ANTI-VACCINATION AND SOCIAL MEDIA:

Studying the spread of COVID-19 Disinformation on Reddit

Matthew Fikes

DSC680: FALL 2021

SUMMARY

This study looks at the social media site Reddit and how users may be spreading disinformation regarding vaccines. This has been a growing issue and Reddit recently walked back on previous statements to enforce limitations on groups sharing COVID disinformation. Four groups identified as being associated with COVID disinformation were analyzed. Data for community operators and contributors were mapped to find any connections.

There were four communities identified where users who post to all four targeted communities were also active – Coronavirus, ChurchofCOVID, conspiracy, and worldnews. These subreddits, and conspiracy in particular, were nearly impossible to untangle from the center of the network graph. This shows they are embedded together, sharing users. The exploration uncovered a few other possible disinformation subreddits to explore, as well as users who post much more frequently than the average.

Finding who these users are and what kind of reach they have is not the difficult part, getting Reddit to act on it is probably the tougher challenge.

INTRODUCTION

BACKGROUND

Reddit is a website founded in 2005 by Steve Huffman, Aaron Swartz, and Alexis Ohanian as the "front page of the Internet" after coming up with the idea while at the University of Virginia (Wikimedia Foundation, 2021). The site has expanded in the years since and provides a numerous group of communities called subreddits that focus on topics ranging from sports and science to cat photos and

niche interests. These subreddits can be set up by users to share interests with others and any content posted is voted on by all users.

The disinformation on Reddit has been coming from a number of subreddits, and in August of this year Reddit CEO and co-founder Steve Huffman posted to the site supporting debate and disagreement over recommended practices, and that going against CDC recommendations was not against site policy (/u/spez, 2021). This was met with backlash from many moderators of the site, and in response to the lack of action made their communities private, preventing users from interacting with large portions of the site (Schlitz, 2021).

One week after the August post, Reddit changed course and took action on many of the disinformation communities. 54 were quarantined, making them invisible to search indexes and requiring click-through to view. NoNewNormal was banned entirely, although Reddit administration claims it is because they violated community rules on brigading other communities and manipulating vote scores.
Despite this ban and quarantine, communities still publicly exist that focus on disinformation.

PROBLEM STATEMENT

Can we explore the spread of COVID disinformation on Reddit?

SCOPE

This project will look at the communities that disinformation group moderators participate in. It will not look at the content of their posts to attempt to identify specific instances of disinformation. The data will be limited to only the top 10 communities participated in based on overall user karma score.

METHODS

DATA SOURCES

The data is all retrieved directly from the Reddit website, via a Python wrapper for the site API.

Limitations to the API restrict data pulls to the latest 1000 activities, whether a comment or post.

For the initial collection of data I used four subreddits as a starting point:

- LockdownSkepticism

- TakeTheJab

- DebateVaccines

- conspiracy

DATA PREPARATION

The list of moderators was pulled for each of the starting groups and their activity data was gathered. All data is organized into post and comment information and the top 10 communities for each category is compiled, based on overall karma score for a given subreddit. These were then combined and totaled, with the top n selected based on the type of analysis being performed. A similar data pull was also pulled for users who submitted posts to the targeted subreddits.

MODELING

To visually explore the connections between users and subreddits I utilized a network graph, implemented with the Networkx Python library. This is a tool for the creation, manipulation, and study of complex networks. (NetworkX, July 2021). I also used the pyvis library to create network graphs that add physics and user interaction for easier exploration of the network connections.

Nodes were limited to the top 100 subreddits to keep the network graphs readable. Graphs were made with both libraries for both moderator and user.

RESULTS

Explorations in the user data show some interesting clues that could be used as a basis of tracking disinformation. Looking at crossover frequency for disinformation subreddit moderators (figure 1) and post submitters (figure 2) there are several subreddits that stand out for having 3 or 4 target subreddit posters in common. There were also groups I was unfamiliar with, like conspiracy_commons,

ChurchofCOVID, and CoronavirusCirclejerk. These could be added to a later study to expand the range of communities collected.
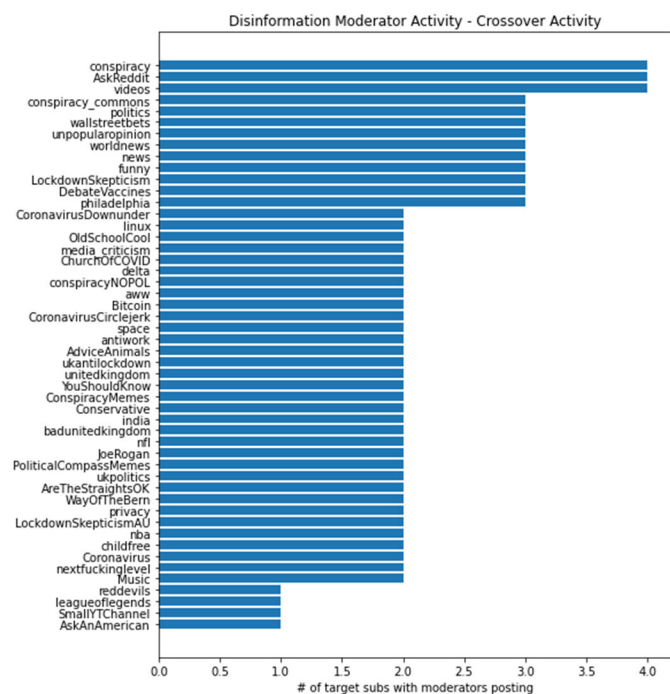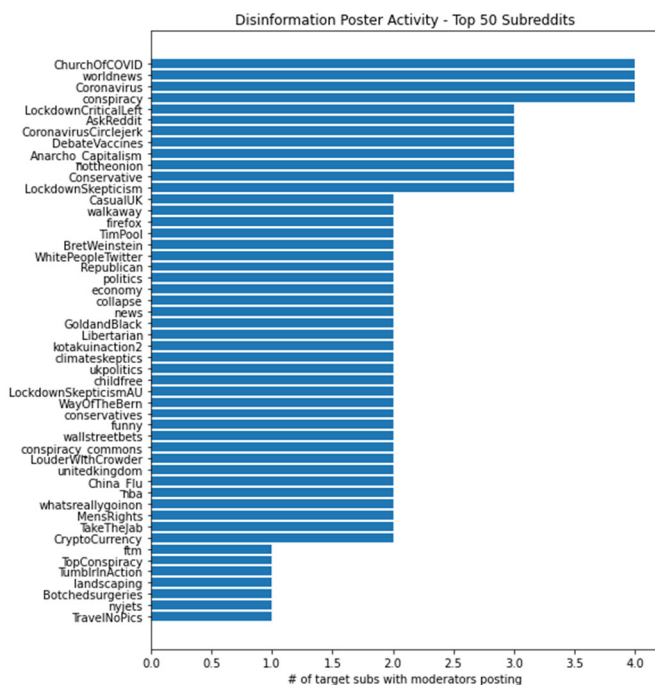

Figure 2

Figure 1

There is evidence that certain users are also posting much more frequently than their peers. The most frequent-posting user made 322 submissions, and the top five averaged 153 and the 2nd five averaged 47. The top submitter is also a moderator of one of the disinformation subreddits, and posts to their own and a number of other places several times a day.
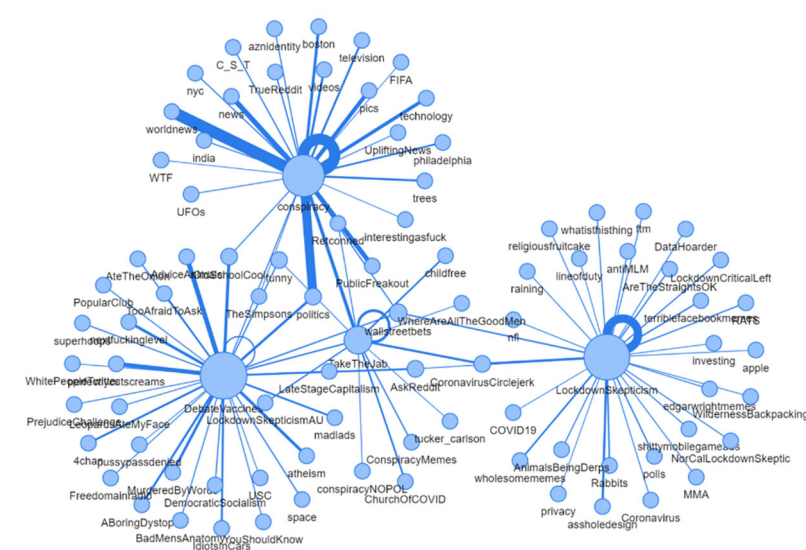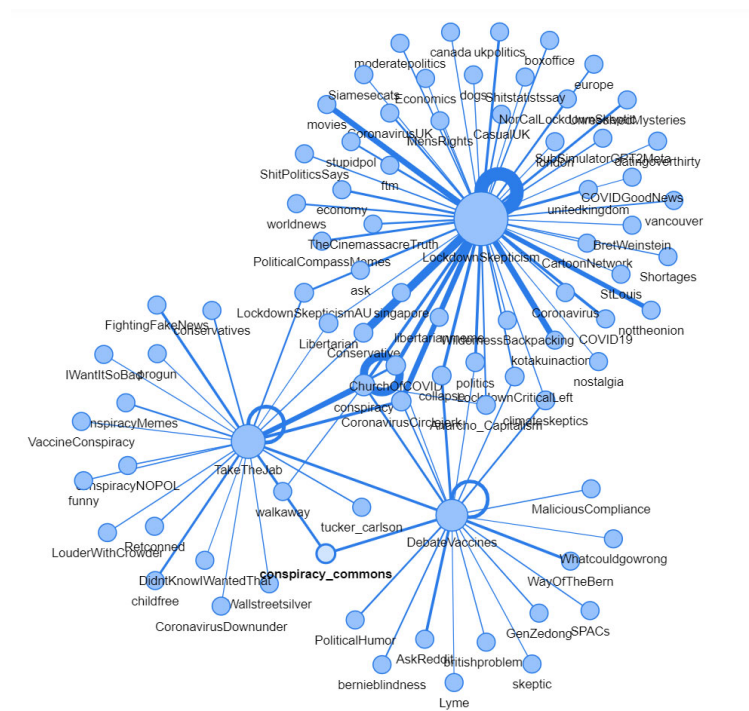
Figure 3

Network graphs help to visualize the connections. Figures 3 and 4 show moderator and user connections respectively. The thickness of the line indicates the amount of karma gained from the target sub from the respective nodes.

These are generated as interactive objects that make it easier to view when allowed to zoom in or move nodes, but for the purpose of this document illustrate the connections. The conspiracy subreddits is integrated into the middle of the graph so tightly that the embedded physics in the model prevent it from being moved into an open area.

Figure 4

ASSUMPTIONS

The users are assumed to not be duplicates owned by the same person. Disinformation subreddit definitions are based on researcher assumptions about community content after viewing a selection. Totals for karma are assumed to be accurate although Reddit has actual totals fluctuate due to vote fuzzing (Reddit, n.d.).
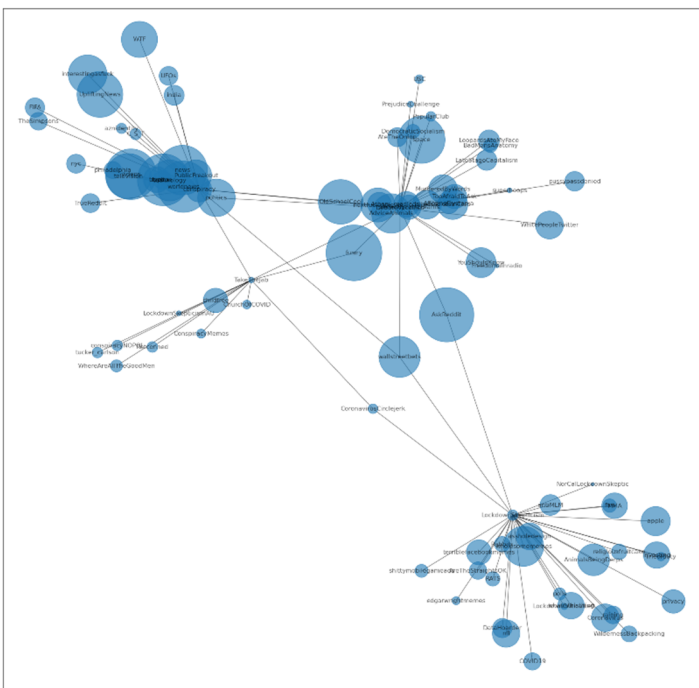
LIMITATIONS/CHALLENGES

The API limitations mean that the study cannot look very far into historical postings. Even with 1000 records, some individuals post many times per day. This will certainly impact any studies that involve high-frequency posting and may necessitate a regular collection of data over a period of time before completing a study.
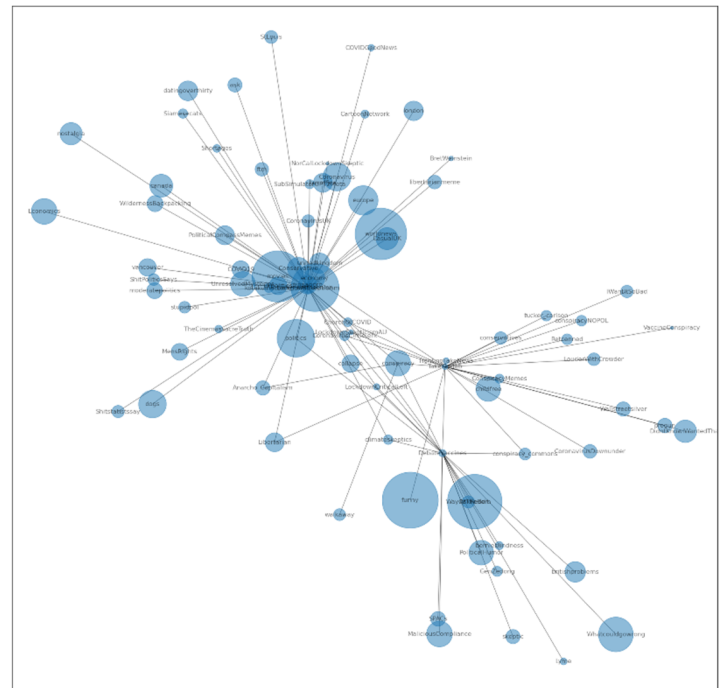
Next Steps

There are several ways to move forward with spotting the disinformation and identifying the spread. Several new subreddits were identified when searching user history that would provide additional posts and users to collect. Pulling moderator and submitter information for all the nodes identified in this study would show 2nd degree connections, but may overcrowd the graph. Finally, looking at the text of the submissions for content to identify disinformation will be a valuable test to see what kind of messages are being broadcast.
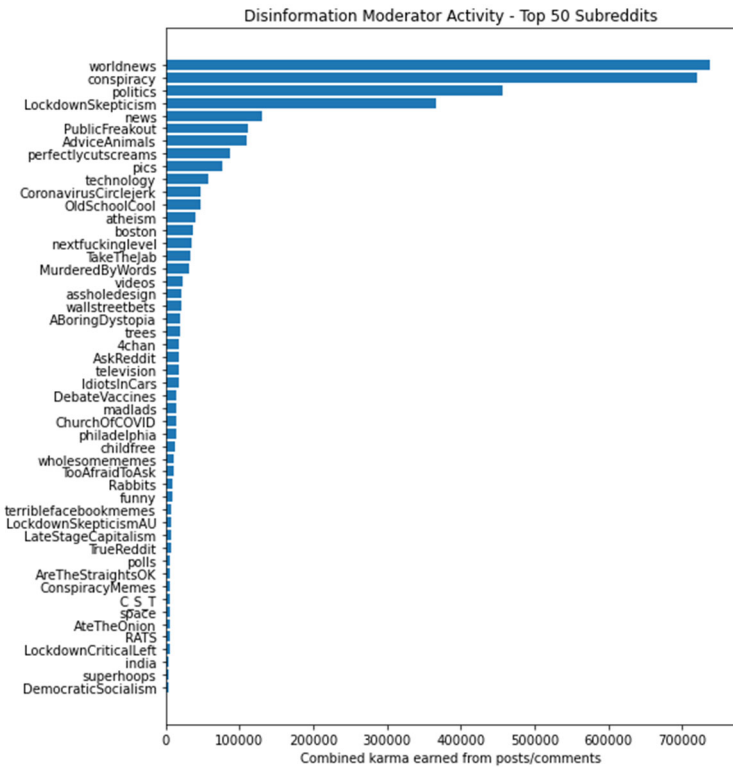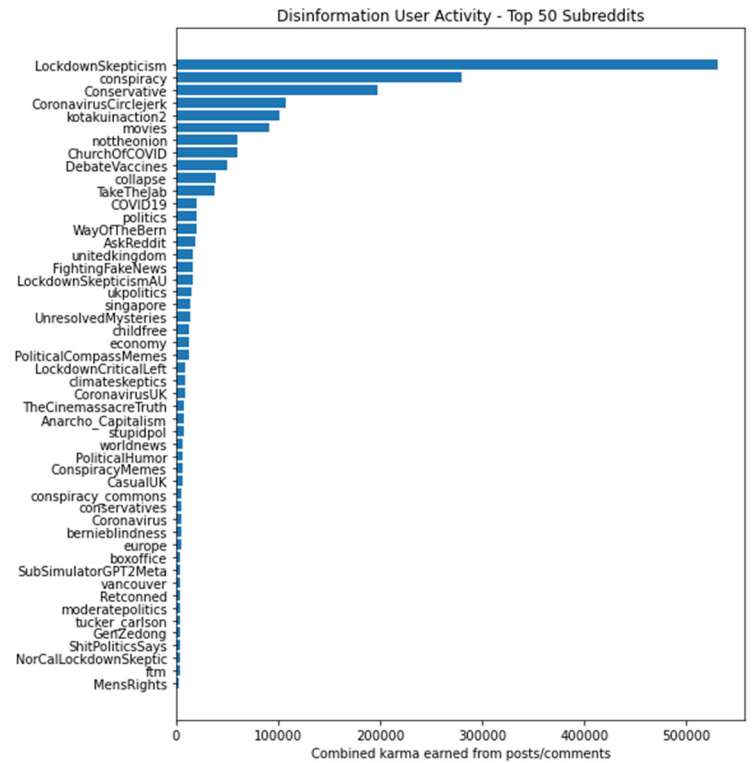
Appendix:

1 - Moderator Network Graph

2- User Network Graph

3 - Top 50 Disinformation Moderator Subreddits

4 - Top 50 Disinformation User Subreddits

References:

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