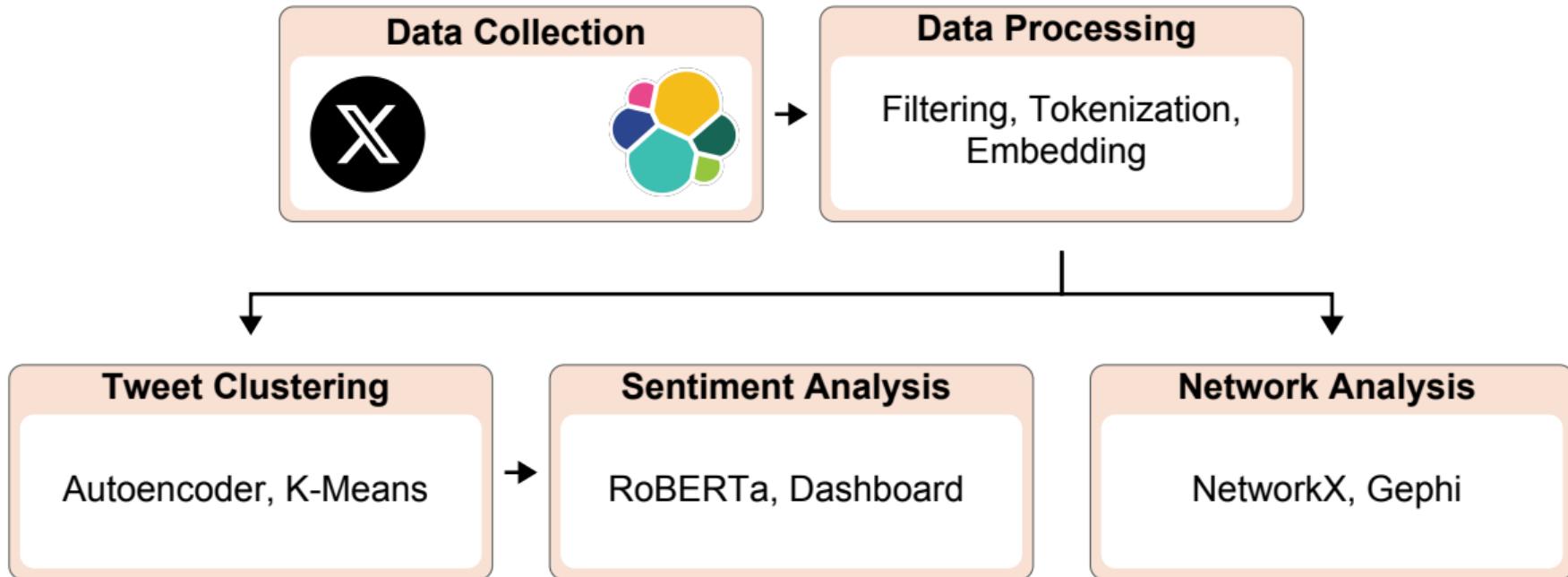
- BERT embeddings reduced to 10 dimensions using autoencoder.
 - Allows for batched training – does not require loading all data to memory at once.
- K-Means with elbow method – identified 6 clusters.
- Streamlit dashboard for visualization & exploration of clusters.



Methodology



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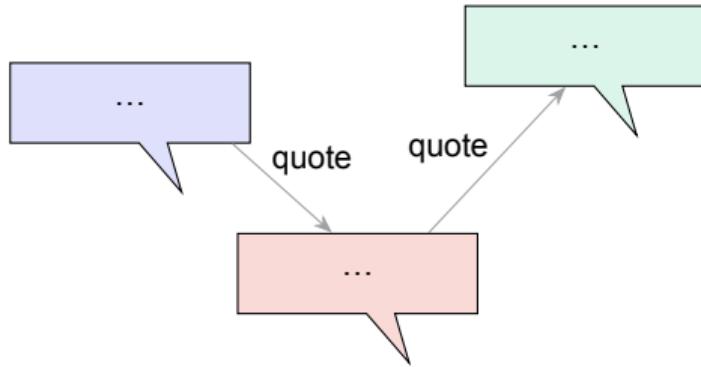


Network Construction

Graph Type	# Nodes	# Edges
Tweet-Quote	44,300	26,255
Tweet-Reply	1,591,247	1,034,017
User-Quote	1,640,251	2,520,608
User-Reply	2,340,960	7,298,105

- Nodes: User, Tweet
- Edges: Reply, Quote

Network Construction

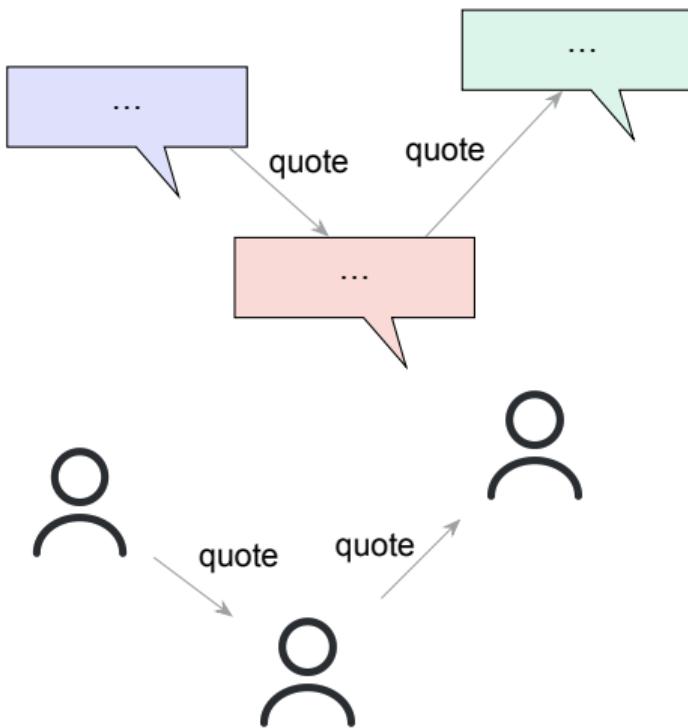


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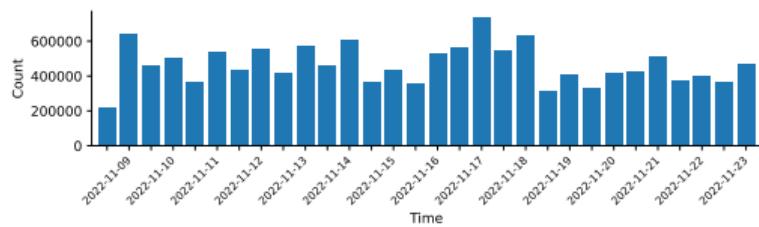


Outline

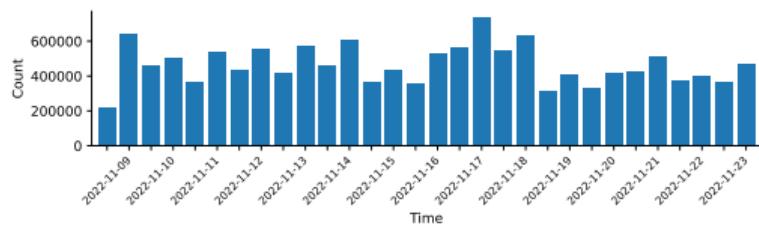
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Collected Data



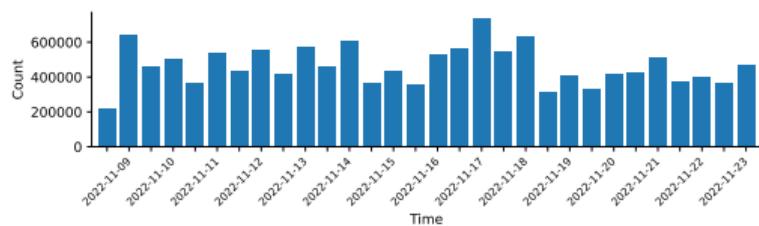
Collected Data



- Collection between Nov. 09, 2022
Nov. 23, 2022



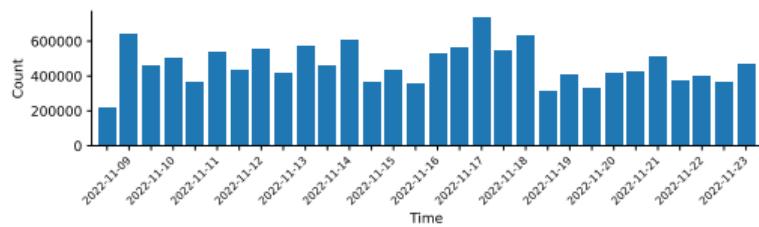
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- Collection between Nov. 09, 2022
Nov. 23, 2022
- Collected 40M tweets



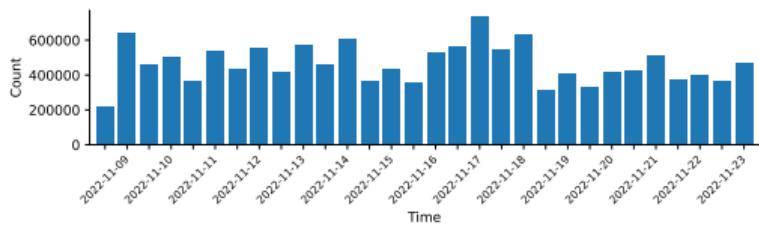
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- 20M after spam filtering



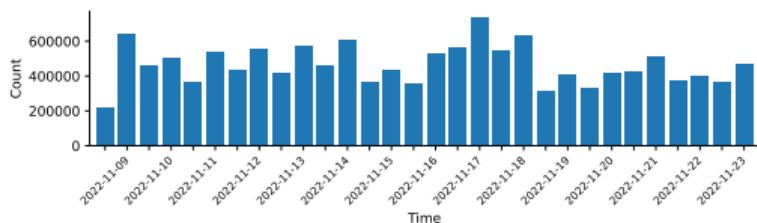
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Field	Description
<code>id</code>	Unique ID of tweet
<code>timestamp_ms</code>	Timestamp of tweet
<code>user.id</code>	User ID
<code>full_text</code>	Main text of tweet
<code>quote_count</code>	Number of quotes on tweet
<code>reply_count</code>	Number of replies on tweet
<code>retweet_count</code>	Number of retweets on tweet
<code>favorite_count</code>	Number of “favorites” on tweet
<code>quoted_status.id</code>	ID of tweet being quoted
<code>quoted_status.user.id</code>	User ID of tweet being quoted
<code>in_reply_to_status_id</code>	ID of tweet being replied to
<code>in_reply_to_user_id</code>	User ID of tweet being replied to

Cluster Characterization

ID	Characterization	Top 10 Keywords
	<i>Overall</i>	user, http, pump, just, signal, happen, crypto, wallstreetbets, event, kucoin
1	Crypto Conspirators	user, pump, http, signal, just, event, happen, wallstreetbets, kucoin, big
2	Meta Crypto Twitter	user, crypto, http, promote, roll, token, price, 000, binance, security
3	Crypto Observers	user, http, crypto, v2, rollup, address, tokens, claiming, compatible, evm
4	Crypto Commenters	roll, crypto, sushi, user, project, security, good, try, http, bridge
5	Crypto Doubters	user, http, pump, crypto, just, signal, kucoin, happen, event, wallstreetbets
6	Interested Investors	promote, user, crypto, price, roll, http, btc, binance, eth, bitcoin



Example Tweets

Tweet:

.....
@SignalsExp WallStreetBets Group, just announced a pump event! This Pump will
happen in just 4 hours on #Binance! <https://t.co/y6cW4iSRm...>

.....
Sentiment Score: 0.4022

.....
Timestamp: 2022-11-21 00:45:19.967000



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Tweet:

Crypto thrives or dies on the news. Just like with stocks Crypto only exists because people believe in it. The power is in your wallets.

Sentiment Score: 0.5001

Timestamp: 2022-11-14 10:40:29.757000

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Sentiment Score: -0.8018

Timestamp: 2022-11-13 15:42:52.818000



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Tweet:

This whole crisis in crypto is caused by people breaking the fundamental principle of crypto: “Don’t trust, verify.” Some investment firm comes to you and says “you can trust us, we’re a multi-billion \$ firm, so please loan us money without/minimal collateral.” Don’t do it.

Sentiment Score: -0.6951

Timestamp: 2022-11-11 02:27:05.050000



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Cluster 6:
Rationalizing current market state

Tweet:

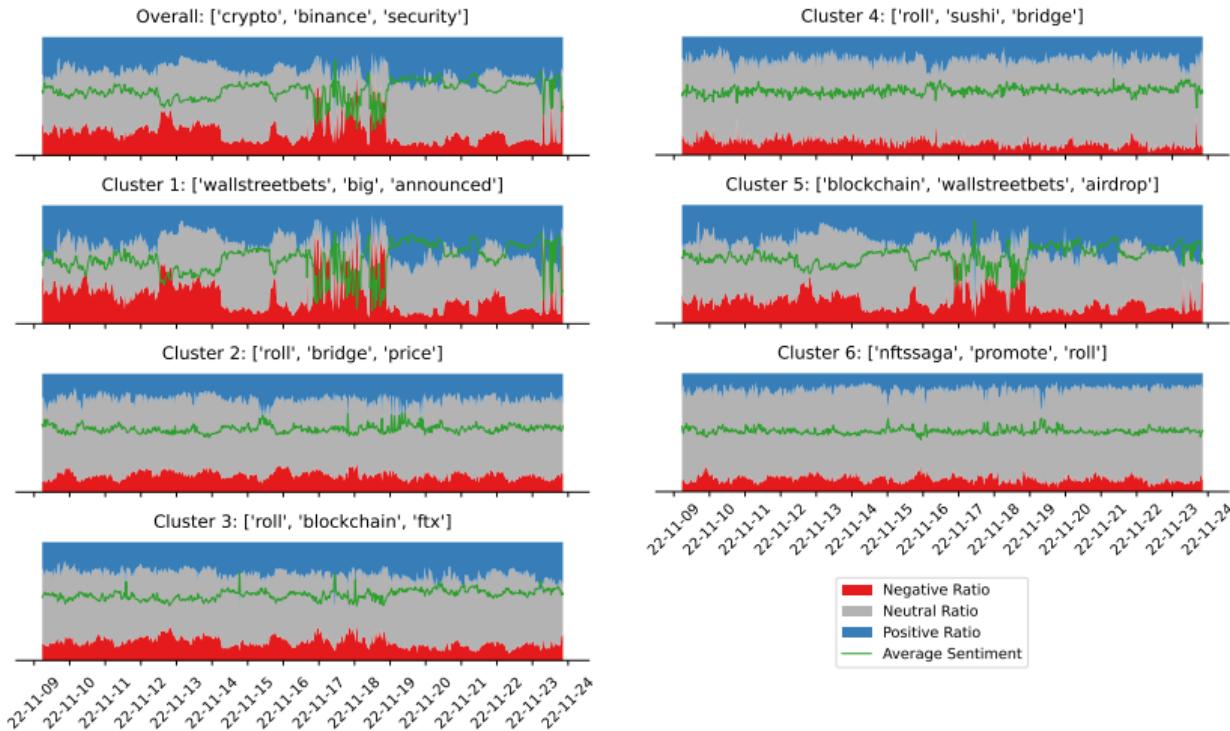
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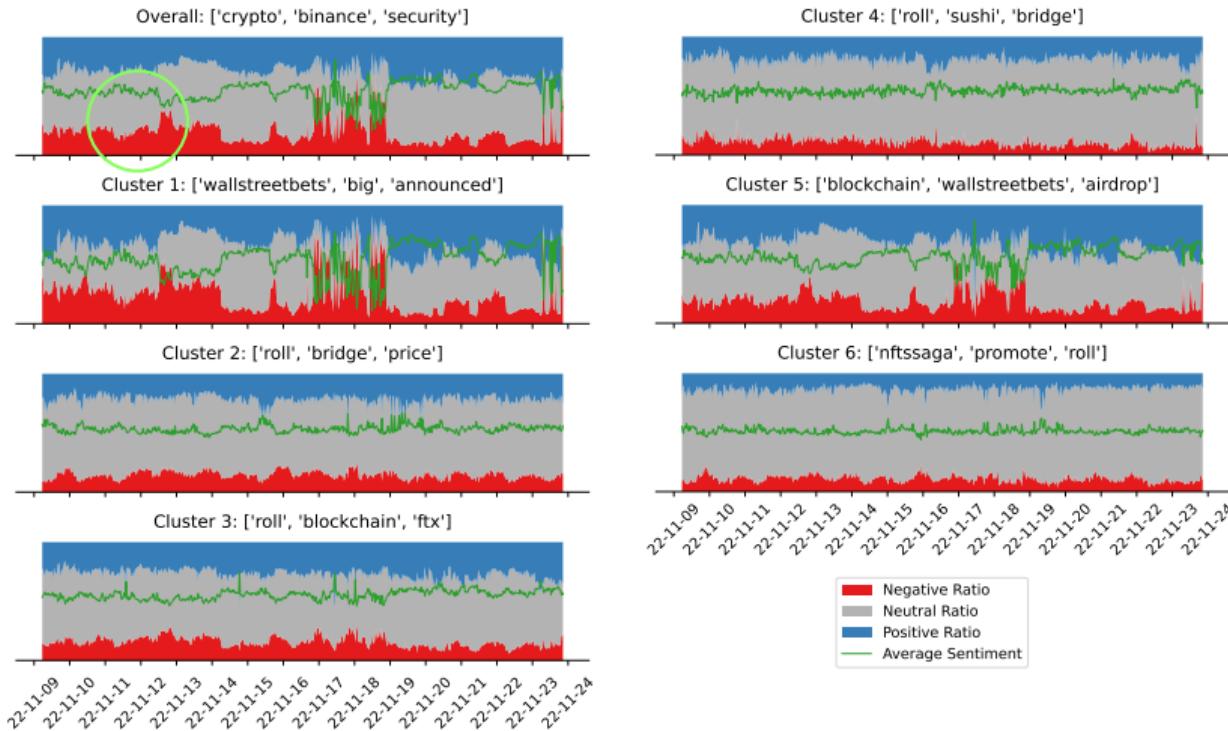
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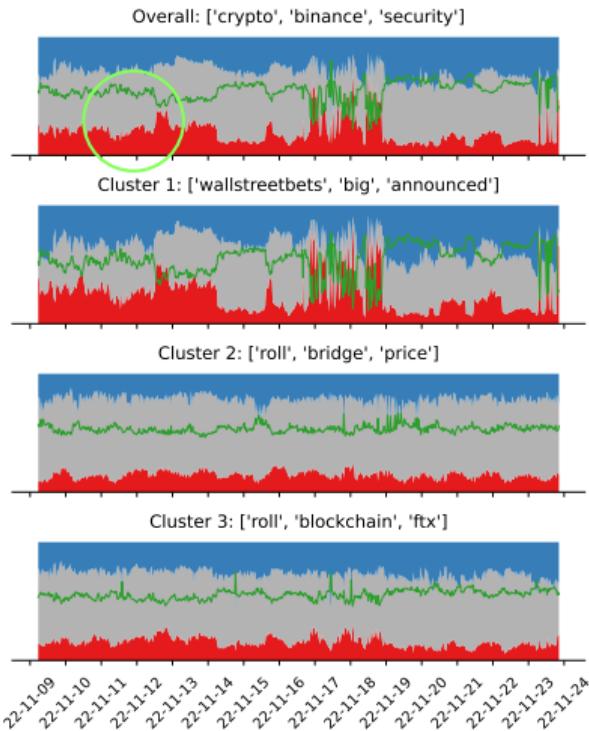
Cluster Sentiment Shift



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Sam Bankman-Fried steps down as FTX CEO as his crypto exchange files for bankruptcy

PUBLISHED FRI, NOV 11 2022 9:21 AM EST UPDATED THU, MAR 28 2024 4:12 PM EDT



MacKenzie Sigalos
@KENZIESIGALOS

WATCH LIVE

KEY POINTS

- Sam Bankman-Fried's cryptocurrency exchange FTX has filed for bankruptcy.
- Alameda Research and approximately 130 additional affiliated companies are part of the voluntary proceedings.



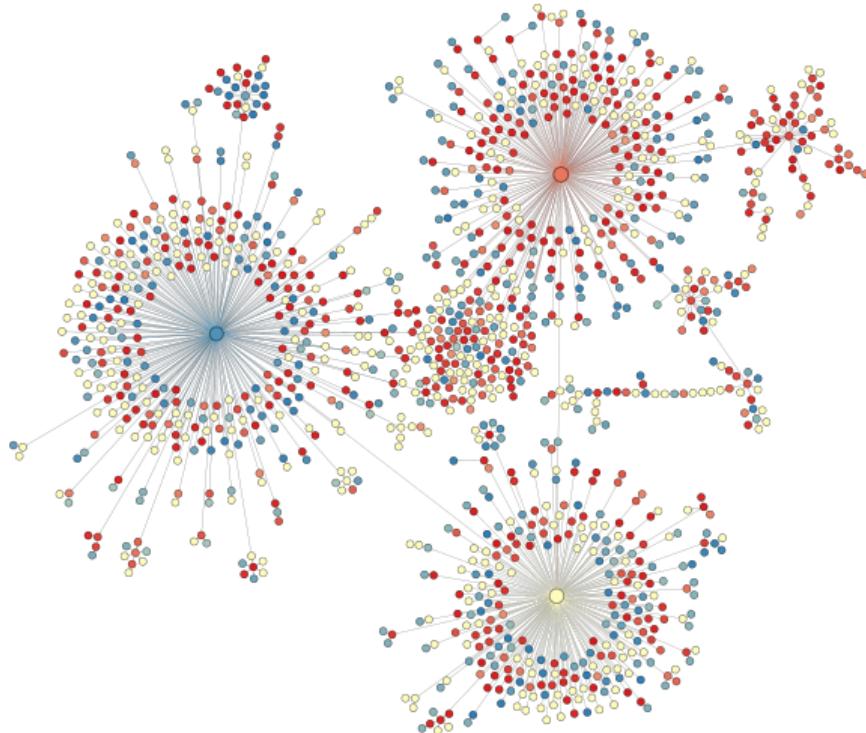
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14/18

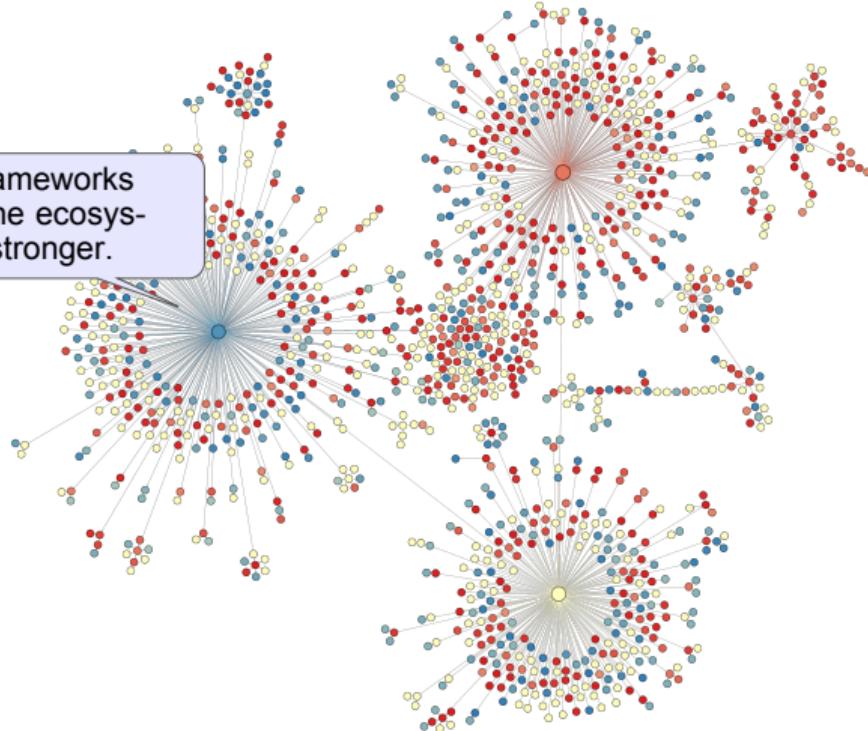
May 24, 2024

Tweet Network

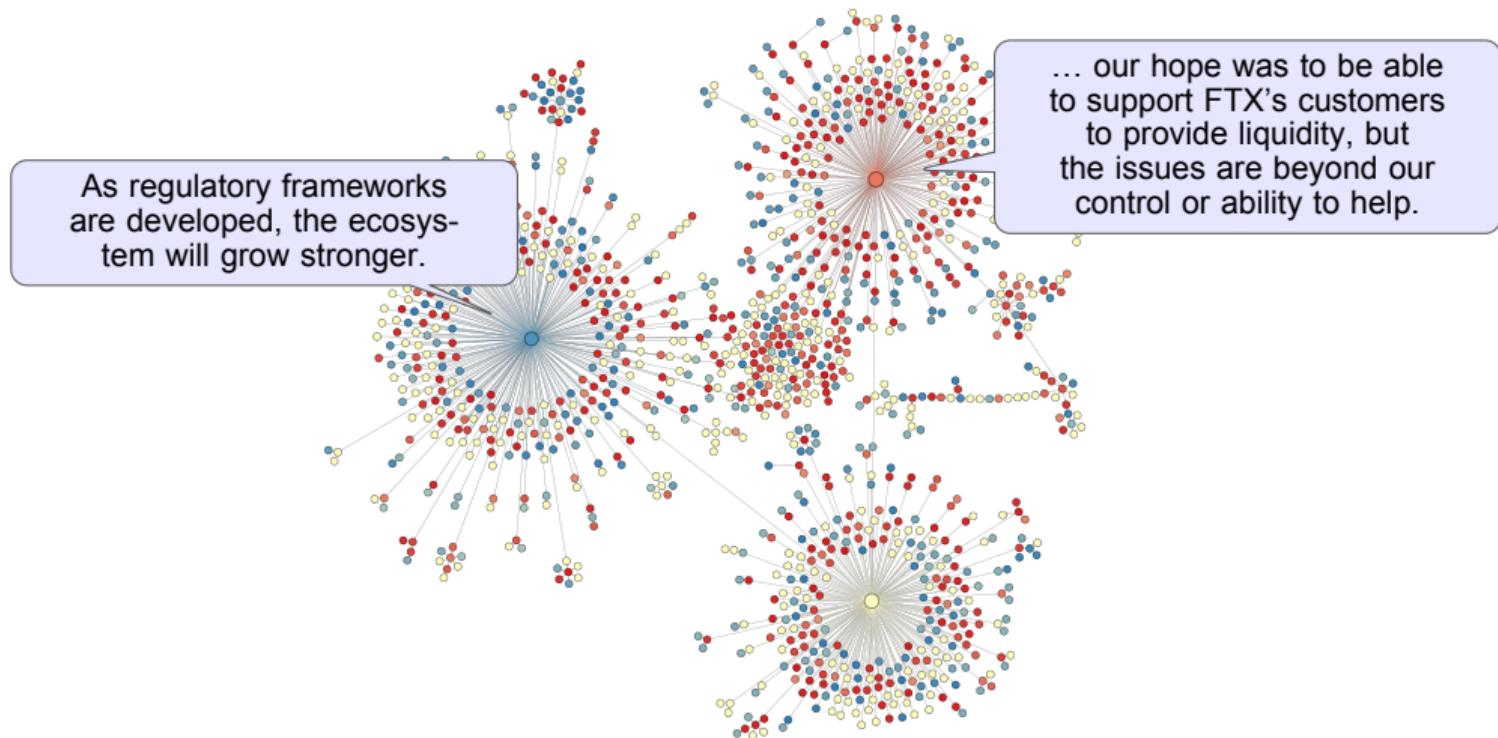


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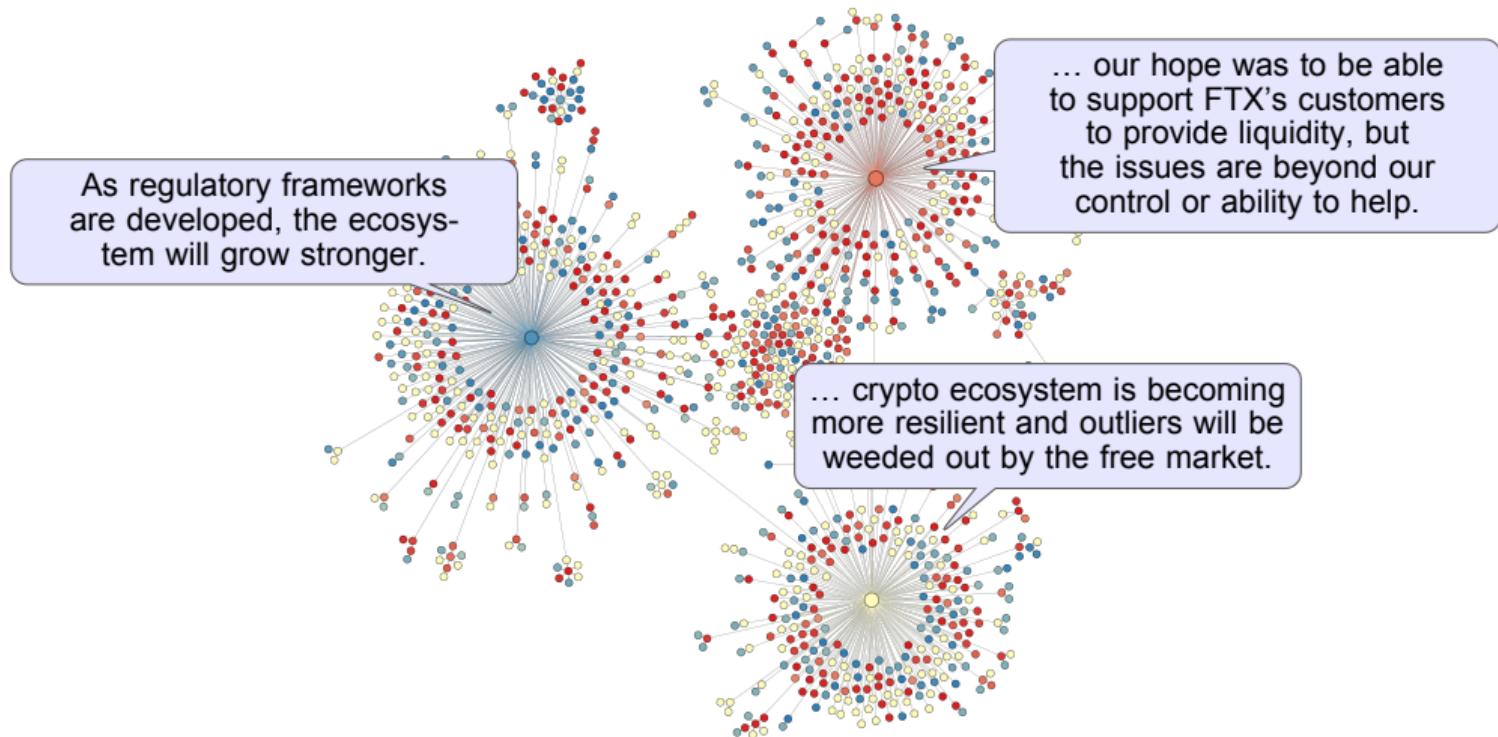
As regulatory frameworks are developed, the ecosystem will grow stronger.



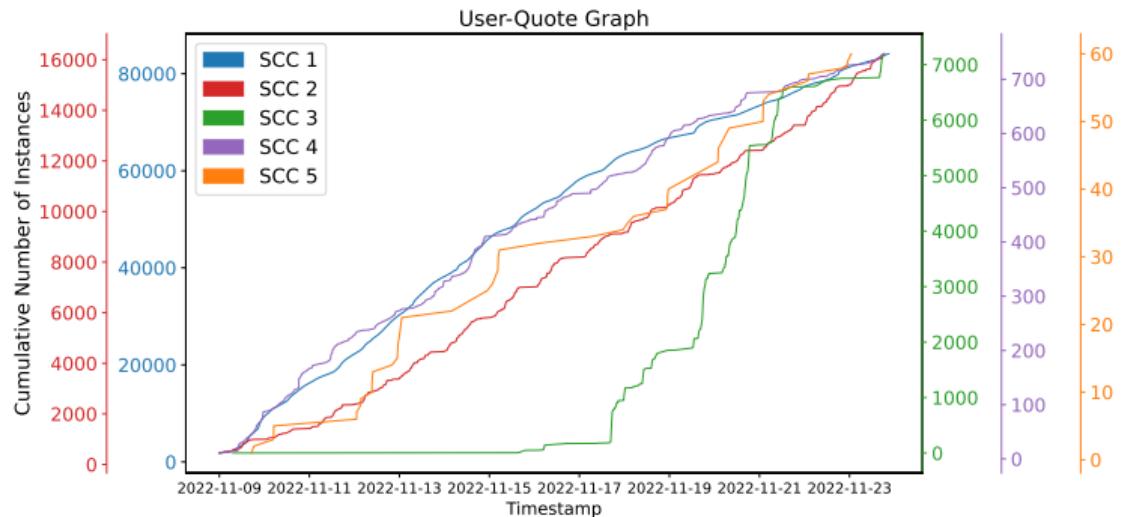
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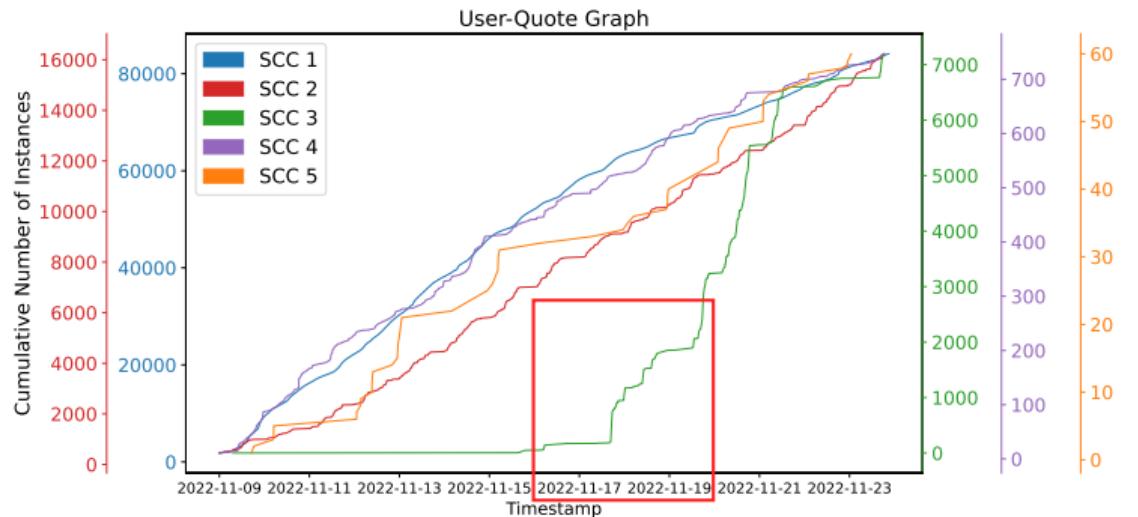
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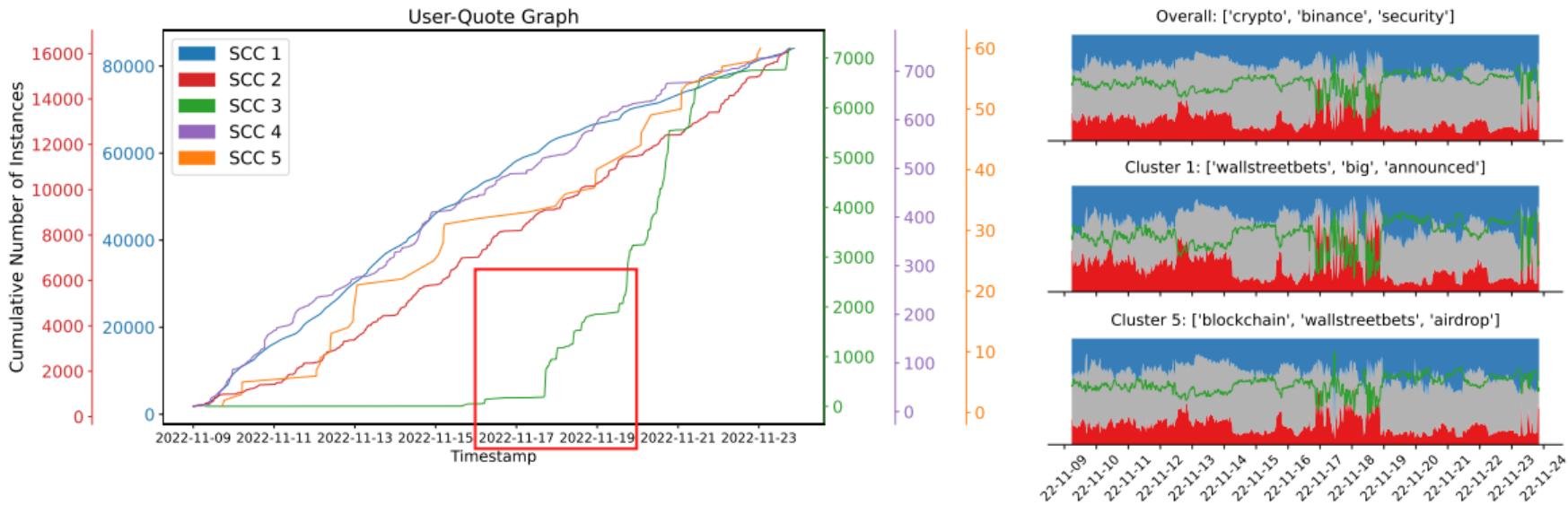
User Network



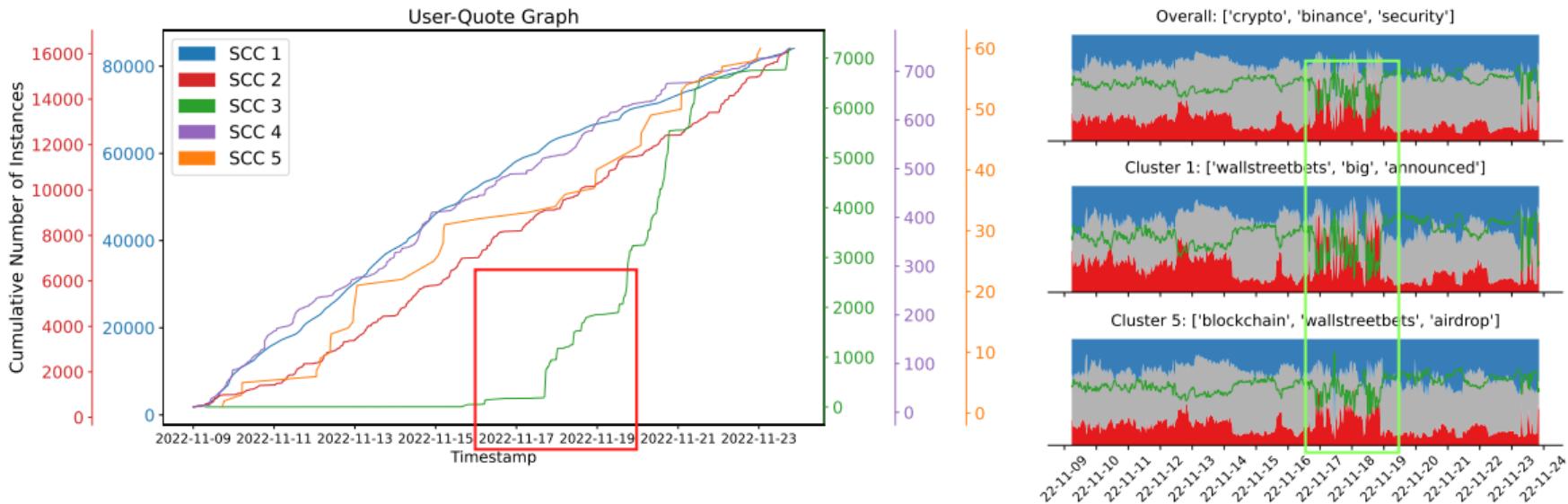
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Good News



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Bad News



Takeaways

Good News

- Sentiment polarity can be traced back to real-life events.
 - Can social media be used to *forecast* such events?
- Communities of users with positive outlook still exist.

Bad News

- Large bot presence – many accounts that are now deleted.



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Good News

- Sentiment polarity can be traced back to real-life events.
 - Can social media be used to *forecast* such events?
- Communities of users with positive outlook still exist.

Bad News

- Large bot presence – many accounts that are now deleted.
- Identifiable ring of bot accounts pushing certain narratives.



Outline

1 The rise of cryptocurrency

2 Methodology

3 Results

4 Takeaways

5 Acknowledgements



Links

Paper



Github



Paper: <https://tinyurl.com/crypto-twitter>

Github: <https://tinyurl.com/crypto-twitter-code>



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Rensselaer

Deciphering Crypto Twitter