LoLNetworkAnalysis.gg

Web Mining Project Team 2

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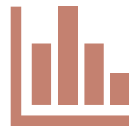
Agenda

Introduction and Project Target

Experimental Setting

Results

Evaluation

Conclusion and Future Work

Introduction

- F2P MOBA

- Released 2009

- 125-180M active players[1]

- Server regions on every continent

- Around 700K concurrent players[1]

- $1.75 billion revenue in 2022[2]

Fig. 1: League of Legends Logo[3]
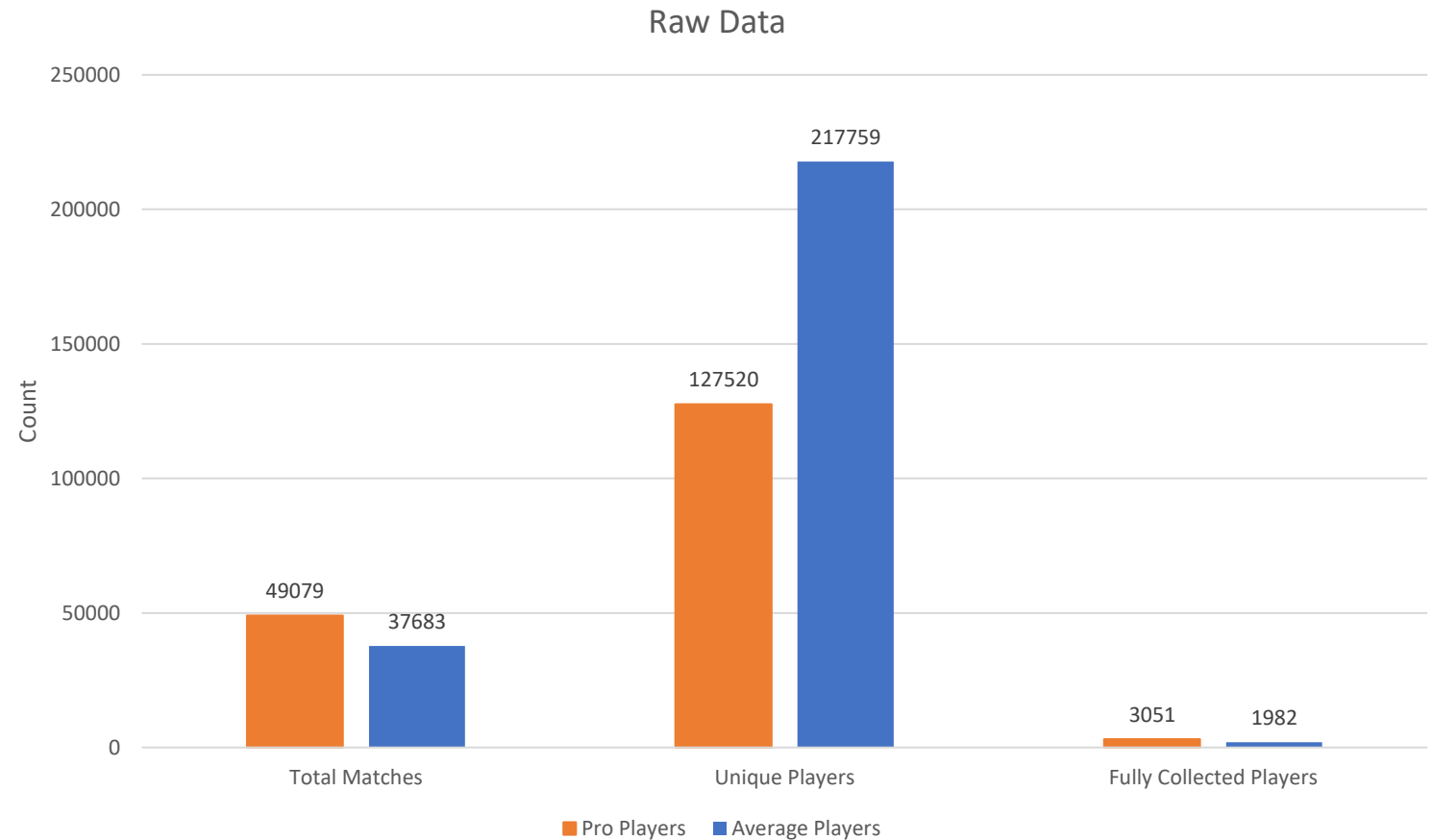
Project Targets and Hypotheses

Project Targets:

- Explore the Network Structure of League of Legends players

- Analyze friend groups

- Compare networks of average players with pro players

Hypotheses:

1. *Different motivation of players depending on their rank: Average players are more likely to play with the same people (friends)*

2. *Professional players play more frequently compared to average players*
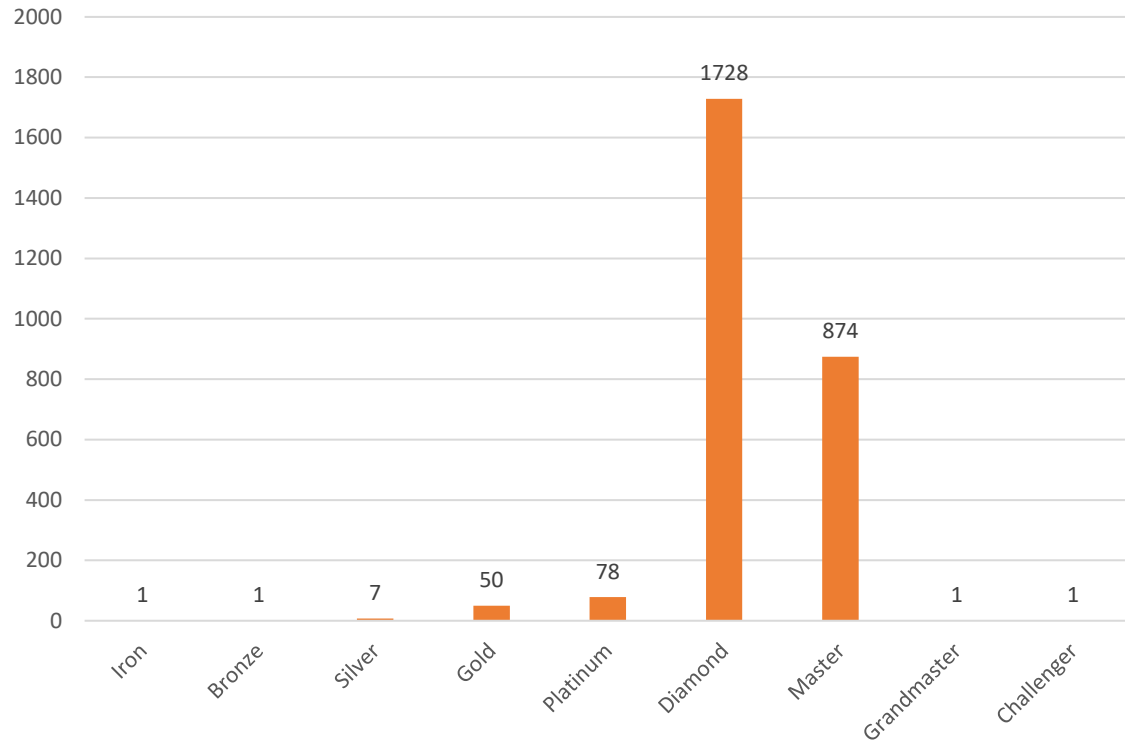
Experimental Setting

- Riot Games API + Cassiopeia
  - Bugs, Rate Limit

- 2 Datasets:
  - "Pro Player" Dataset
  - "Average Player" Dataset

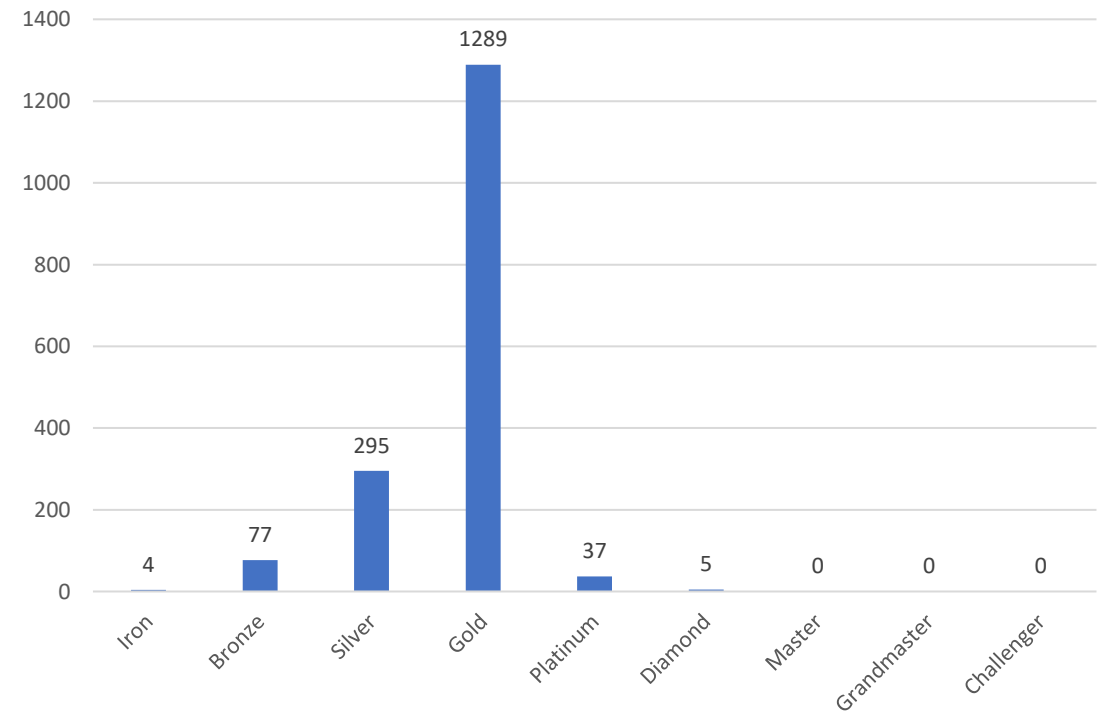- Only fully collected players (20 Games) considered in the analysis

Raw Data

Count

- Pro Players
- Average Players

	Total Matches	Unique Players	Fully Collected Players
Pro Players	49079	127520	3051
Average Players	37683	217759	1982

Rank Distribution in the Datasets

Time

Updated Chart for Play time distribution

Daily Play Time Distribution
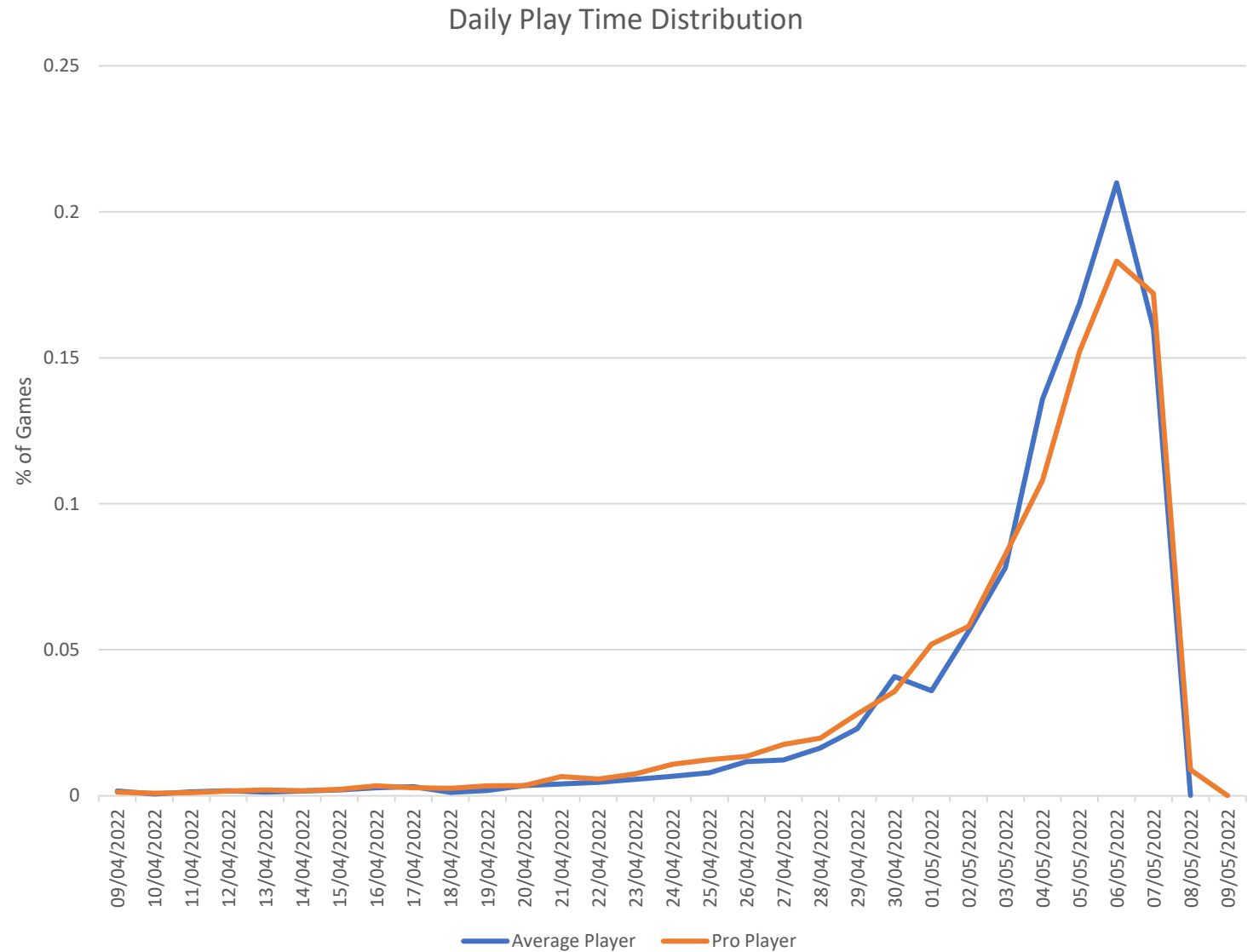
Results: networks

LoL match history network of pro players

LoL match history network of average players

node color = community structure
node size = betweeness centrality

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node size = betweeness centrality
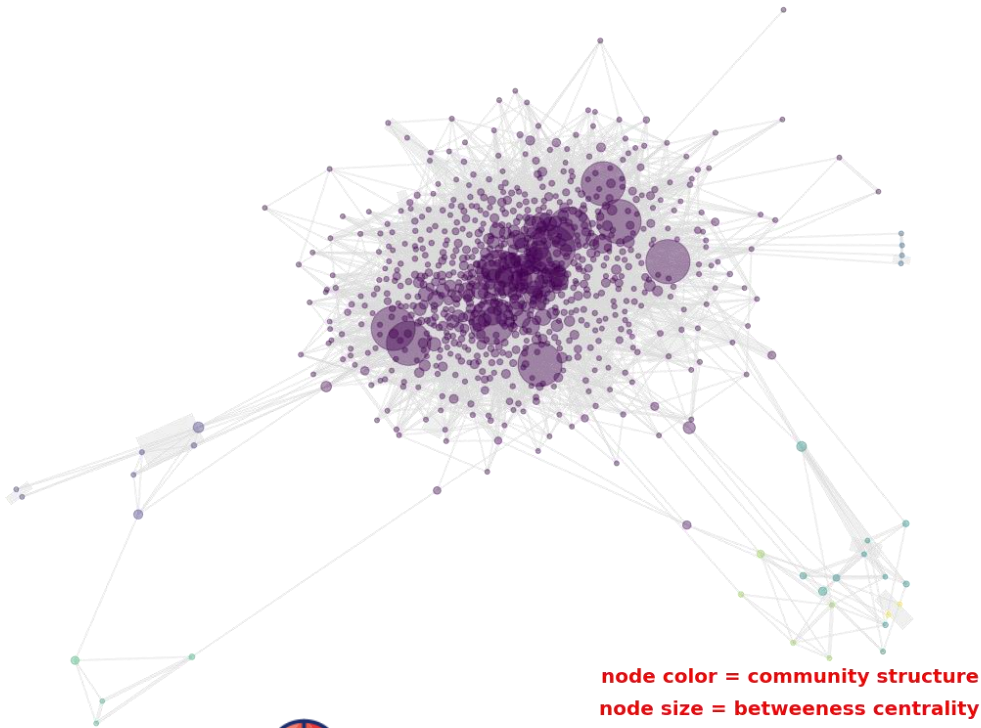
Nodes: 3000
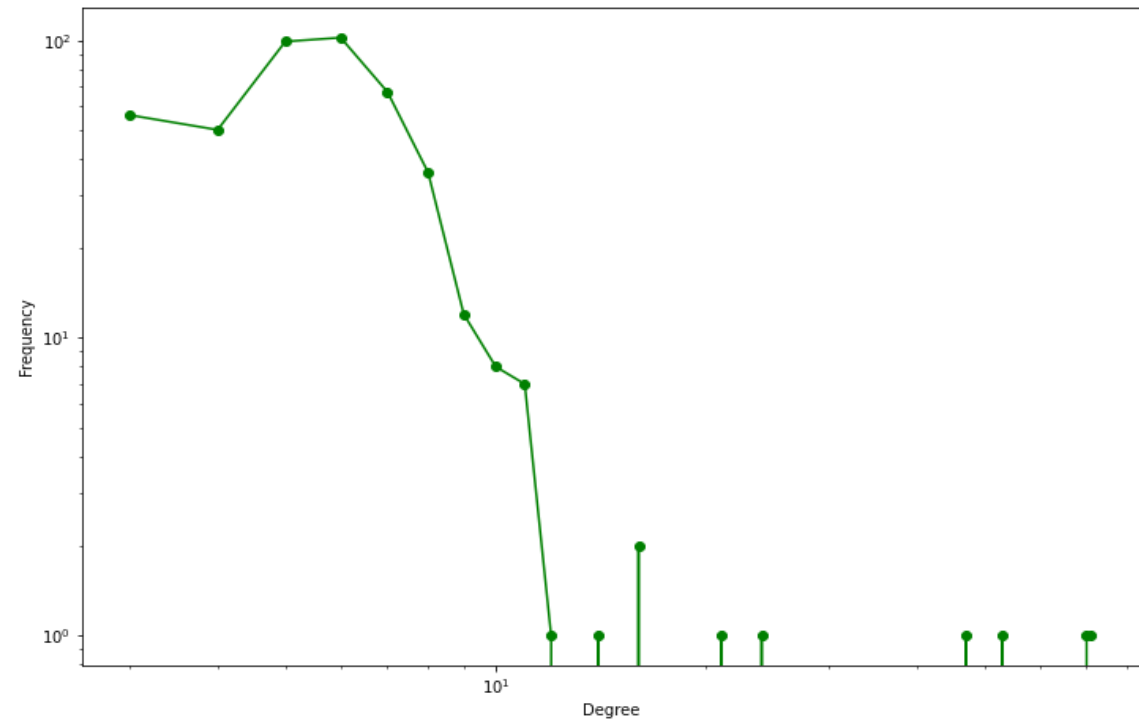Edges:115000

Nodes: 2000
Edges: 12000

LoLNetworkAnalysis.gg

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Results: degree

Pro
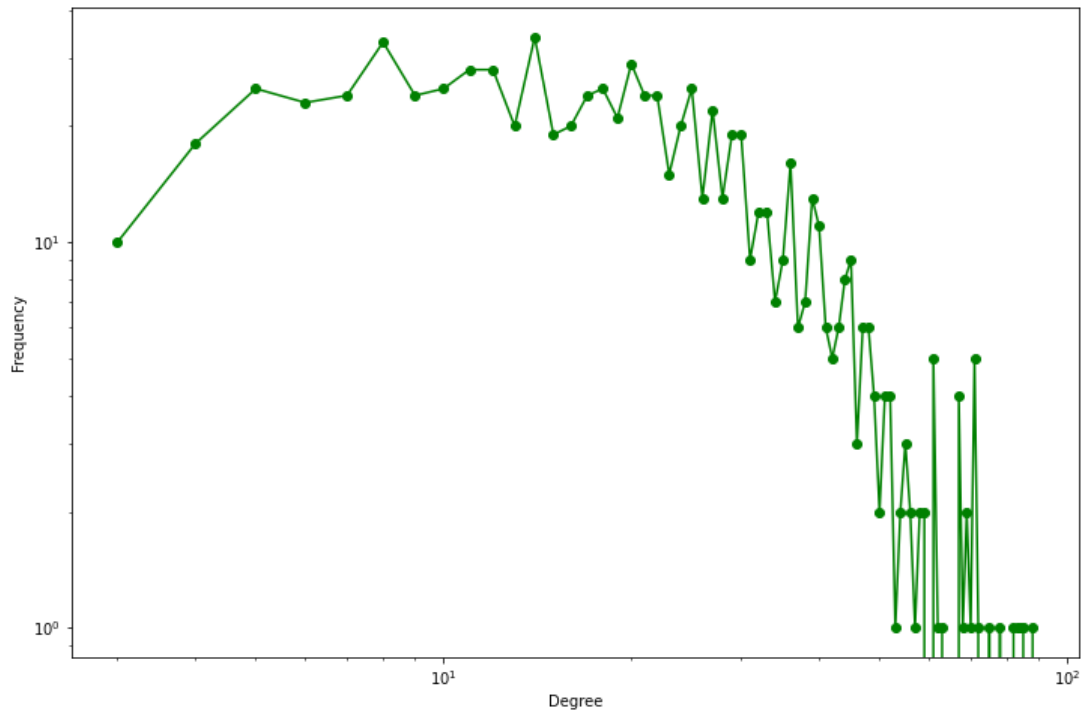
Average

degree distribution scope: 1-100

1-50

Results

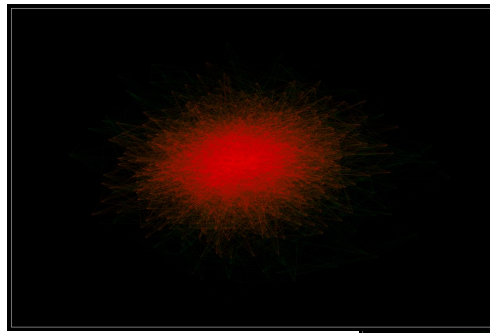|	Pro Player network	Average player network	Conclusion
Average edge weight	2.23	**3.2**	APs tend to play with the same person
Density	**0.03**	0.01	PPs are more closely connected in network.
Average clustering coefficient	0.15 (<0.19)	**0.66 (>0.19)**	APs has some community structure.
Average shortest_path_length	5.33	**8.94**	The efficiency of information transformation is higher in APs.
Triadic closure	0.095	**0.35**	AP`s network is more social

Results: Clauset-Newman-Moore
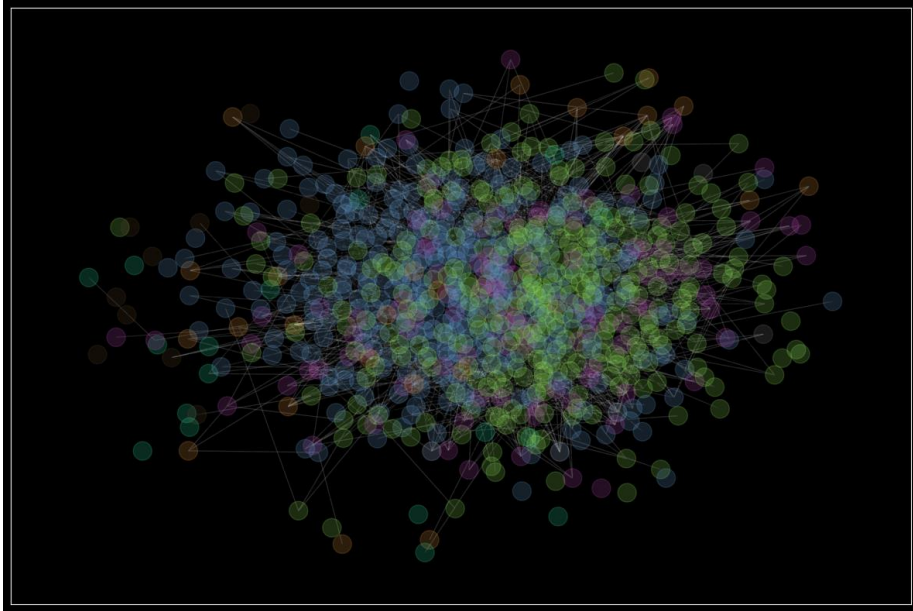
Pro player network – 8 communities
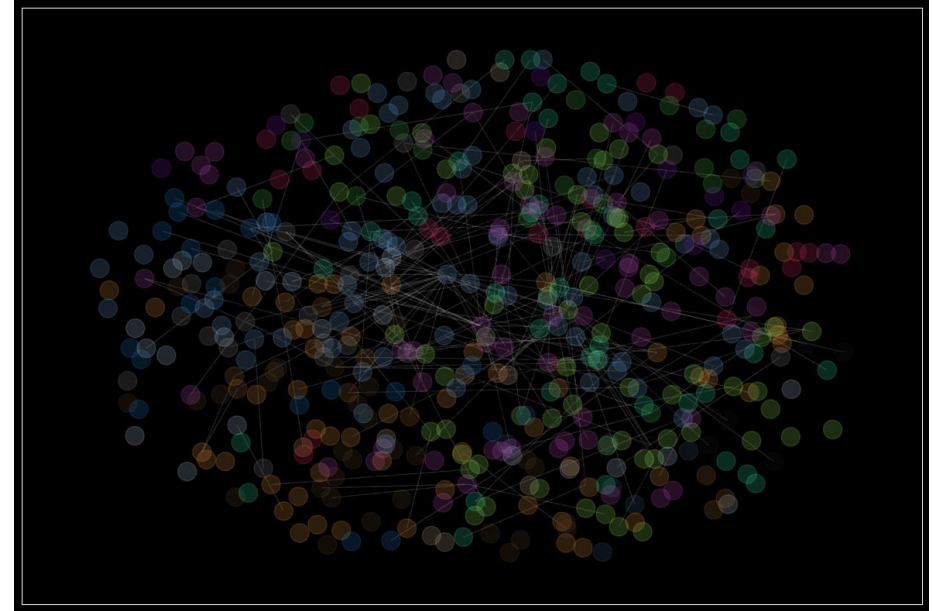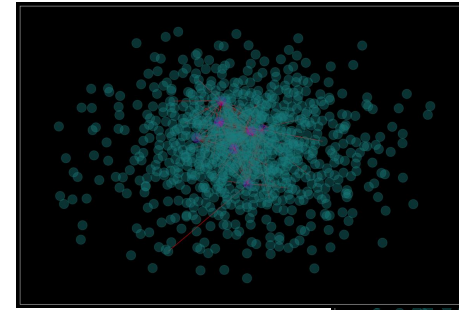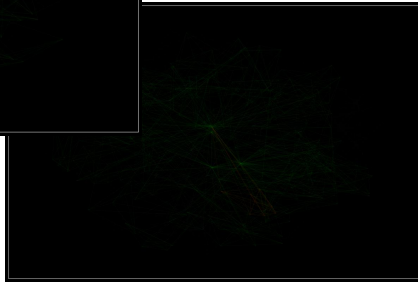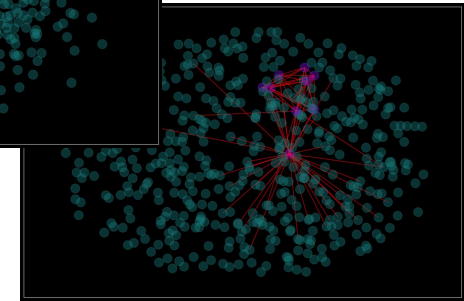

Average player network – 21 communities

Results: community detection

K-cores

Cliques

	Pro_player_network	Average_player_network
Number of nodes	833	499
Number of nodes with at least degree 5	786	301
Number of nodes with at least degree 8	706	9
Number of cliques	6845	332
Biggest clique	7	9

Evaluation

👍 *Different motivation of players depending on their rank: Average players are more likely to play with the same people (friends)*

Our results seem to confirm that: AP tend to play more with the same players

👎 *Professional players play more frequently compared to average players*

No significant difference on the timestamp when we fully mined 20 matches

Error Analysis

Player type of the start-player in the collection

Small timeframe of the data collection

Different dataset sizes

Players who played together vs. players randomly assigned to a game

Teammates vs. enemies

Conclusion and Future Work

Collect a more "meaningful" dataset

Set a fix number of players and mine an initial network

Collect matches for several month

Collect additional player and match features

Compare different game-modes and different regions

More in-depth analysis of the ranks

Thank you for listening!

Any questions?

Sources

Nick Galov 2022: League of Legends Player Count, https://webtribunal.net/blog/league-of-legends-player-count/, retrieved: 20.05.2022

Statista 2022: League of Legends (lol) revenue worldwide from 2015 to 2020, https://www.statista.com/statistics/806975/lol-revenue/, retrieved: 20.05.2022

TheTimeBreaker 2022: League of Legends Wiki (League of Legends), https://leagueoflegends.fandom.com/de/wiki/League_of_Legends?file=League+of+Legends+logo.png retrieved: 20.05.2022

Wikimedia Commons 2013: Map of MOBA, https://commons.wikimedia.org/wiki/File:Map_of_MOBA.svg, retrieved: 20.05.2022

Vincenzo Milella 2022: League of Legends Rank Distribution in Solo Queue – April, https://www.esportstales.com/league-of-legends/rank-distribution-percentage-of-players-by-tier, retrieved: 26.05.2022

Appendix

Gameplay

- 2 Teams

- 5vs5 Players

- 30-45min avg. game length

- Coordinate different objectives and In-game economy
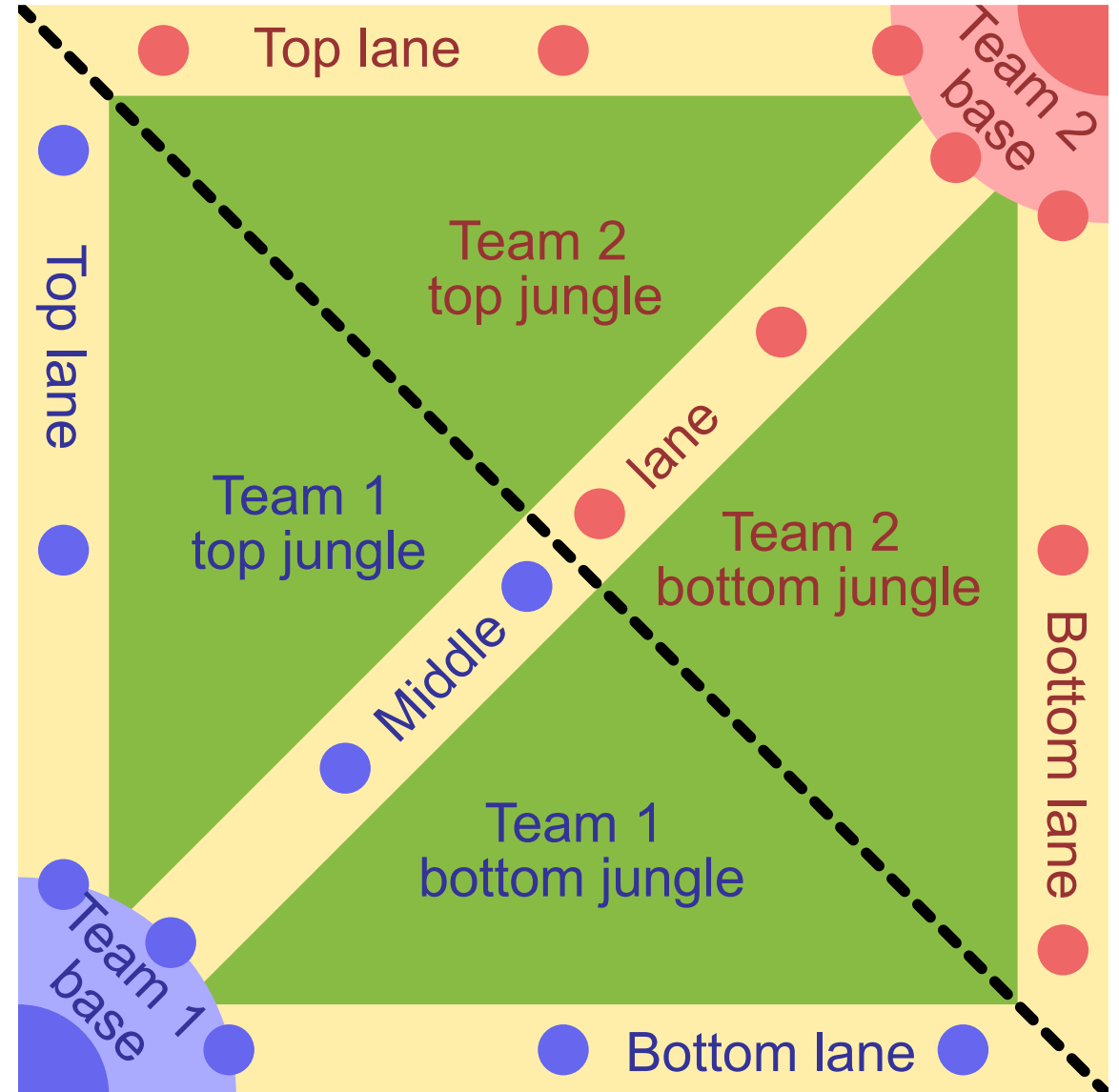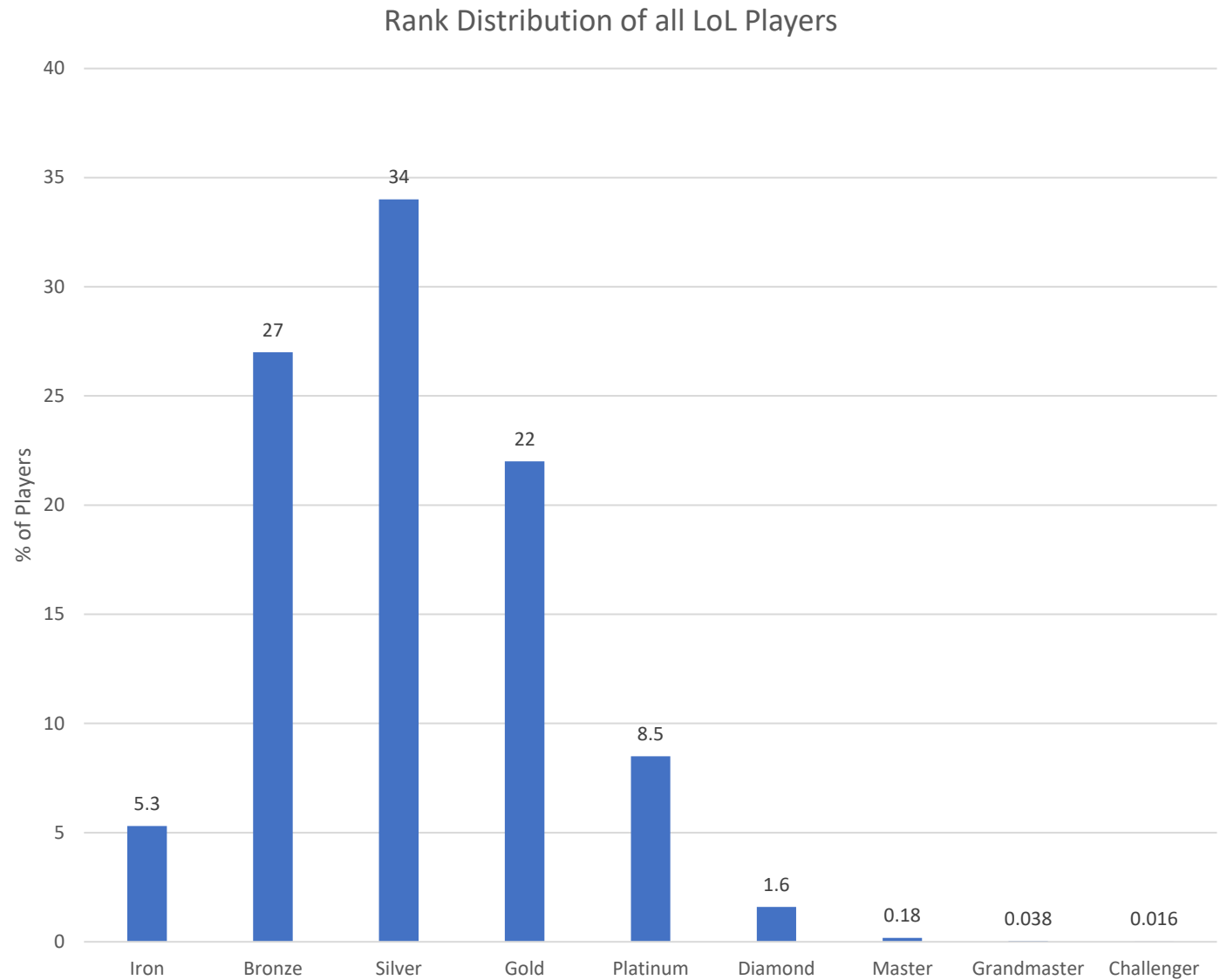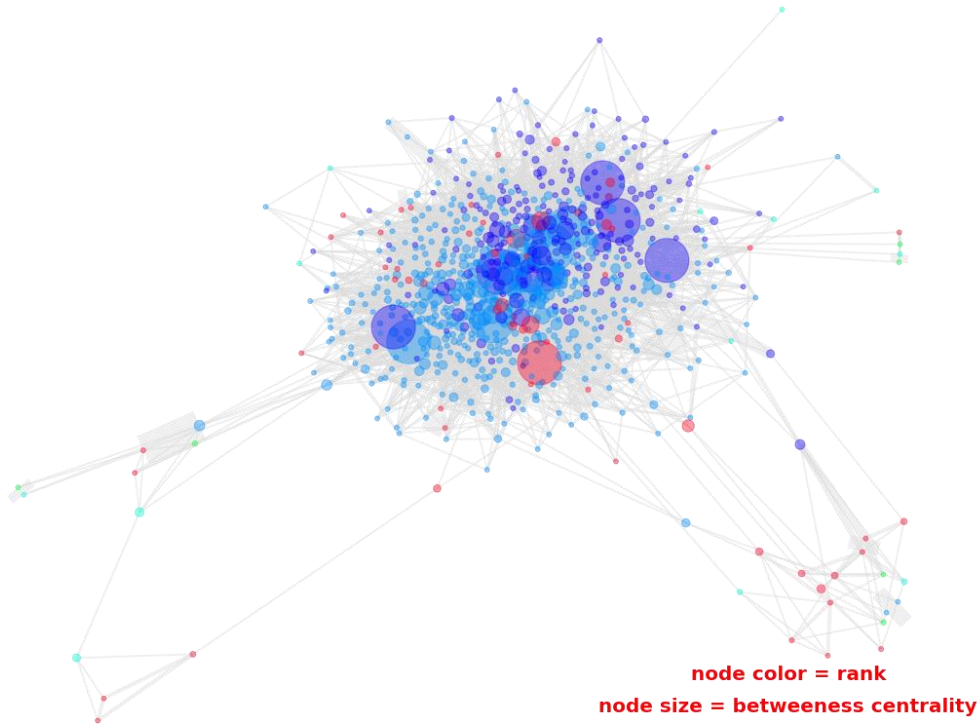
- Ultimate goal: Destroy enemy base

Fig 2: Game Structure[4]

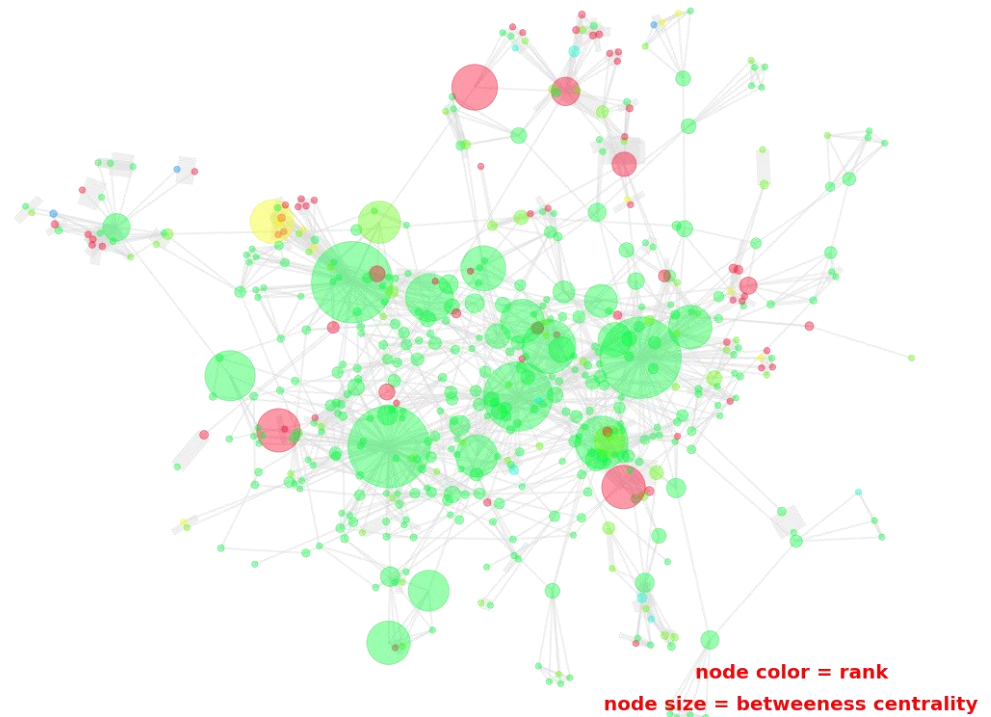# Rank Distribution of the whole Playerbase

Rank Distribution of all LoL Players

Results: networks with ranks

LoL match history network of pro players

LoL match history network of avg players

node color = rank
node size = betweeness centrality

node color = rank
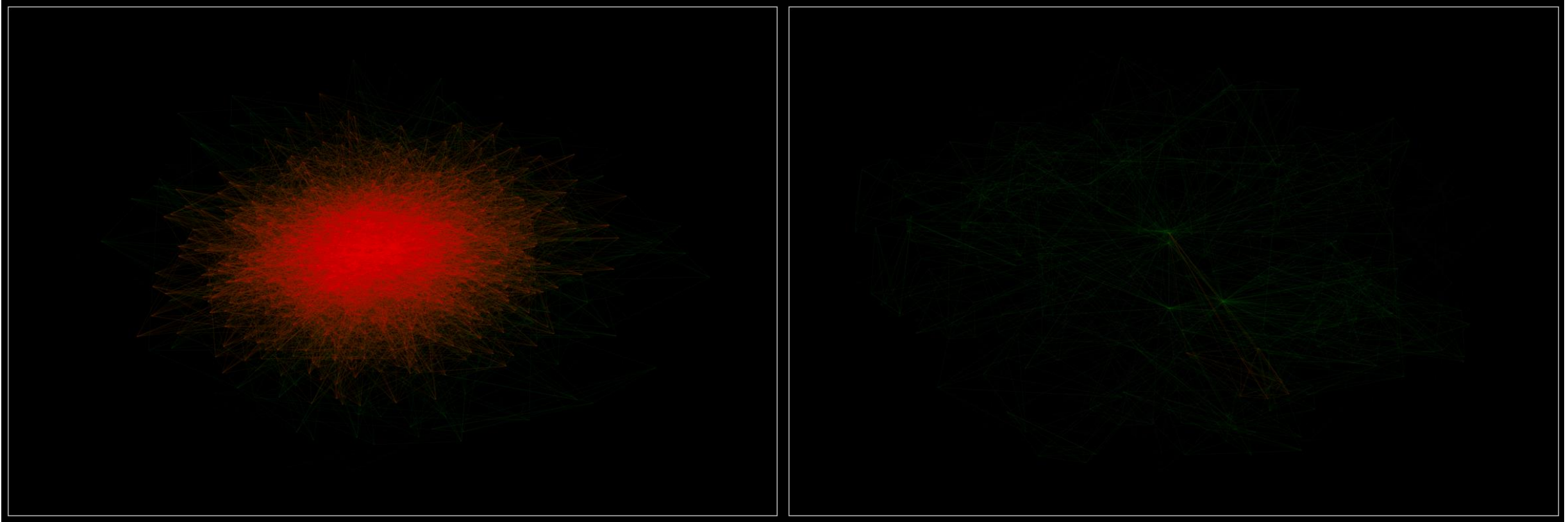node size = betweeness centrality

Networks raw
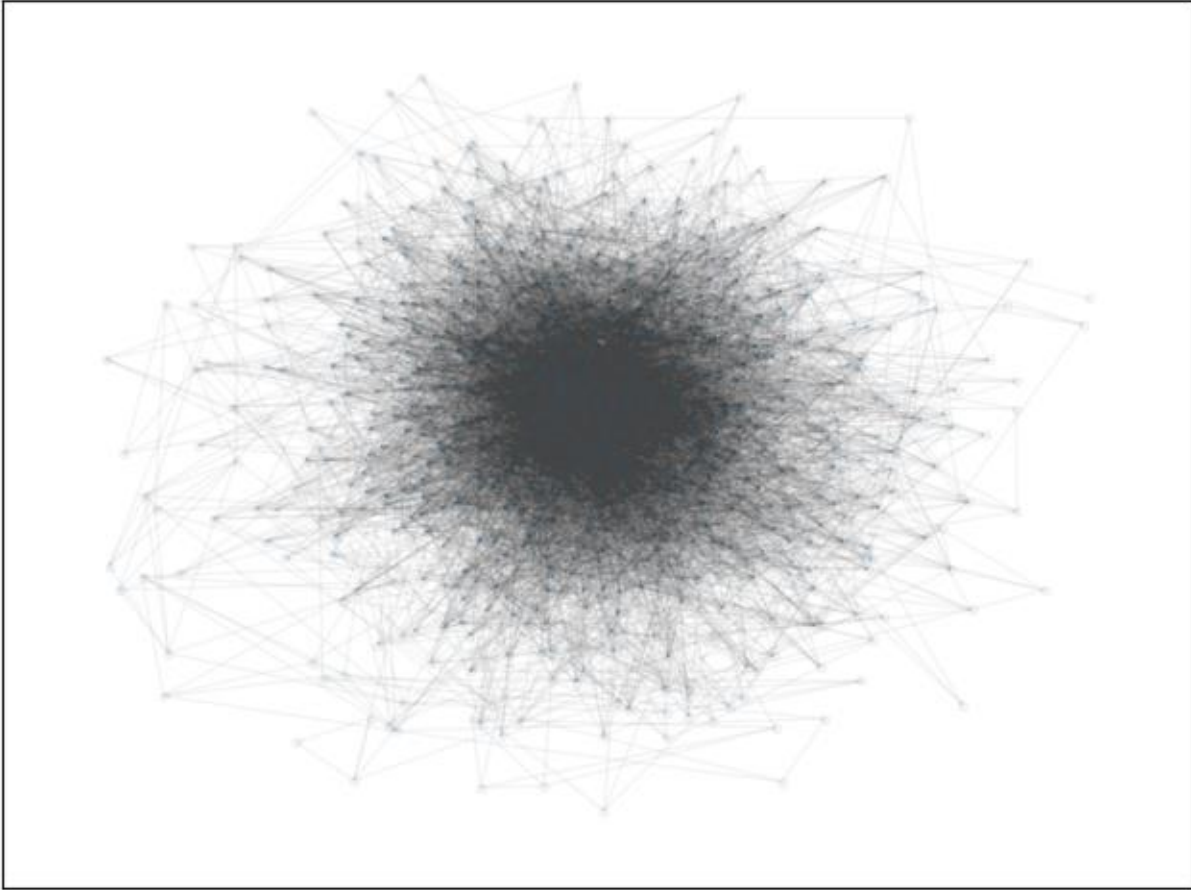
Pro player graph
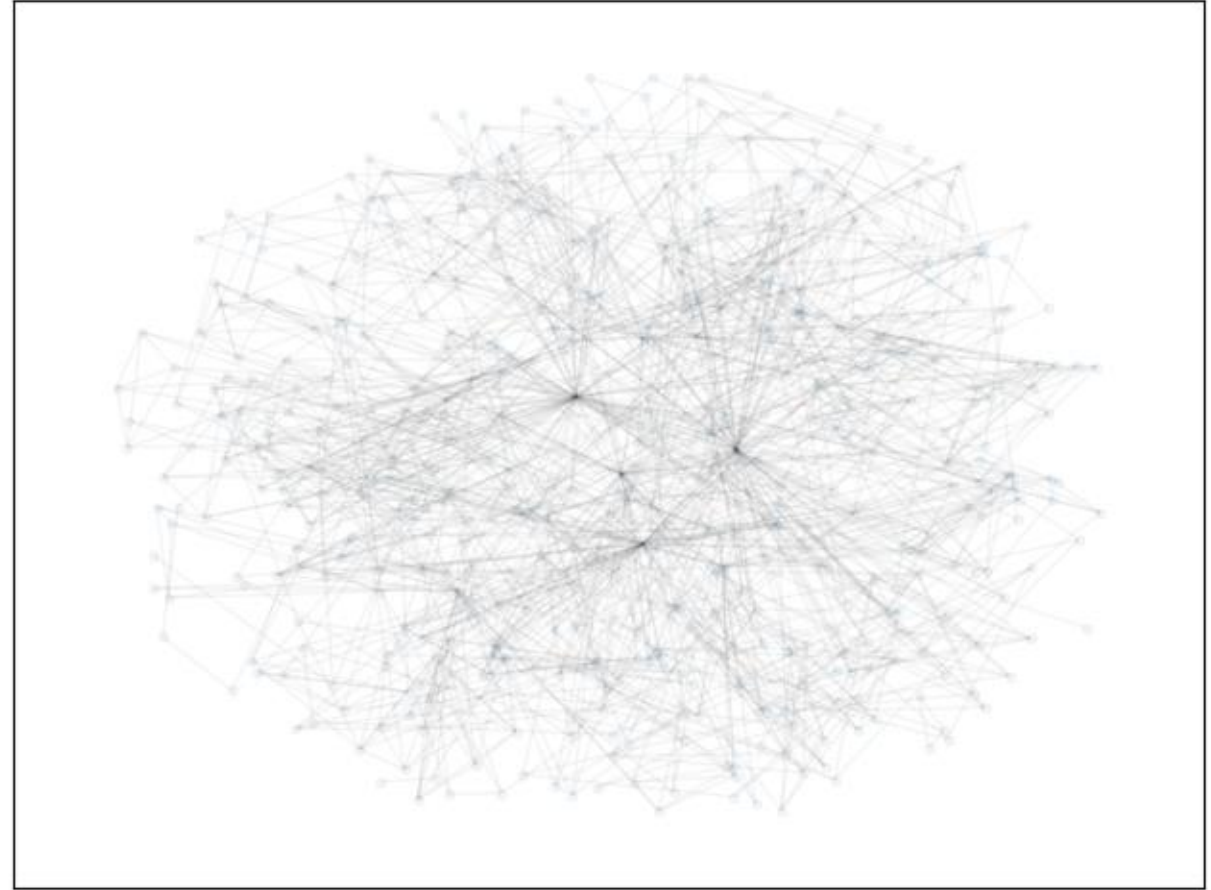
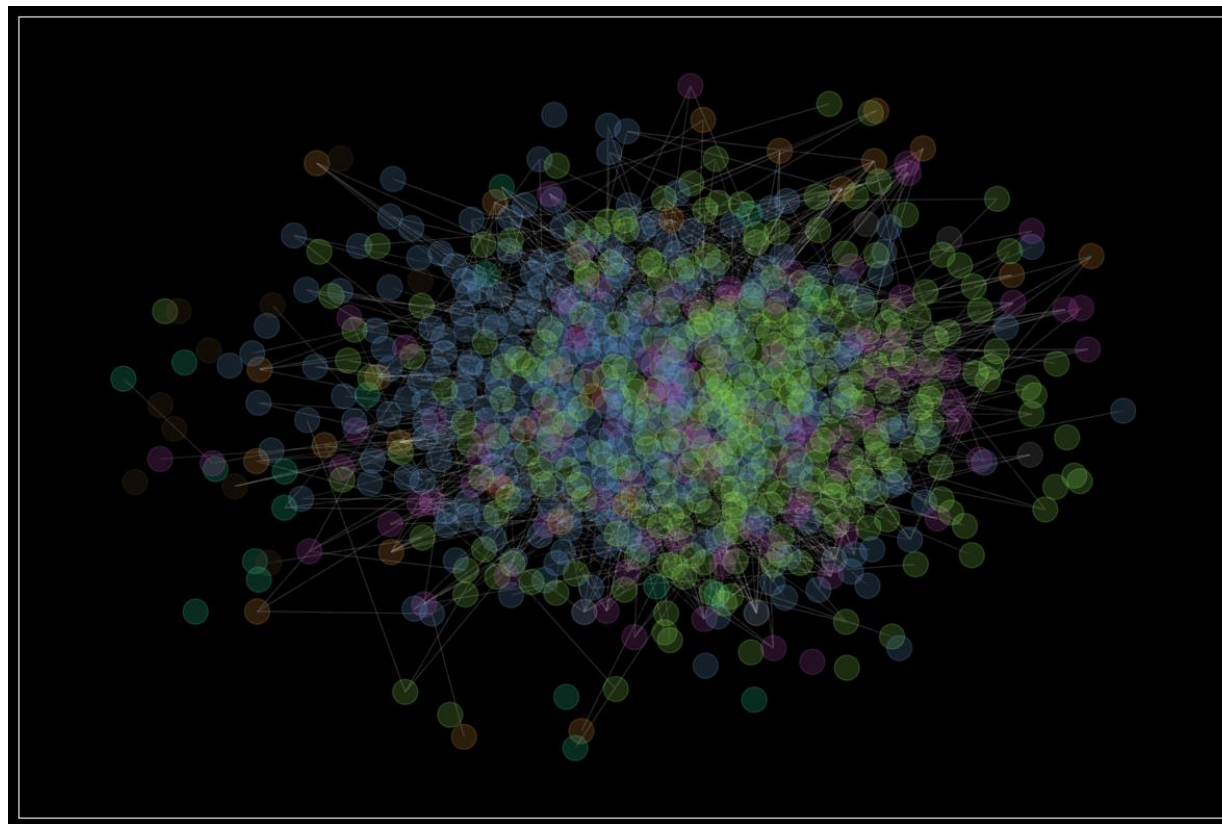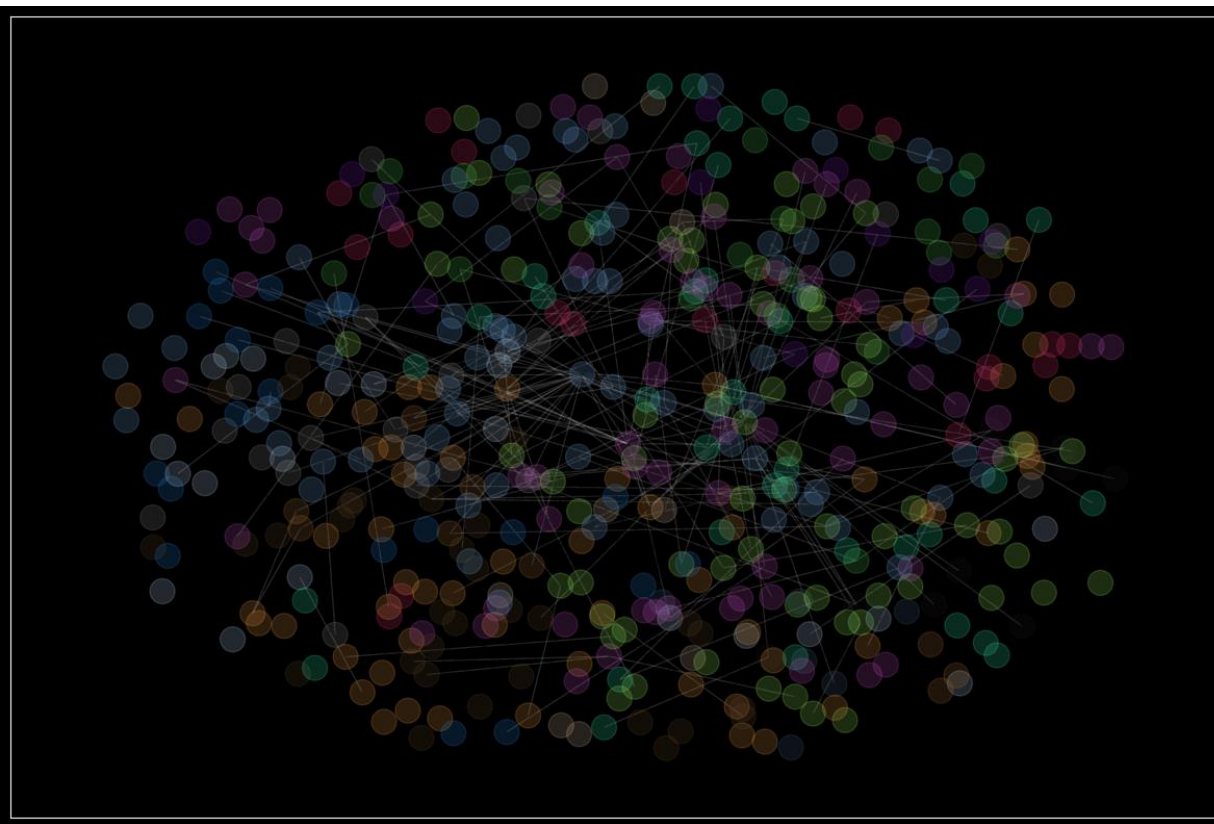Average player graph

K-Cores

Pro player graph

Average player graph

Community detection after Clauset-Newman-Moore

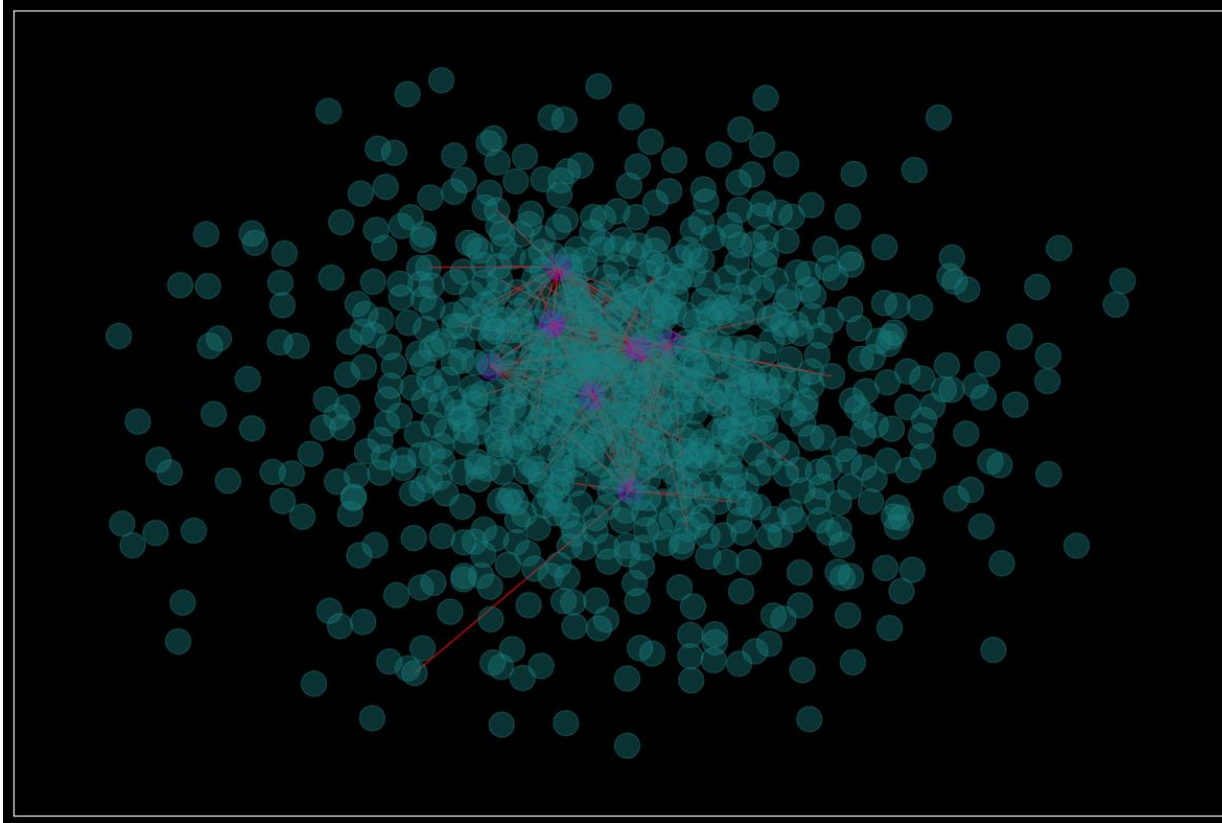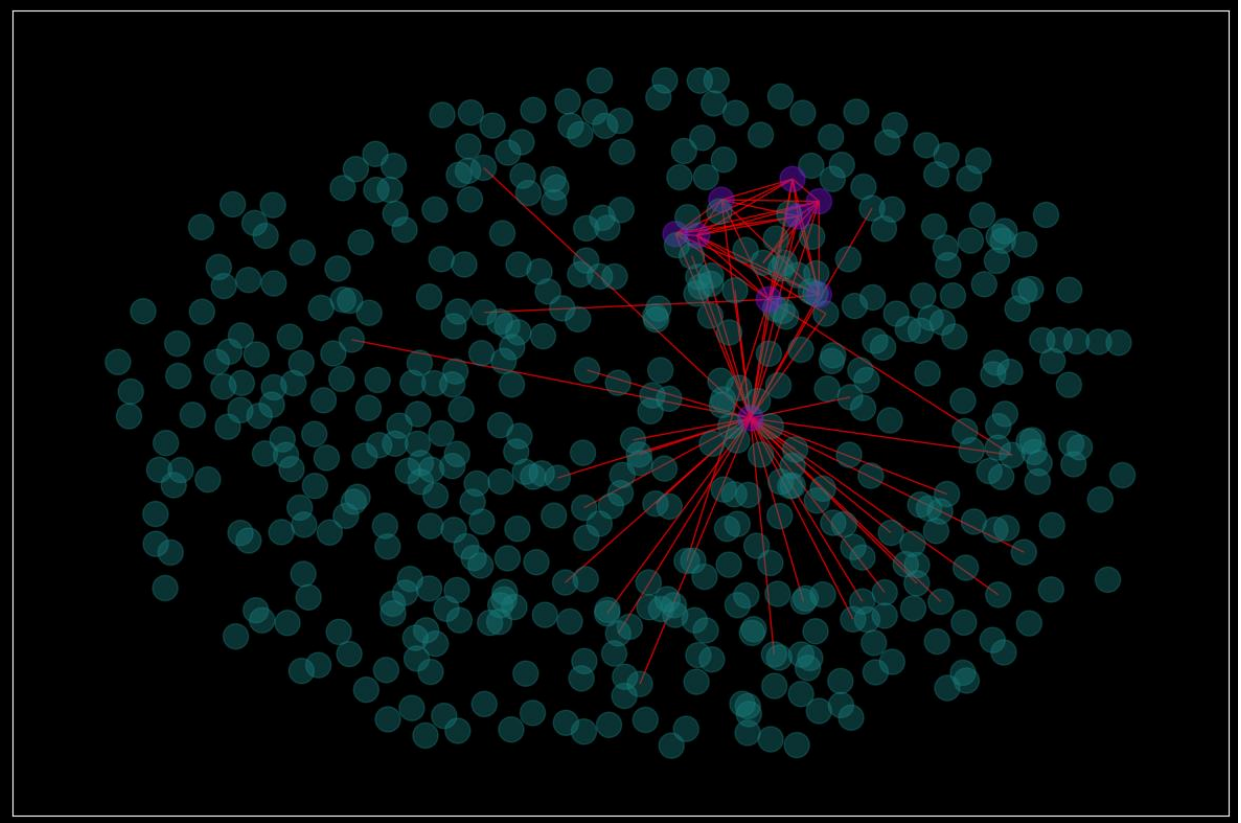Pro player graph

Average player graph

Cliques

Pro player graph

Average player graph