Network Analysis - Discord Channel

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Introduction

- The Discord server I analyzed mainly serves as a place for friends to play video games, talk, and make plans.
- My main goal was to learn more about the users in the server and examine how communication flows between them.
- I also wanted to test my expectation that the creator of the server would be the most active and central user in the network.

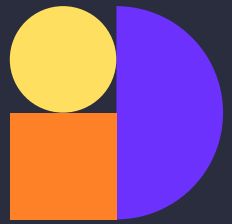


Network Theory Concepts



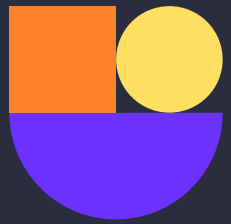
Degree Centrality

The number of connections a node has



Homophily

The tendency for individuals to associate with others who are similar to them



Core-Periphery

A common pattern in social networks where a group of highly connected nodes forms a central "core".



Research Questions

01.

Who are the most active users in the Discord server?

02.

What reasons do users report for being in the server?

03.

What is the age distribution of users in the server?

04.

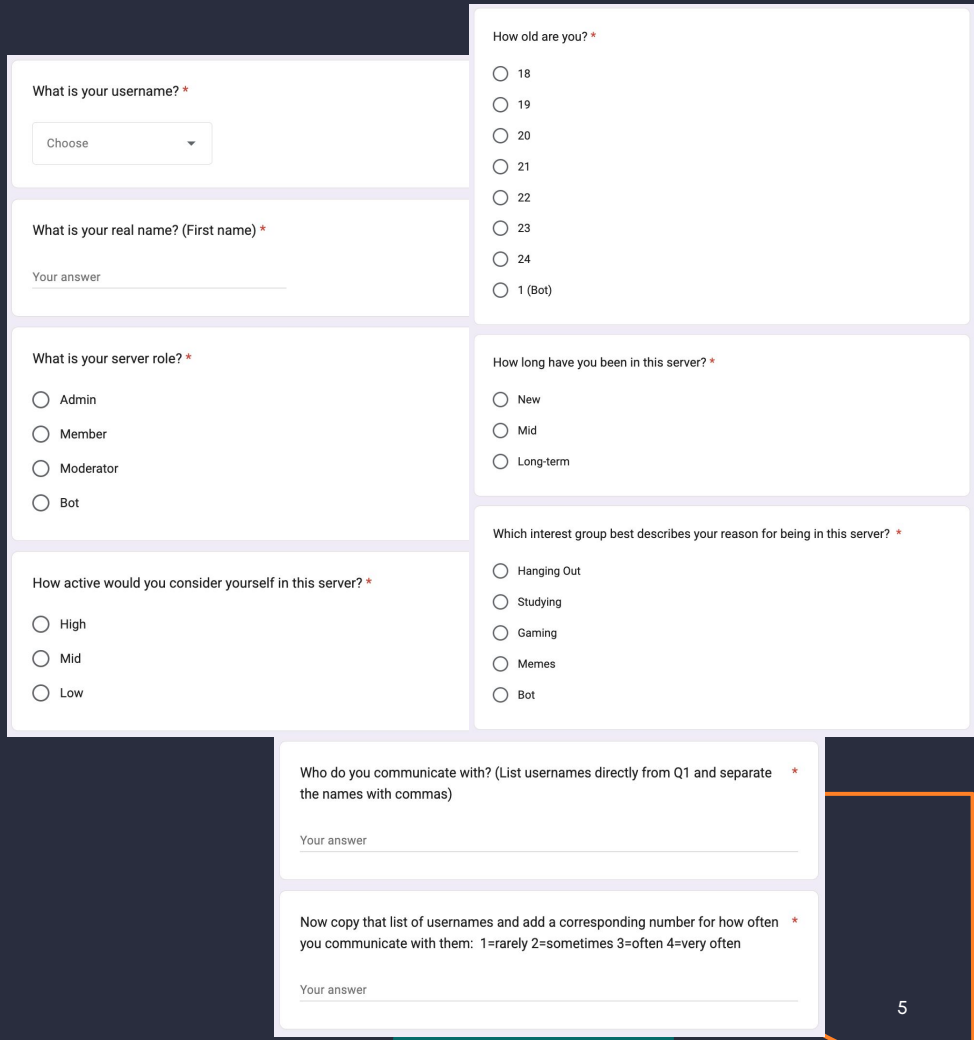
How long have users been members of the server?

05.

Does the network show evidence of a core-periphery structure?

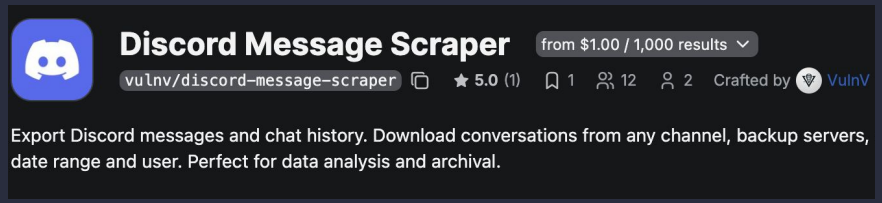
Approach:
Survey

- Basic information was collected like matching real names with usernames, age, role, and interests
- Other data like server tenure and self-perceived activity were also collected
- Self-reporting connections/communications data were collected, even if it may not have been as useful as I thought at the start



Approach:
Downloading Data

- A Discord message scraper tool on Apify was used to export the entire chat history
- This dataset made it easier to keyword search rather than constantly scrolling up in the channels
- Since I exported the data outside of the Discord UI, I was able to sort, categorize, and skim the data easier



	author/discriminator	author/id	author/isBot	author/name
g?size=512	0000	627255539973357578	false	boxybadger
g?size=512	0000	625788569218318361	false	spiraldevil
g?size=512	0000	625788569218318361	false	spiraldevil

channelId	content
1144431788287066125	I'm down to play some fortnite at some point tbh
1144431788287066125	I was just playing Fortnite smh
1144431788287066125	Bet just text me and imma be down to play
	Yo we should do jackbox tn
	^
	Fr
	Joined the server.
	Dyno™ #dyno-updates
	Joined the server.
	I'm down
	What time tho?
	Idk we could go out to dinner then come back and play
	I'm down
	Ok wanna meet in Frieda lobby at 6:30?
	wait I'm at the corec tho
	Can we do like 7:30
	Sure

Approach:
Filtering Data

- AI models like ChatGPT and Claude made it much easier to create an initial edge list based on direct chat replies
- The AI tools also were able to generate other interesting data about the server like the average number of messages sent each day
- Lots of scrolling was still required in order to include more interactions that AI would not have been capable of understanding
- This process left me with a relatively comprehensive edge list

Thinking

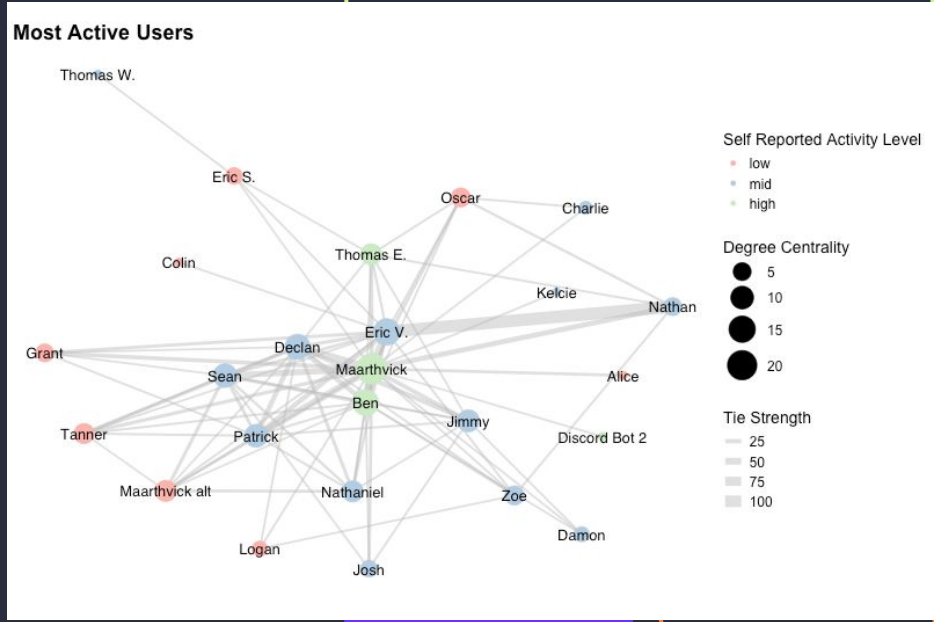
timestamp	timestampEdited	type
2023-08-25T00:43:59.034+00:00		GuildMemberJoin
2023-08-25T00:44:11.423+00:00		GuildMemberJoin
2023-08-25T00:44:11.575+00:00		Reply
2023-08-25T00:44:13.106+00:00		Reply
2023-08-25T00:44:37.98+00:00		Default
2023-08-25T00:45:00.567+00:00		Default

Full inclusive calendar span	968 days
Average messages per day over full span	3.06 messages/day



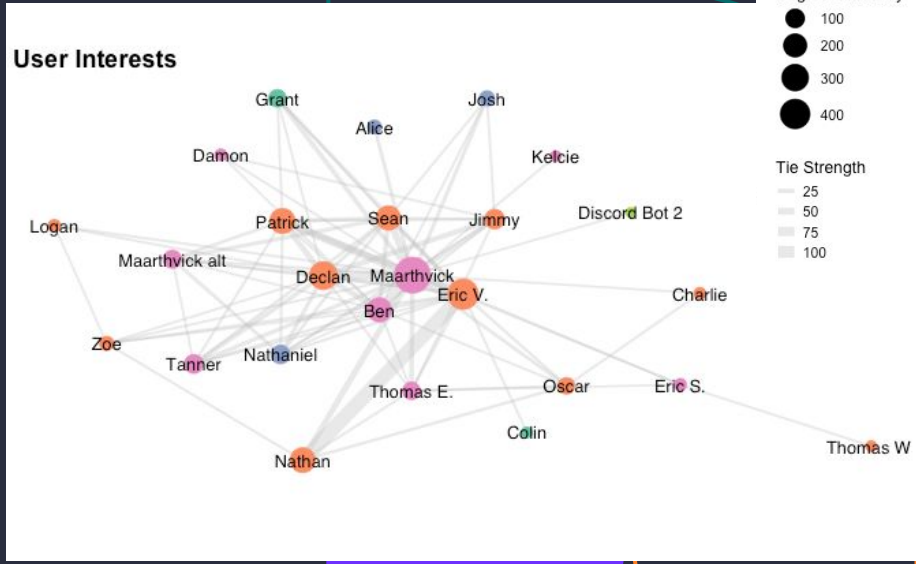
Degree Centrality: Most Active Users

- The most active users are located in the center
- Comparing the self-reported activity level to the calculated weight, many users underestimated their participation
- Highly connected users act as hubs bring different parts of the network together



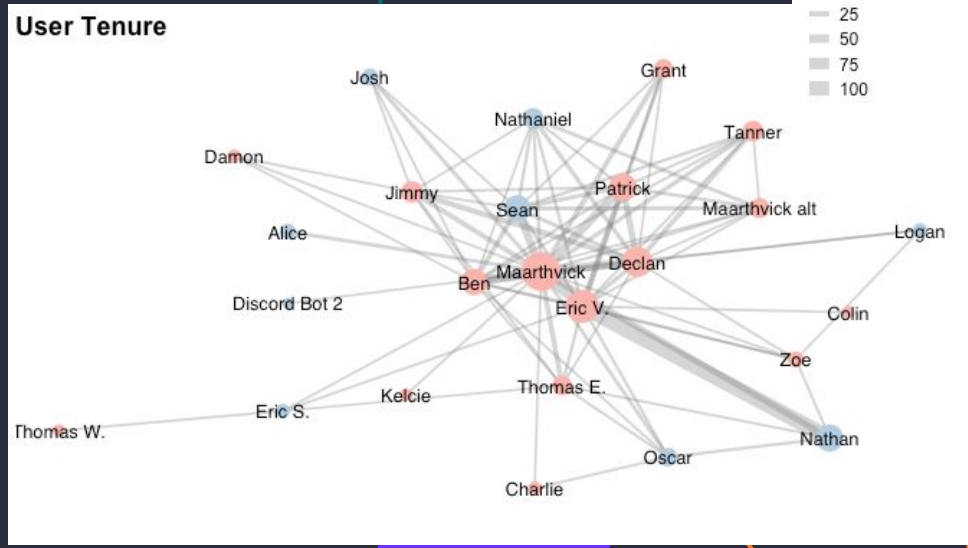
Homophily:
Similar Interests

- To better this visualization, I could have given more than 1 option for interests
- The vast majority of people in the Discord listed hanging out as their interest group
- This makes sense since everyone in the server is a part of the friend group (at Purdue) and has met one way or another



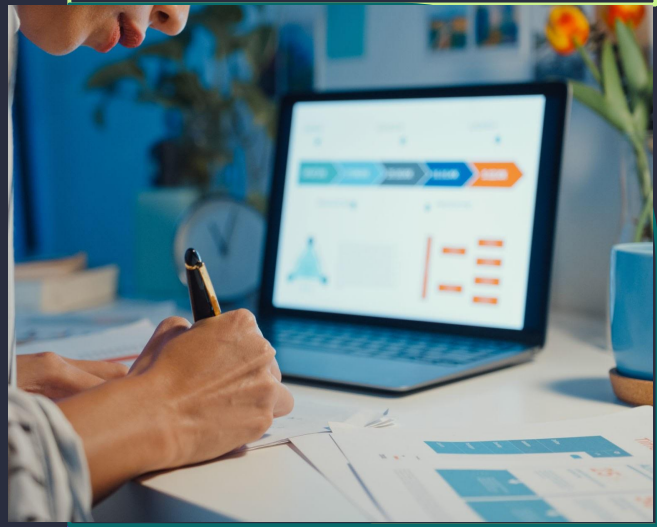
Core-periphery: Network Structure

- The core-periphery structure is apparent in the visualization
- The members in the core are close friends of the server's owner (Maarthvick), so they are more likely to communicate frequently with him
- Peripheral users tend to interact mainly with core users rather than with each other



Conclusion
& Next Steps:

- The network is generally dominated by a few key users
- The results matched my expectation that the server owner is highly central
- Create a visualization without including the most central nodes
- Share my visualizations with the server



Thank you