

Introduction



- Homelessness is a complex, multi-faceted problem that affects millions of people worldwide [1].
- Rapid growth of online social networks, homeless people have a new opportunities to connect, access resources and support [2].
- There is limited understanding of the structure and dynamics of homeless people's networks [3].
- Social network analysis is a powerful tool to gain insights into homeless people's network.

"Networks are important because if we don't understand networks, we can't understand how markets function, organizations solve problems, or how societies change." [4]

^[1] Mago et al. J. BMC medical informatics and decision making 2013.

^[2] Mary Yost. J. Undergraduate Research in Communications 2012.

^[3] Bhandari et al. J. New Media & Society 2021.

^[4] Brandes et al. J. Network Science 2013.

Aim of the Study

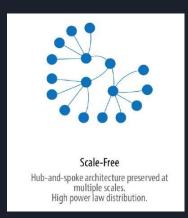
Utilize network analysis techniques to examine the structure of the r/homeless subreddit on Reddit, and

investigate the potential impact of the subreddit on the lives of individuals experiencing homelessness.

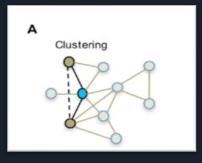
This, in turn, may create a sense of empathy and motivate others to develop targeted interventions and resources to support this population

Evaluation

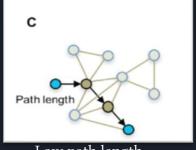
• The study will examine social network nature of the subreddit, with known features of human social networks, such as:



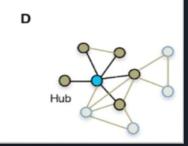
Scale-free distribution



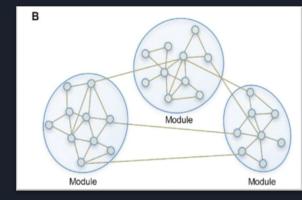
High clustering



Low path length



Hub nodes



Community detection

Methodology

We sub-divided our research in two main categories

• Finding structure and hub nodes of our network

• How communities are formed and what are their mutual topics of discussions

Data Collection and Cleaning



Network Creation and Measures



Data Preparation for Content Analysis

Data Collection and Cleaning

- Collected data from r/homeless subreddit using PRAW
- Extracted 2512 posts and 36379 comments / replies from Jan 2020 to Feb 2023.
- Merged data as network analysis and content analysis Dataframe after cleaning and wrangling.

Network Creation and Measures

- Constructed a weighted undirected network
- Nodes users total # of nodes = 7126
- Edges communication between the author of the post and that of the comment or reply total # of edges = 19743.
- Calculated network analysis metrics



Data Preparation for Content Analysis

- Used pandas, nltk, and re libraries
- Processed the content text
- Grouped content by communities' numbers to find the top 15 most common bigrams (word pairs)
- Analyzed the highestranked content of the top 4 hub nodes.

r/homeless Subreddit Network

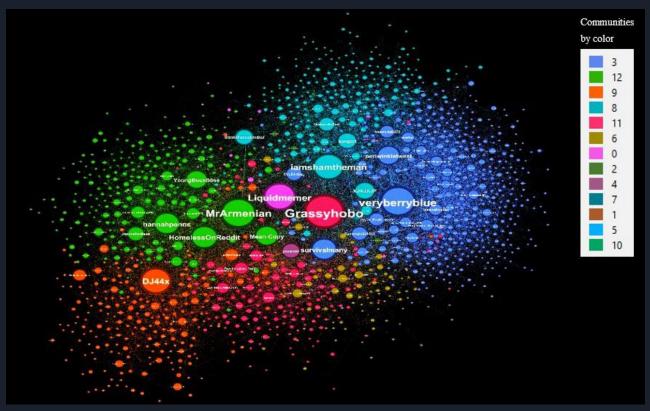
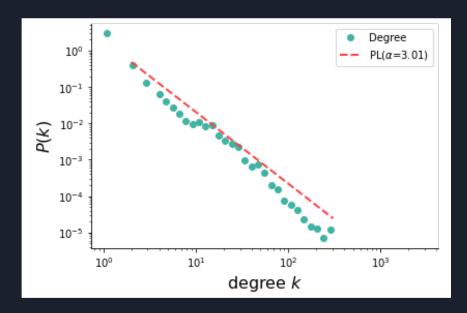


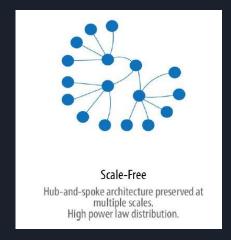
Figure 1. r/homeless network colored by communities and node size by degree centrality (Layout used - ForceAtlas)

Network Analysis Results

- ☐ Degree Distribution
 - The graph showed a power-law distribution with a scaling exponent of $\alpha = 3.01$
 - The graph fits the Barabási-Albert model that generates scale- free networks.

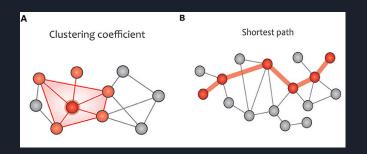
Scale-Free behavior: "The phenomena of the rich gets richer"

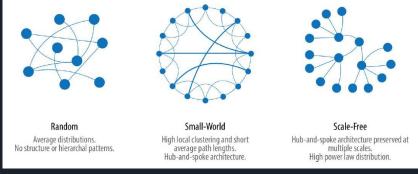




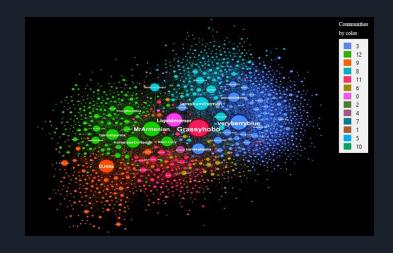
- Avg Clustering Coefficient = 0.0277
- Avg shortest path length = 4.0152

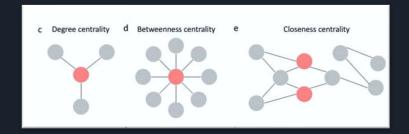
Comparing values of original graph with connected double-edge swap null model				
Measure	Original Graph	Null Model	Standard Deviation	
Clustering Coefficient	0.0277	0.0191	+ / - 0.0010	
Shortest Path Length	4.0152	4.0062	+ / - 0.0078	





Top ten hub nodes based on degree centrality measure			
Node (user)	Node (user)		
Grassyhobo	DJ44x		
veryberryblue	survivalmany		
MrArmenian	HomelessOnReddit		
Liquidmemer	Hannahpenns		
Iamshamtheman	periwinkletweet		

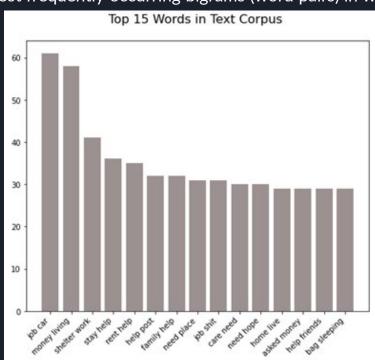




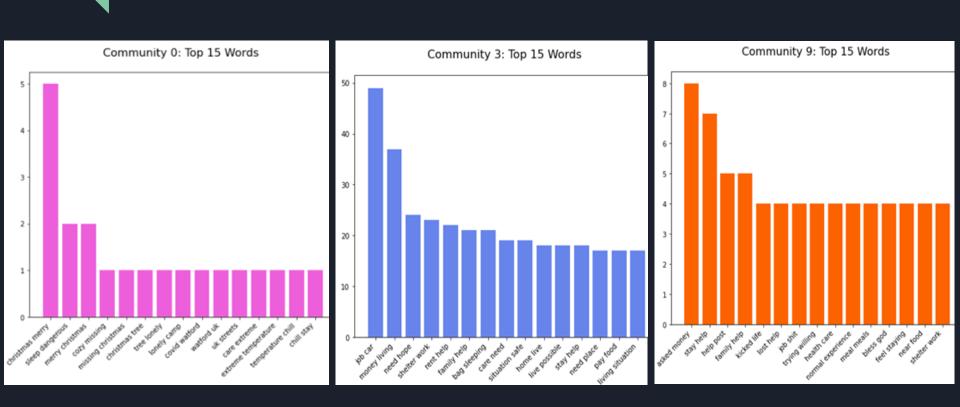
Detected thirteen communities

Content Analysis results

Analyzed 15 most frequently occurring bigrams (word pairs) in whole network.



Analyzed 15 most frequently occurring bigrams in each community.



Nodal level content analysis on top 4 hub nodes

- Grassyobo shared content focusing on sharing homeless camp life experience and social support.
 - O The user's highest-scored content "losing their camp to a Bulldozer", which received 175 upvotes
- Veryberryblue shared posts, reflecting on experiences of homelessness and seeking advice.
 - The user's highest-scored "feeling unsupported during times of adversity, despite previous assurances of social network support", which received 169 upvotes.

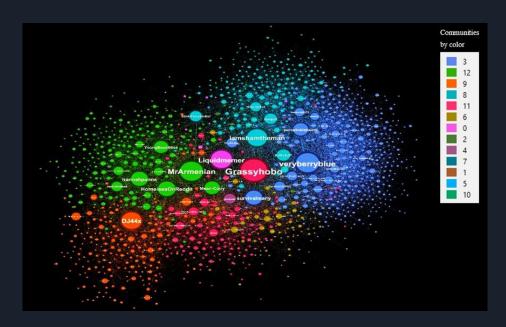
- MrArmenian shared mostly positive and supportive posts on available support services.
 - O The user's highest-scored content "celebrated 1-month sobriety" and received 614 upvotes.
- Liquidmemer shared content focused on camaraderie among homeless individuals, gratitude, and the challenges of living on the streets.
 - O The user's highest-scored content "thankful for finding wifi and power" received 512 upvotes

These two users' communication is notable for receiving a high number of upvotes, indicating a desire within the subreddit community for positive and supportive content.

Conclusion

- This network is like any other social network.
 - o centralized and hierarchical in nature
 - o Dominated and influenced by some hub nodes
- Content analysis revealed the most pressing concerns and the significant role of individuals with lived experience of homelessness in providing support and advice.
- Development of strategies using subreddits and hubs about resources and support programs could prove to be a cost-effective and time-efficient approach to reaching a larger and underprivileged homeless population.

Overall, this study demonstrates the value of network analysis and content analysis in understanding the complex social dynamics of online homeless population



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