

Twitter network analysis shows few focused followers elevate influential leader

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Agenda

- ❖ Introduction
- ❖ Related Work
- ❖ Methodology
- ❖ Experiments & Results
- ❖ Discussion
- ❖ Conclusion

Introduction

- ❖ **Influencers Definition:** Influencers are individuals with significant social media followings whose opinions can sway their followers' behavior.
- ❖ **Importance of Followers:** Followers are essential metrics for Twitter influencers, as they indicate their reach and influence to brands and advertisers.
- ❖ **Increased Reach:** More followers mean a wider potential reach, increasing an influencer's value to brands seeking broader audiences.
- ❖ **Digital Marketing:** Replies and retweets promote influencers by increasing visibility, providing social proof, and amplifying messages which fosters engagement.

Related Work

- ❖ Lu et al. (2014)
 - Investigated how often tweets are retweeted on Twitter.
 - Thought retweets might follow a pattern where a few get shared a lot, and most get shared very little.
- ❖ Tong et al. (2016)
 - Looked at how Twitter is organized.
 - Said there are two groups: one where people follow each other, and one where they don't.
 - Found that both groups follow a similar pattern, where a few users have a lot of influence.

Methodology

- ❖ Data Collection Process:
 - Tweepy library accessed Twitter API v2 with authentication
 - `search_all_tweets(query,...)` endpoint used with "has:hashtags" operator.
 - Dates range from **01/01/2022** to **04/30/2022**
- ❖ Data Collection Outcome:
 - **286,044** tweets (with hashtags) collected from **388** users.
 - Tweet information parsed to dataframe and saved as .csv files
- ❖ Tools Used for Analysis:
 - Pandas, Bash Script (awk, sed, grep), RedHat Linux, Gephi, Matplotlib, Seaborn
- ❖ Data Representation:
 - Tweets structured in network format using directed adjacency lists.
 - Representation: follower retweets or replies to leader

Experiment

- **High-Influence User** : Receive **3+** Retweets/Replies
- **Low-Influence User**: Receive **1-2** Retweets/Replies

	Replies Follower-Leader Pair	Retweet Follower -Leader Pair
Adjacency List	8,321	24,927
High Influence User	2,766	5,555
Low Influence User	8,334	16,593

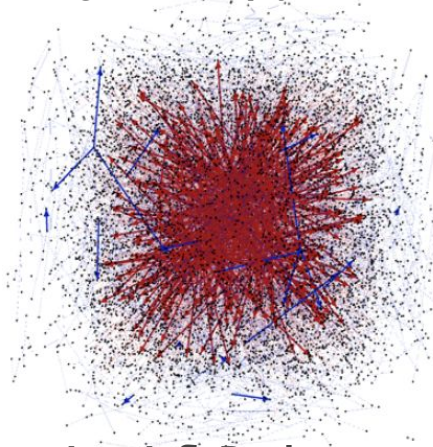
Experiment

- 1,239 followers replied to 4,966 low influence leaders.
 - They replied a total of 5,555 times (4-5 times each).
 - **Suggests they distribute replies across many leaders, not focusing on any one.**
- 515 highly influential leaders received 3 or more replies each.
 - They got half as many replies in total (2,766) from 774 followers.
 - **Suggests influential leaders can be boosted by a small group of focused followers.**

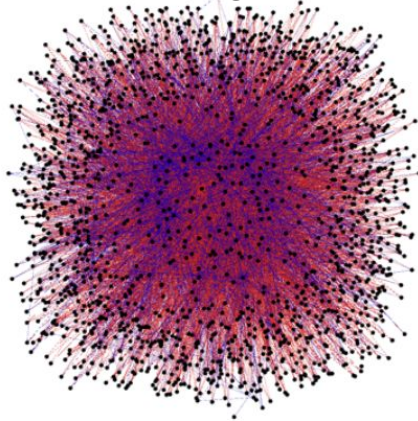
Experiment

- Top 40 repliers
 - Almost all replied to both highly influential and less influential leaders (39 vs. 40)
 - Replied twice as much to less influential leaders compared to highly influential ones (4,089 vs. 1,956)
- Subset comparison
 - 174 follower repliers to less influential leaders also replied to highly influential leaders
 - Only 70 less influential leaders replied to highly influential ones.
 - In retweets, 107 follower retweeters of less influential leaders also retweeted highly influential ones.
- **Top repliers don't focus on highly influential users or any specific users.**

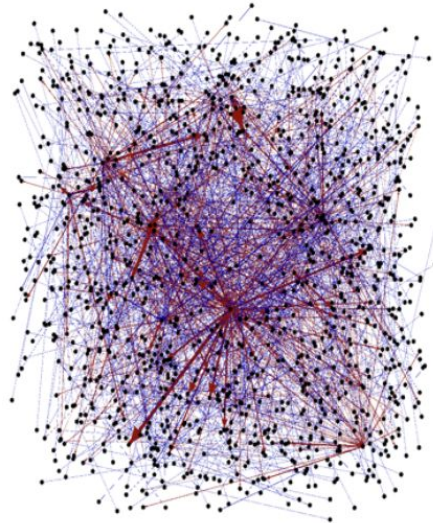
High Infl. Reply



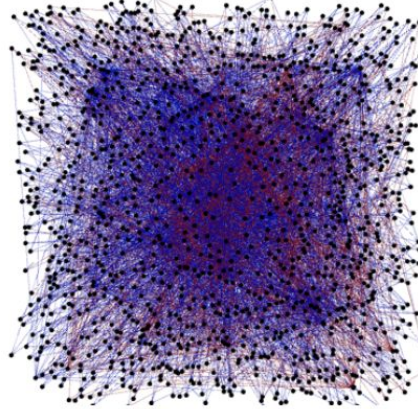
High Infl. Retweet



Low Infl. Reply



Low Infl. Retweet



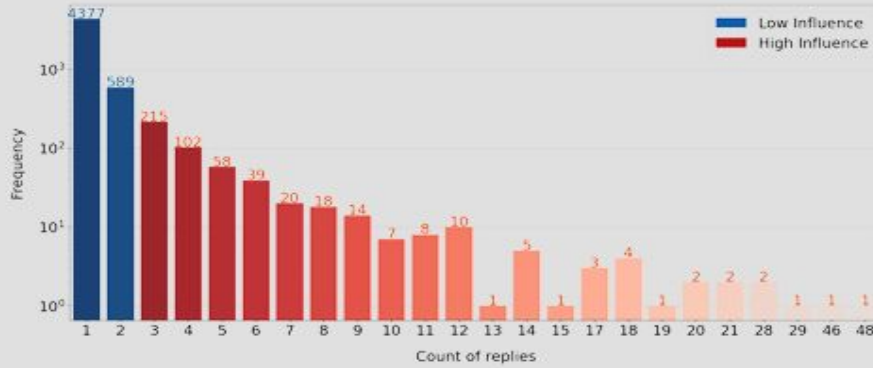
All Other users



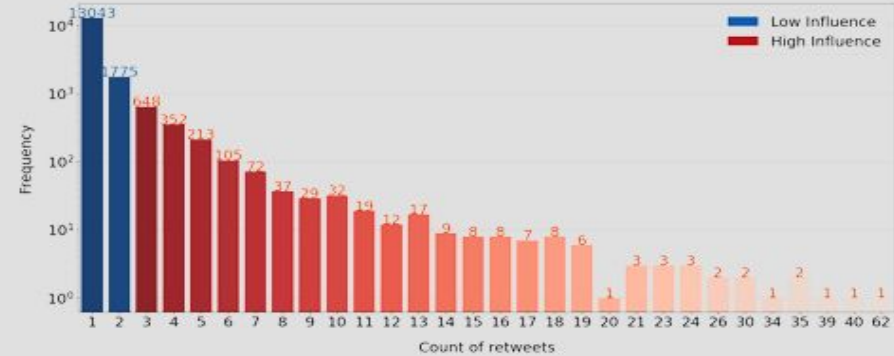
Top 40
Replier/Retweeter

Experiment

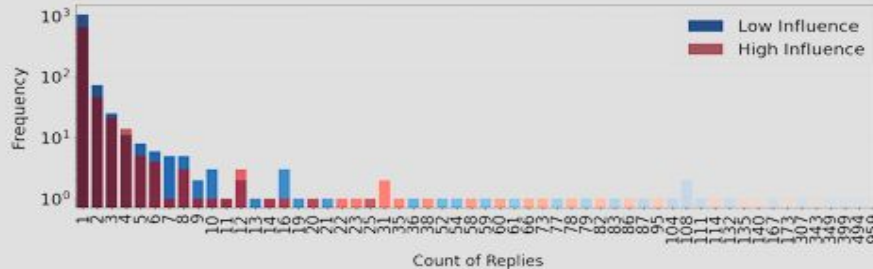
Histogram of in-degrees of users who get replies
Frequency of users vs. Count of replies



Histogram of in-degrees of users getting retweeted
Frequency of users vs. Count of retweets



Histogram of out-degrees of users replying
Frequency of users vs. Count of replies



Histogram of out-degrees of users retweeting
Frequency of users vs. Count of retweets

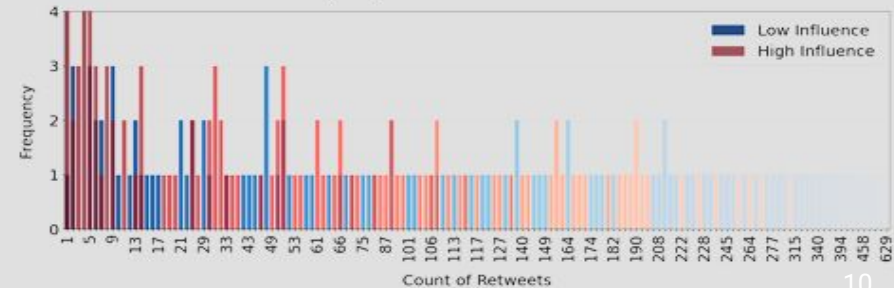


Table 1. Twitter Reply Statistics.

Replies	Low infl leader	High infl leader
Unique follower replying	1239	774
Unique leader replied to	4966	515
Ratio	1239/4966	774/515
Total replies	5555	2766
Total replies from top 40 follower repliers	4089	1956
Total replies from bottom 1554 repliers (with only 1 reply)	992	562
Count of top 40 repliers who replied to a low or high influence leader	40	39
Count of bottom 1554 repliers (with only 1 reply) who replied to a low or high influence leader	992	562

Table 2. Twitter Retweet Statistics

Retweets	Low infl leader	High infl leader
Unique follower retweeting	113	108
Unique leader retweeted	14818	1602
Ratio	113/14818	108/1602
Total retweets	16593	8334
Total retweets from top 40 follower retweeters	12071	6092
Total retweets from bottom 60 retweeters	2467	1460
Count of top 40 retweeters who retweeted a low or high influence leader	40	40
Count of bottom 60 retweeters who retweeted a low or high influence leader	59	54

Discussion

- ❖ Many users reply or retweet just once or twice, while fewer do so multiple times.
- ❖ Fewer followers retweet compared to those getting retweeted, showing diverse engagement.
- ❖ High influence leaders attract fewer followers but receive more total replies or retweets.
- ❖ Low influence leaders are retweeted more but lack focused attention, keeping them low influence.
- ❖ High influence leaders have fewer followers but get more focused attention per leader.

Conclusion

- ❖ Fewer high influence users due to less noisy engagement from fewer followers
- ❖ High influence possibly due to focused attention from a smaller group of followers.
- ❖ Low influence users get a dispersed attention from many group of users
 - Thus, there are many users who reply once or twice
 - Few users reply 3 or more times in both low and high influencers' networks.
- ❖ Characteristics of followers elevating highly influential leaders need further study for patterns.



THANK YOU