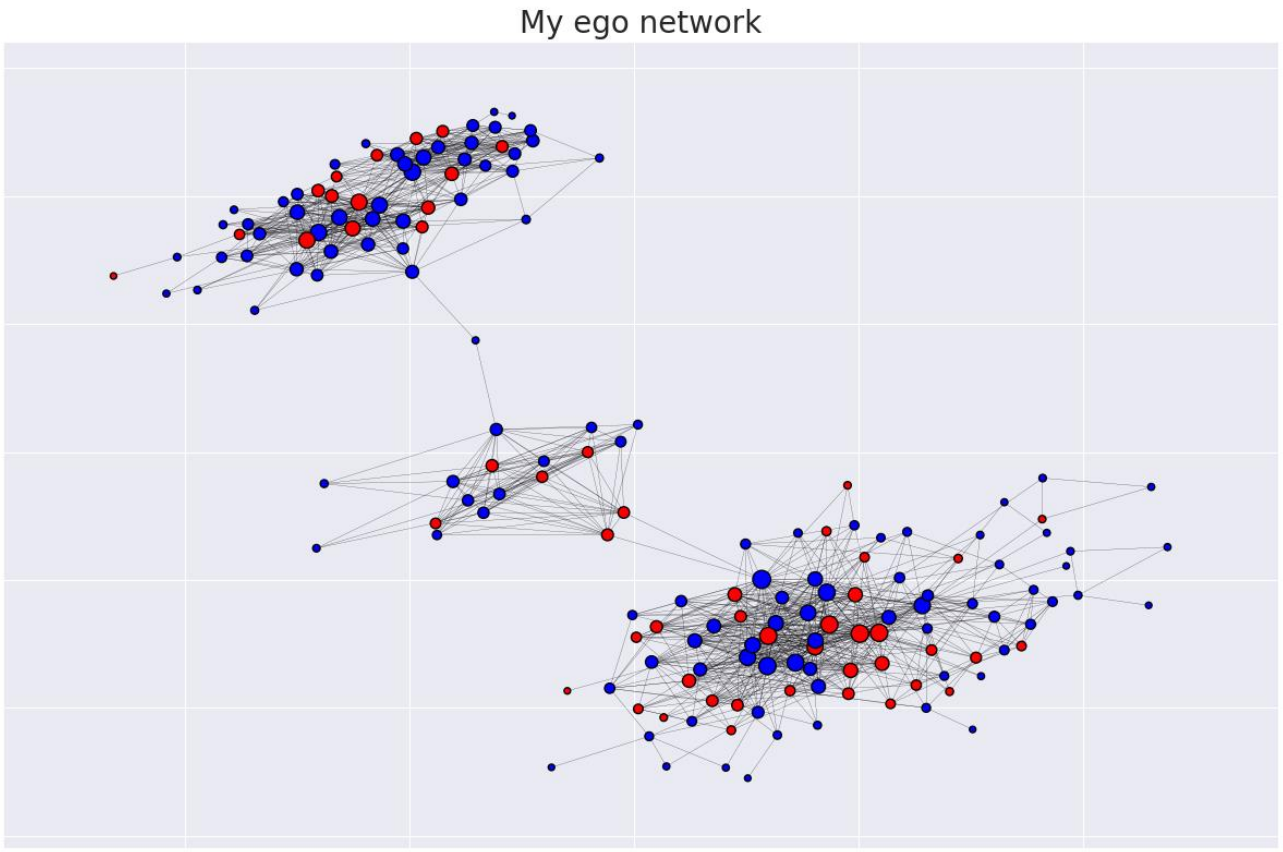
Social Network Analysis Project

Network Science course

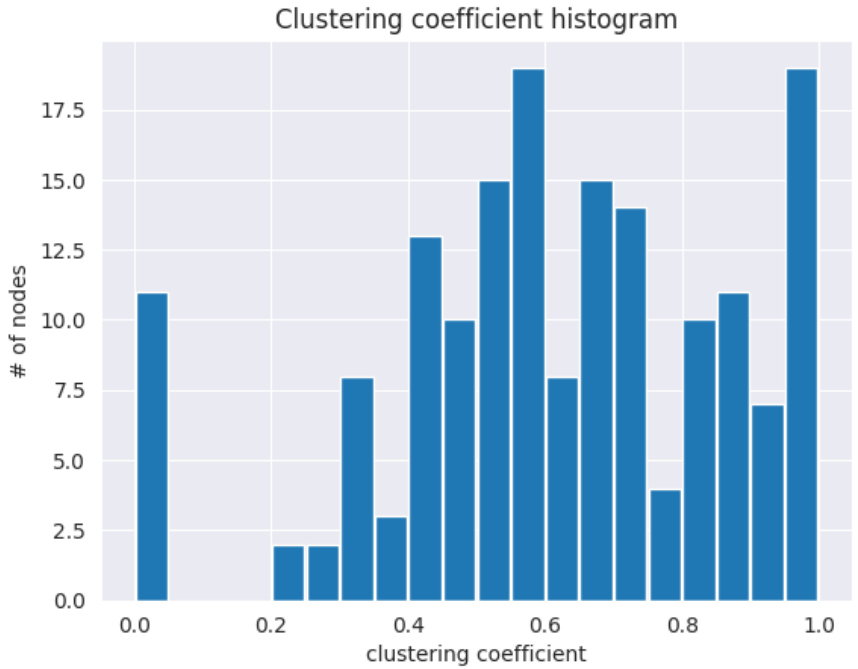
By Aliev Mishan

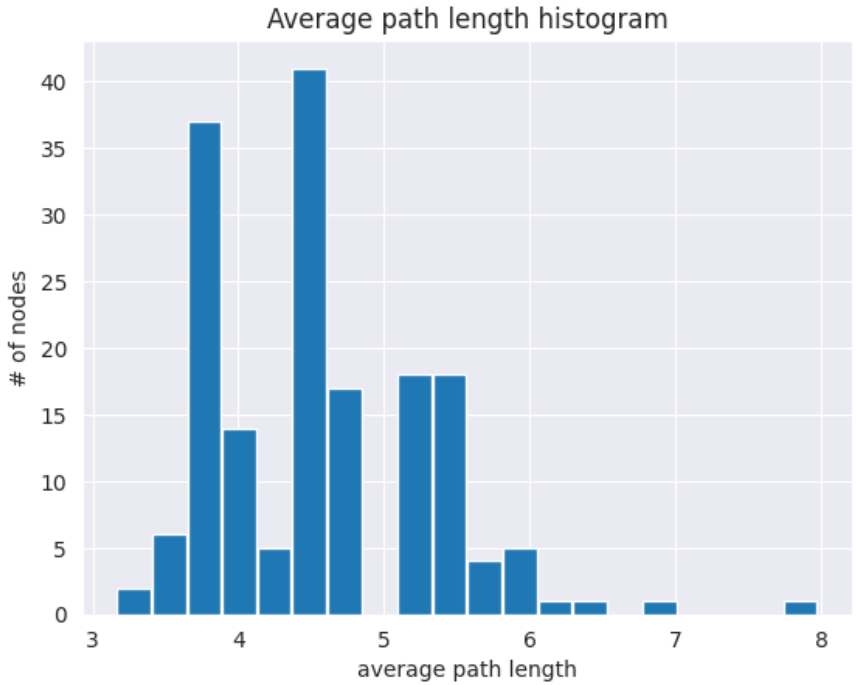
Network summary

Tool to collect data	VK API
Graph	Undirected, homogeneous, unweighted, connected
Nodes attributes	'first_name’, 'last_name’, 'sex’ (1 – female, 2 –male)
Edges attributes	None
Graph order	171
Graph size	1195
Graph diameter	12
Graph radius	6
Min degree	1
Max degree	42
Average degree	13.976608



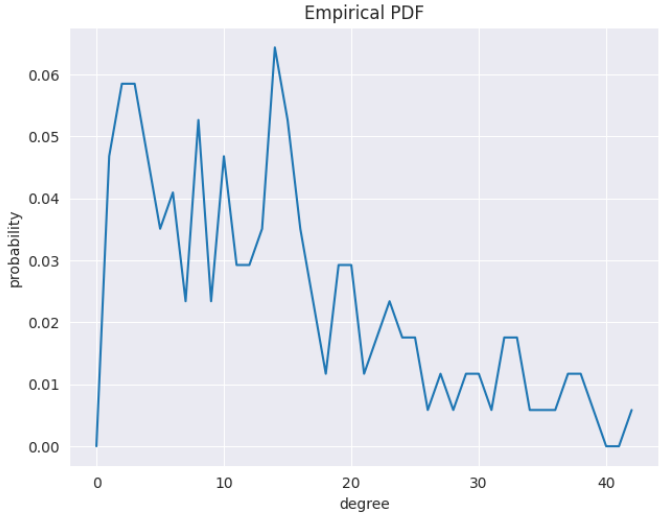
Network summary

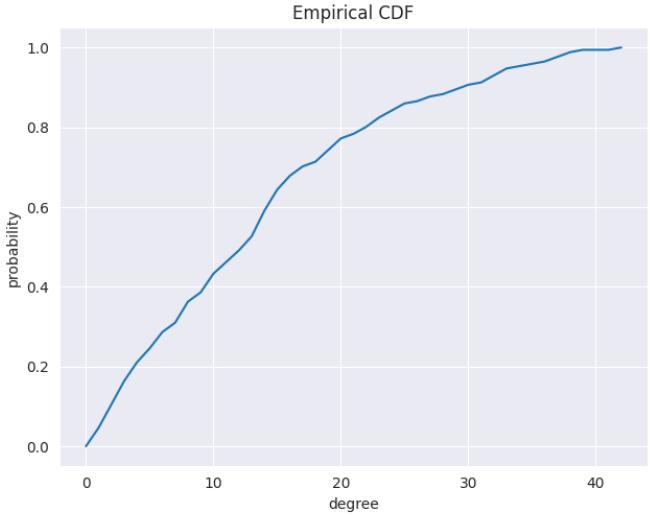


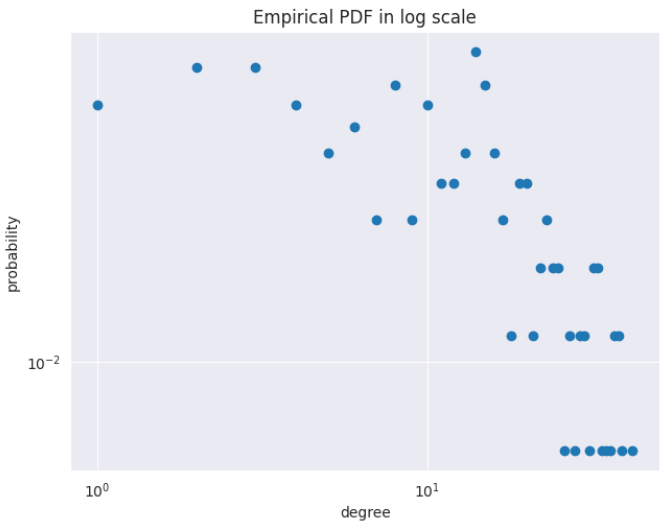


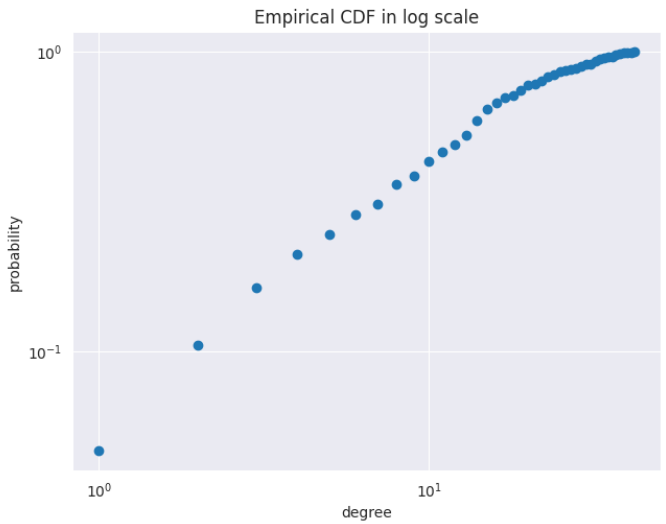
Global clustering coefficient	0.541345
Average clustering coefficient	0.615446
Average shortest path length	4.594427

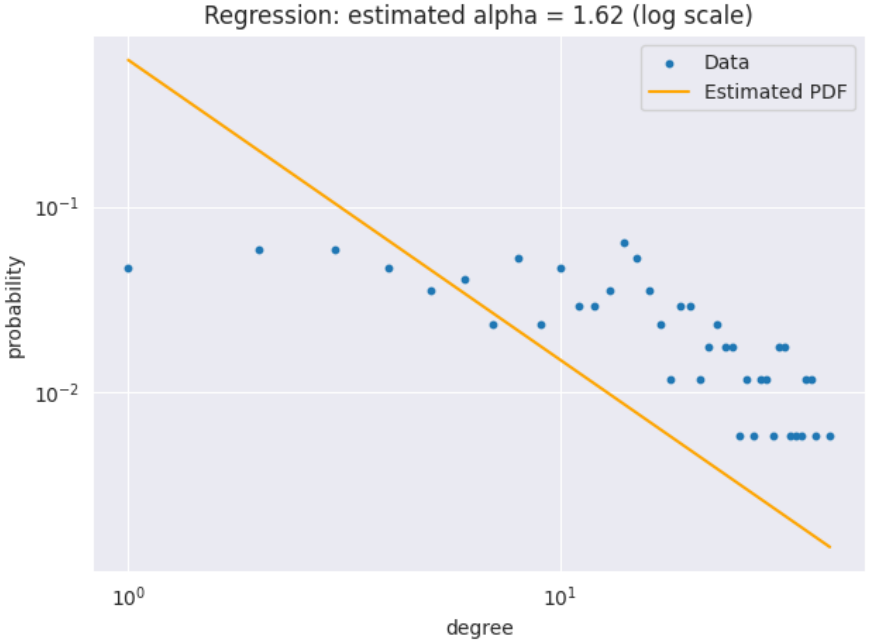
Network summary

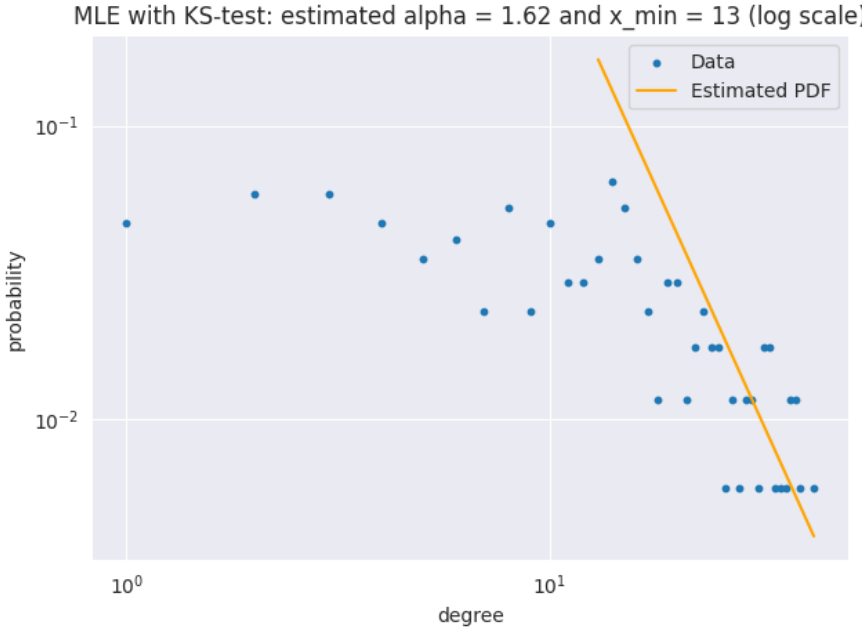








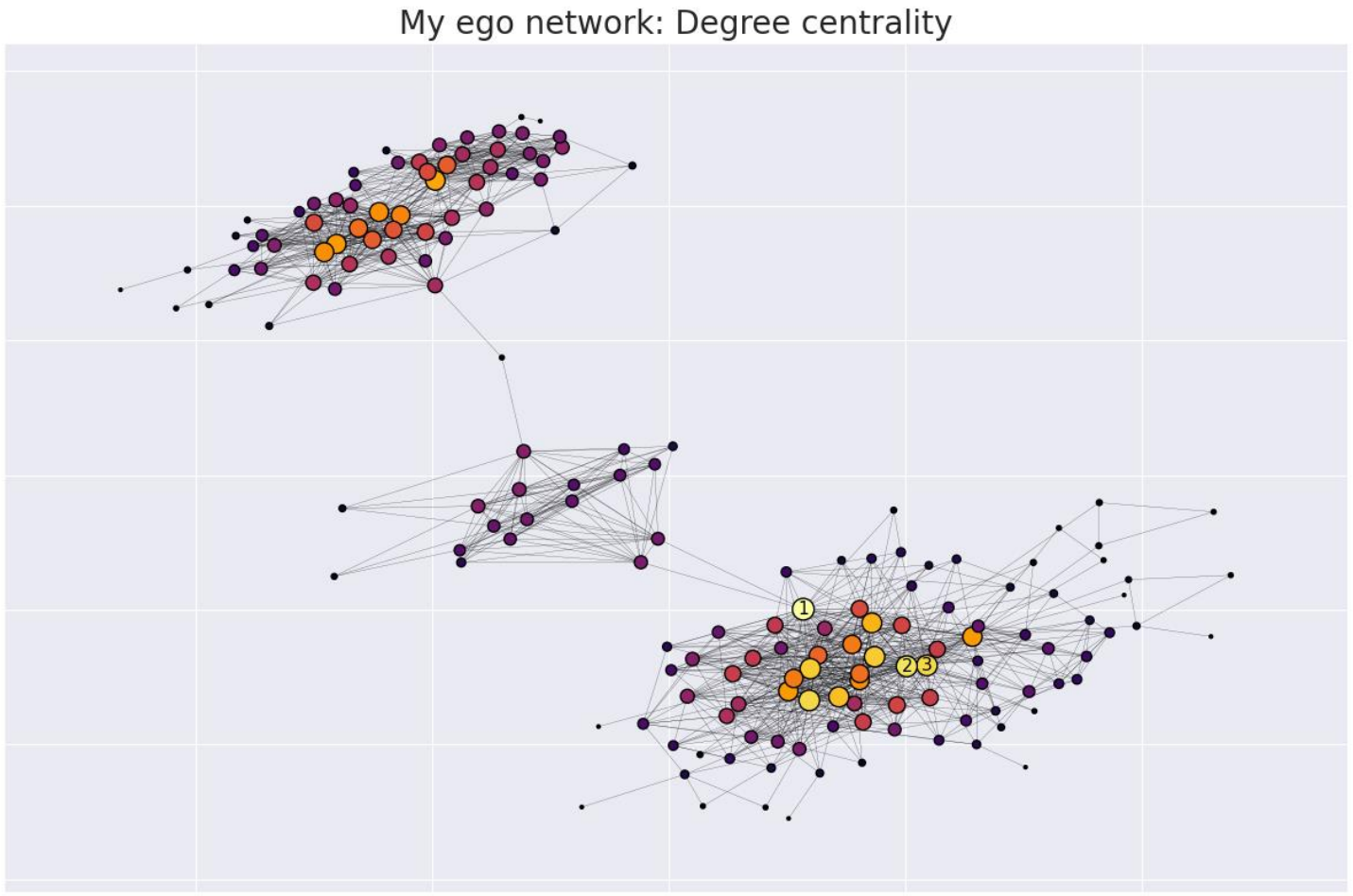




Structural Analysis: comparison with random graphs

	Mine	Erdos-Renyi	Barabasi-Albert	Watts-Strogatz
Order	171	171	171	171
Size	1195	1090	2054	1026
Diameter	12	4	3	4
Radius	6	3	2	3
Global clustering coefficient	0.541345	0.077933	0.222584	0.131732
Avg clustering coefficient	0.615446	0.075873	0.228692	0.136721
Avg shortest path length	4.594427	2.280358	1.907465	2.382663
KS p-val	1.0	0.000002	0.0	0.0

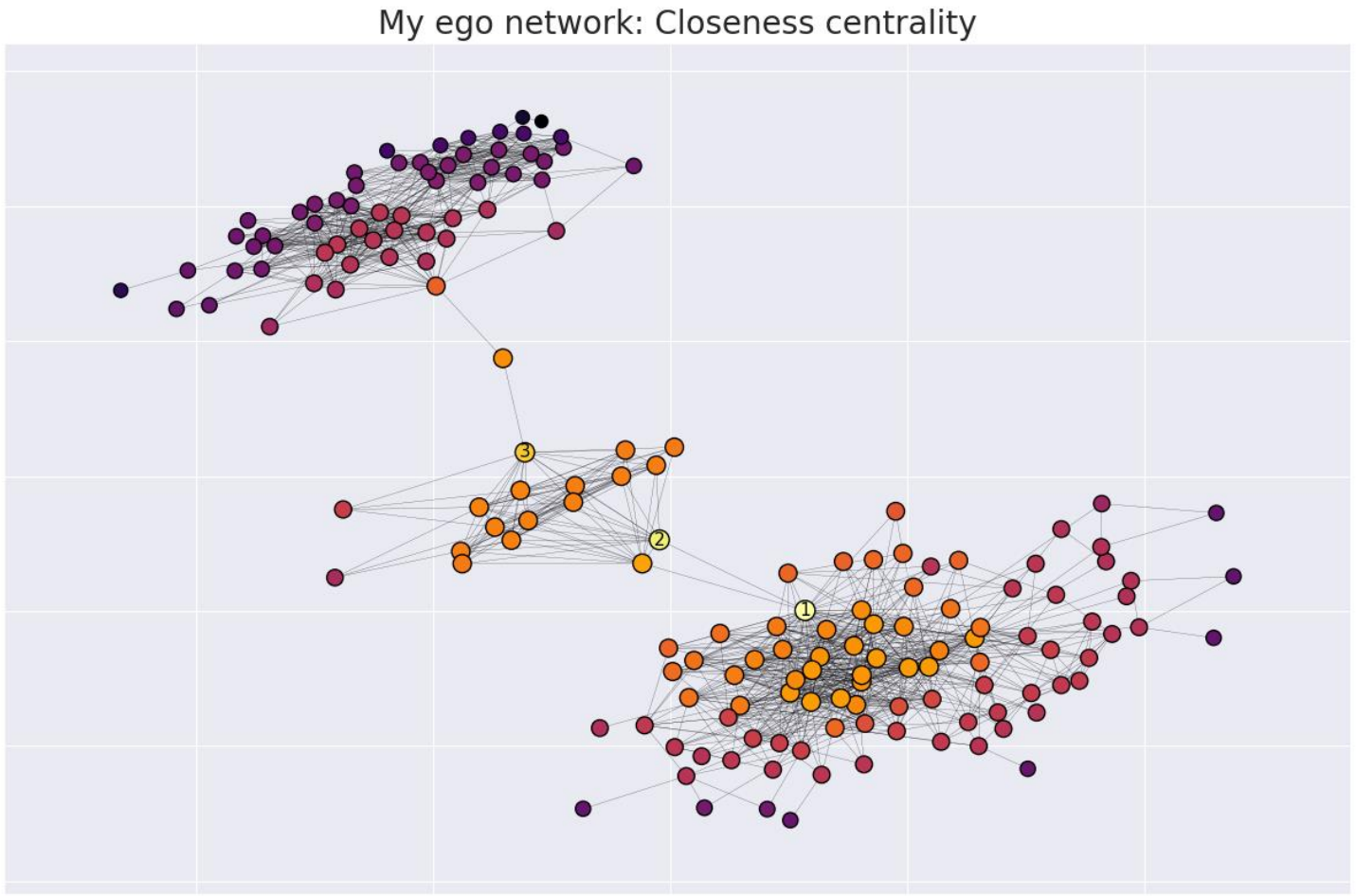
Structural Analysis: Degree centrality



Top 3 nodes and their centralities:

1. Егор Адамский - 0.247059
2. Марина Юрьевна - 0.229412
3. Мария Ягид - 0.223529

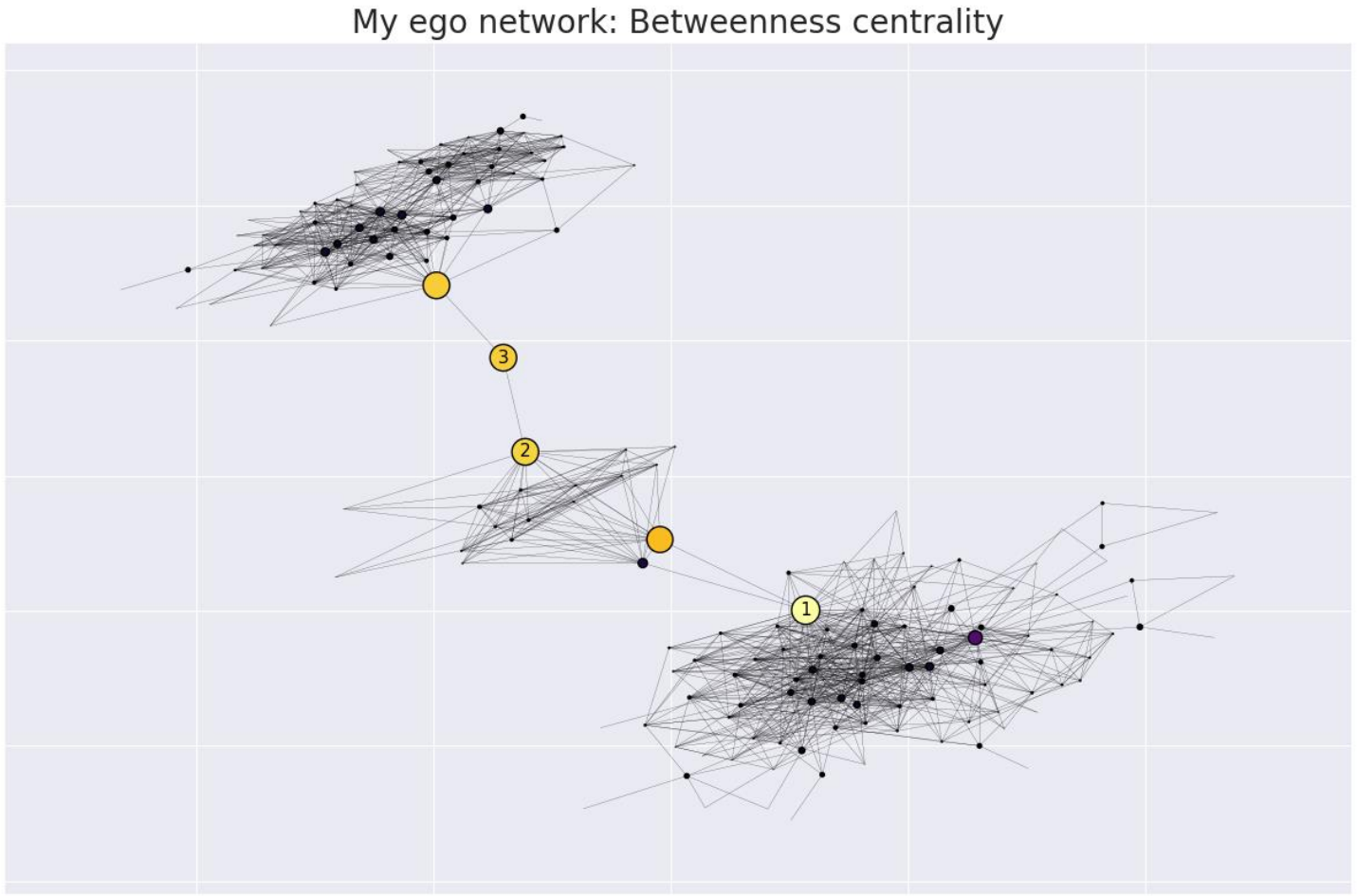
Structural Analysis: Closeness centrality



Top 3 nodes and their centralities:

1. Егор Адамский - 0.314233
2. Мария Кислицына - 0.305206
3. Михаил Осокин - 0.290102

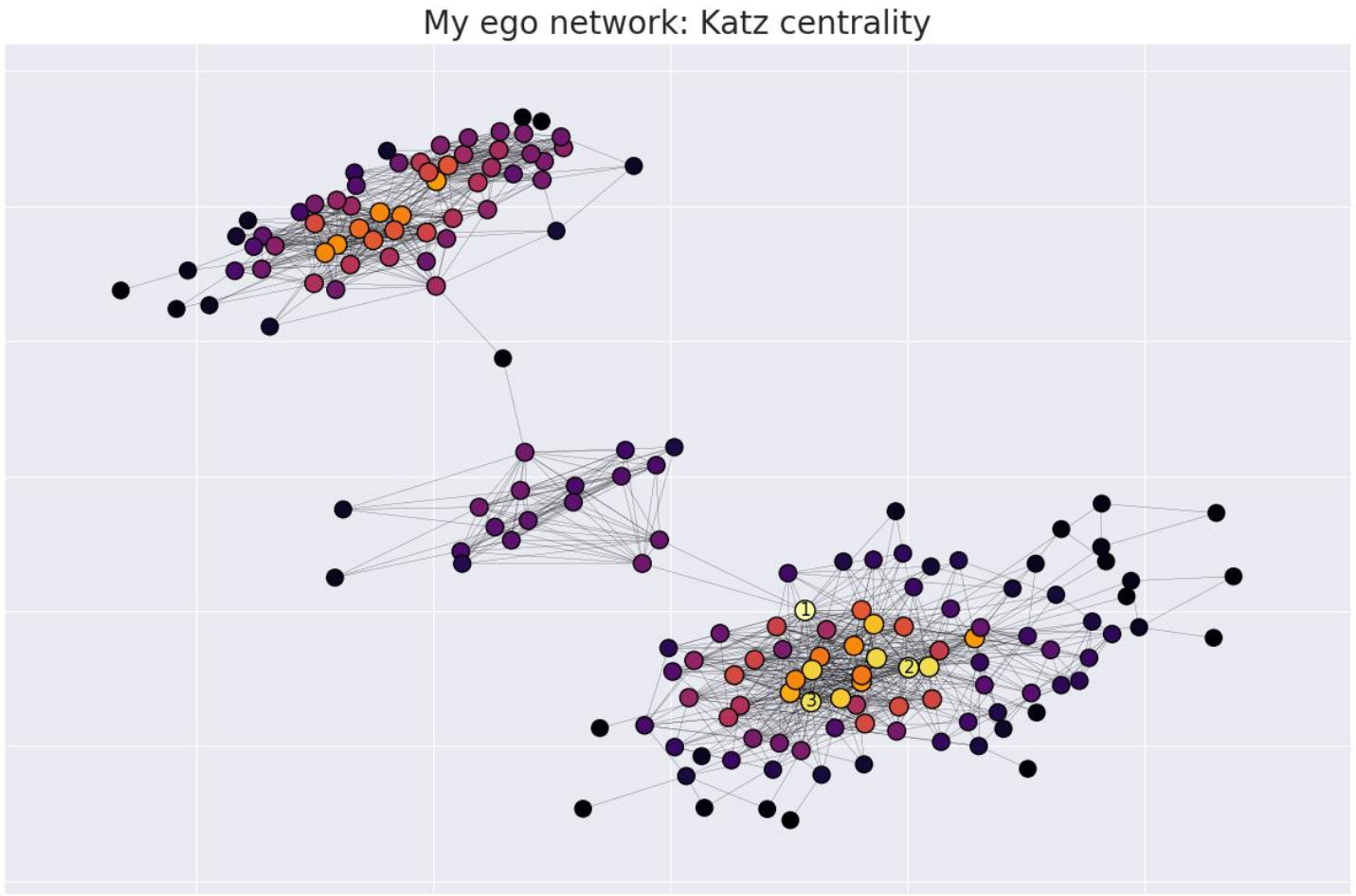
Structural Analysis: Betweenness centrality



Top 3 nodes and their centralities:

1. Егор Адамский - 0.518841
2. Михаил Осокин - 0.46427
3. Алексей Рябыкин - 0.45945

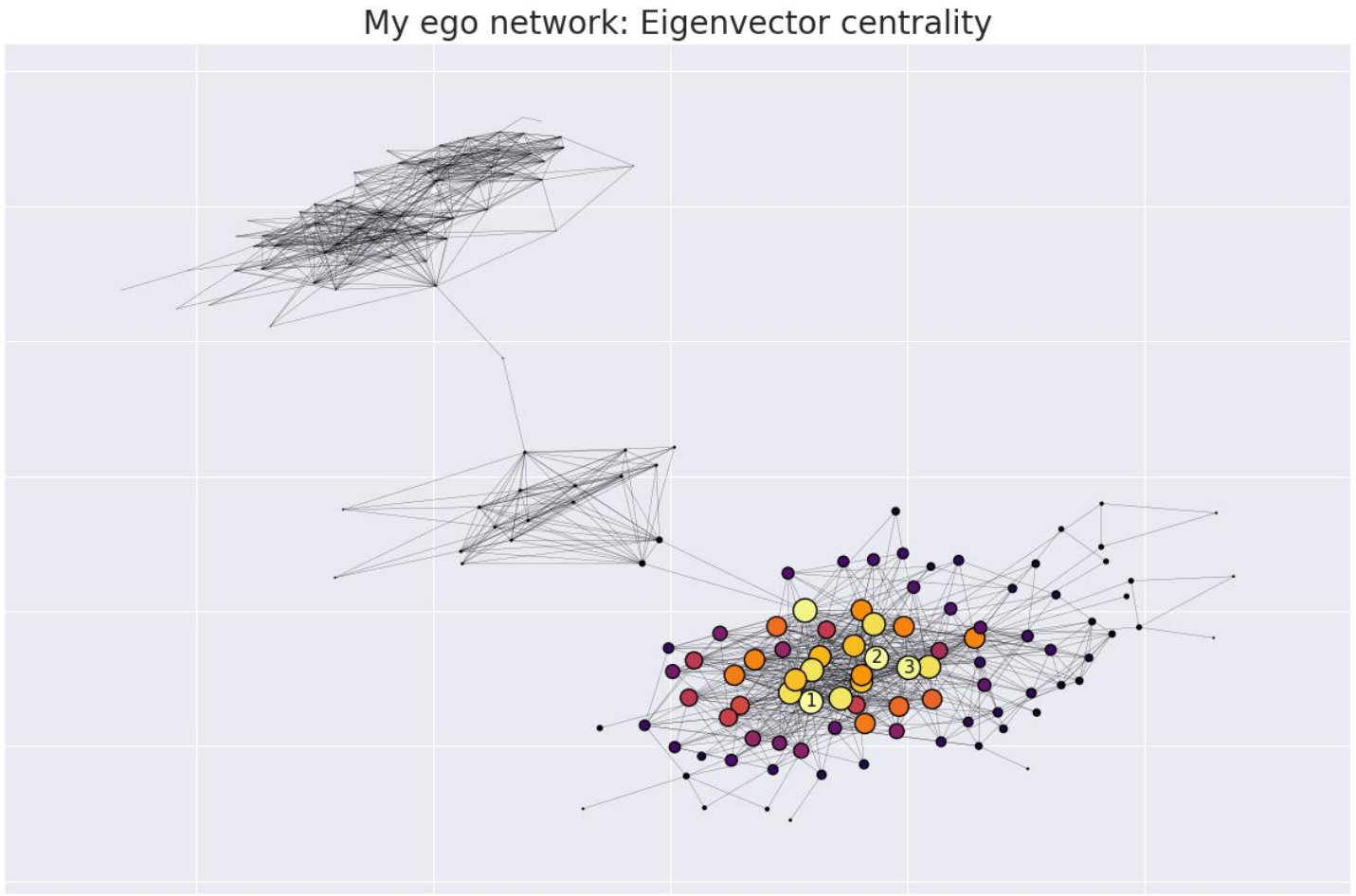
Structural Analysis: Katz centrality



Top 3 nodes and their centralities:

1. Егор Адамский - 0.098971
2. Марина Юрьевна - 0.096987
3. Петр Казанов - 0.096412

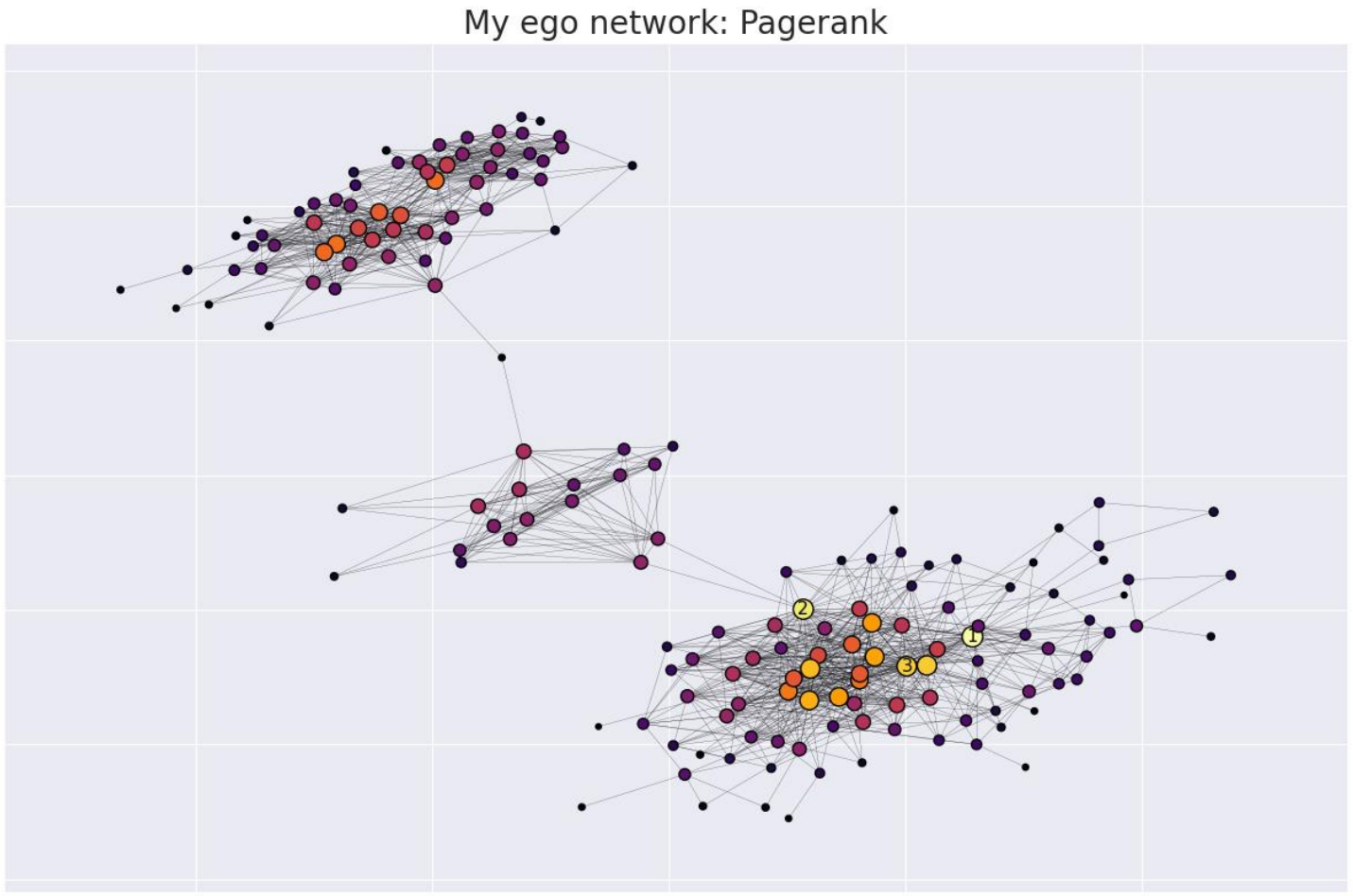
Structural Analysis: Eigenvector centrality



Top 3 nodes and their centralities:

1. Петр Казанов - 0.222897
2. Людмила Сибрина - 0.220709
3. Марина Юрьевна - 0.216919

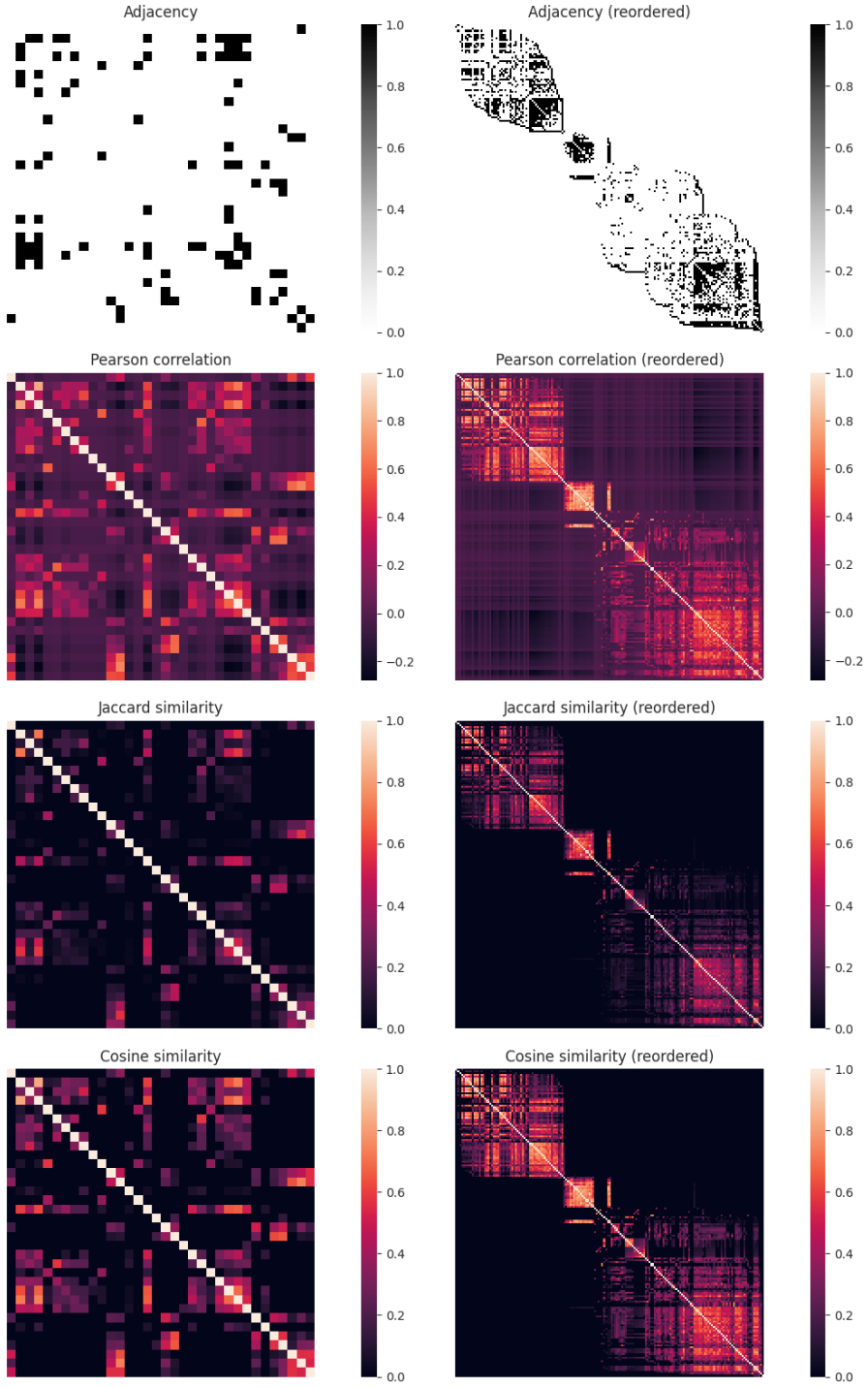
Structural Analysis: PageRank



Top 3 nodes and their centralities:

1. Али Алиев - 0.016656
2. Егор Адамский - 0.015797
3. Марина Юрьевна - 0.014891

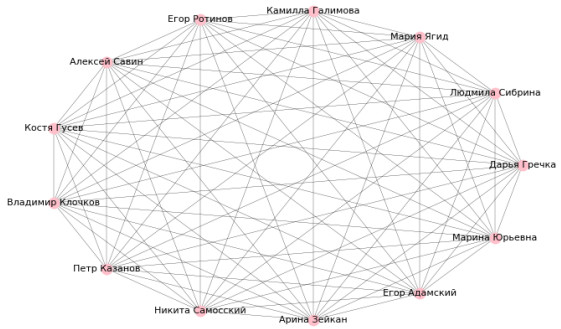
Structural Analysis

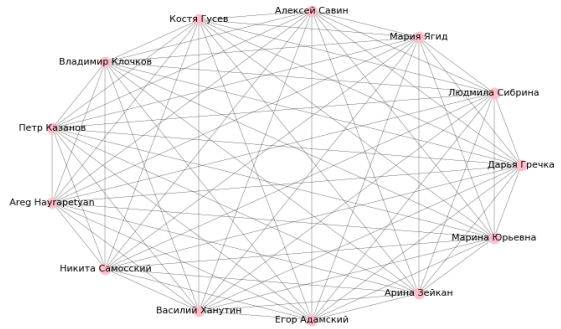


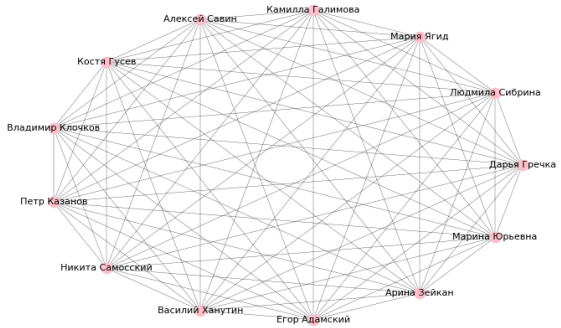
Node attributes assortativity	0.106611
Node degree assortativity	0

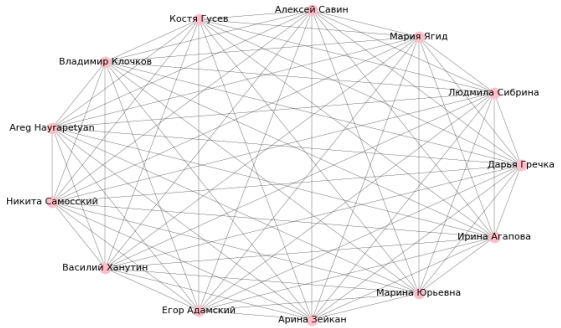
structurally equivalent	2 nodes

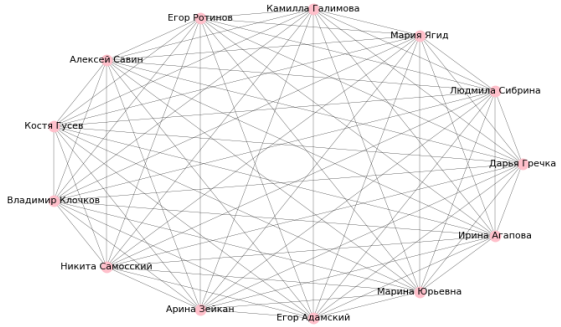
Community Detection: Clique search, k-cores visualization

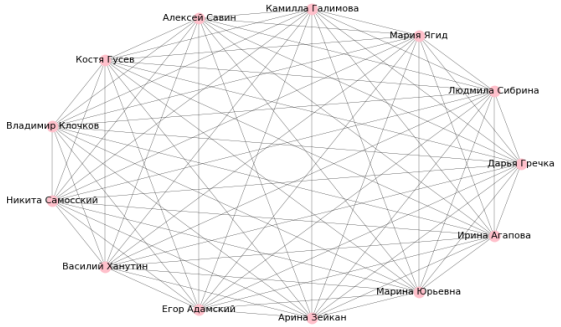


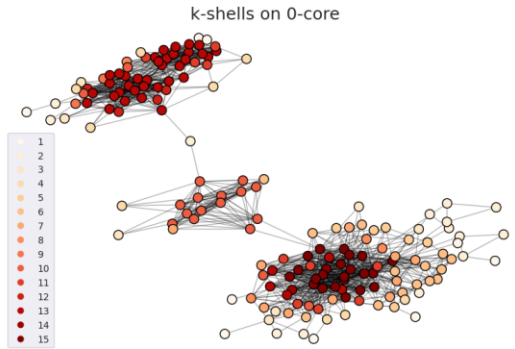


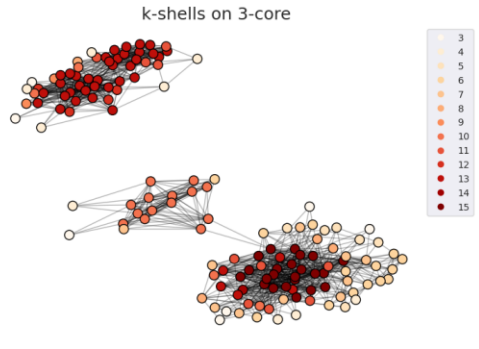


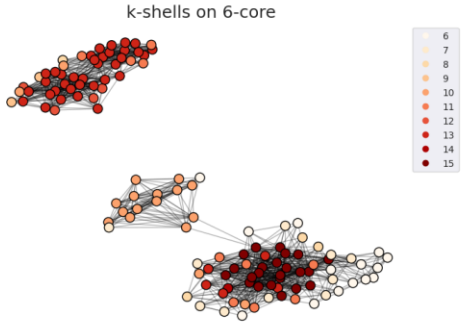


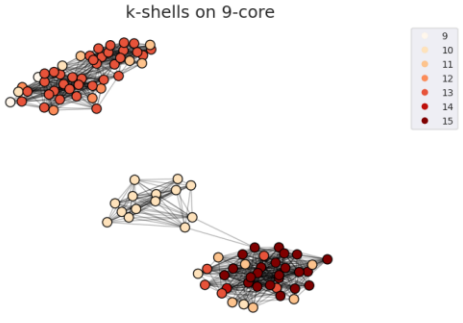


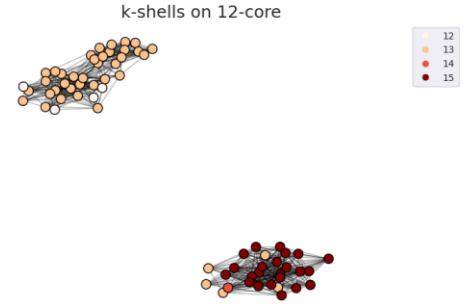


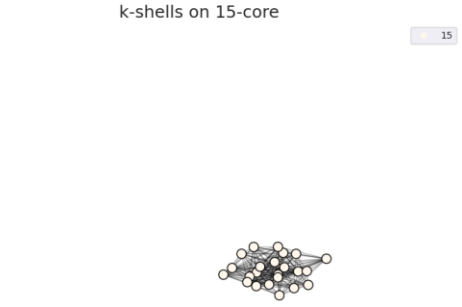






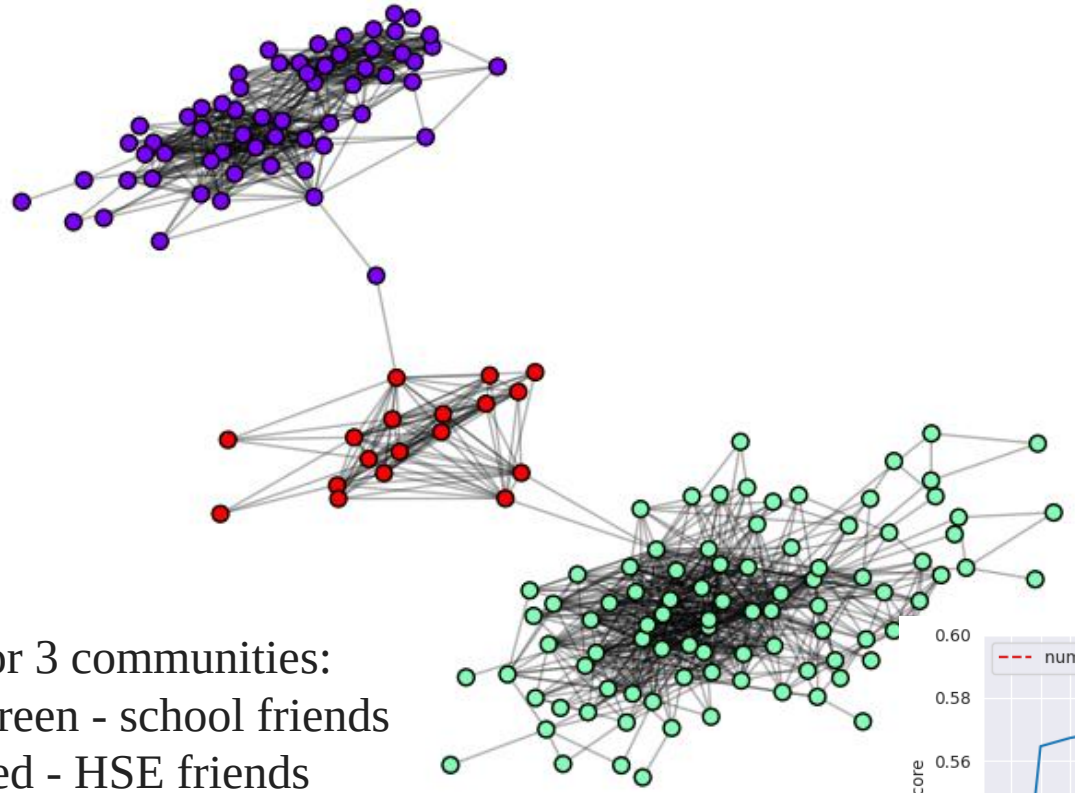




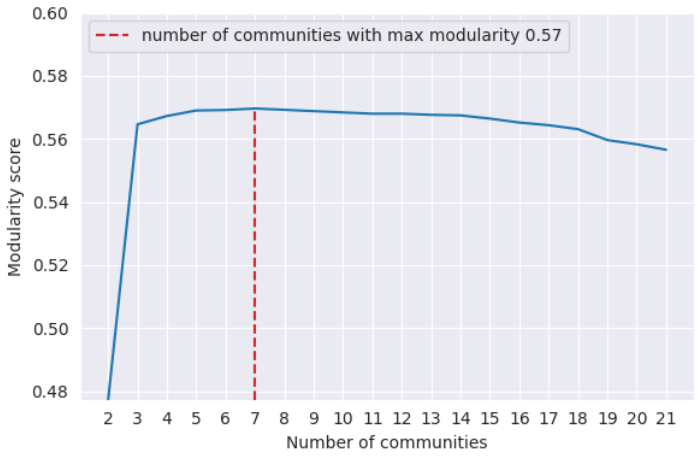


Community Detection: Girvan-Newman algorithm

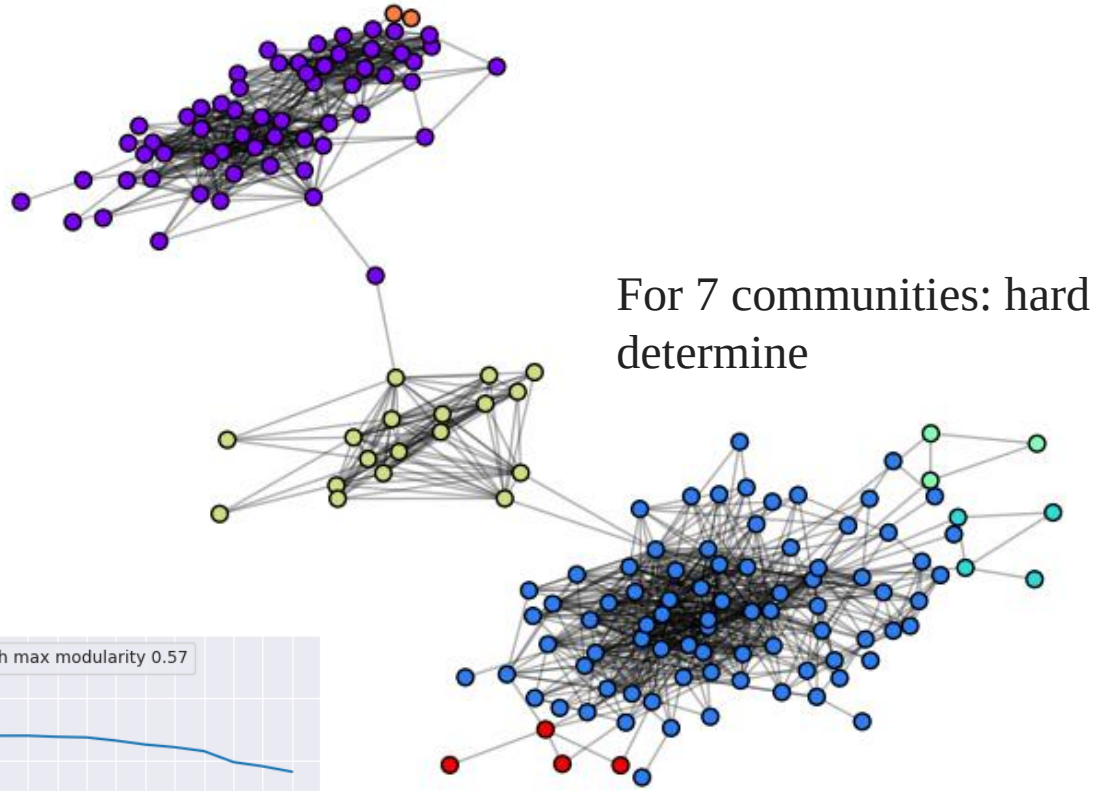
Girvan-Newman algorithm, 3 communities



For 3 communities:
- green - school friends
- red - HSE friends
- purple - MIREA friends

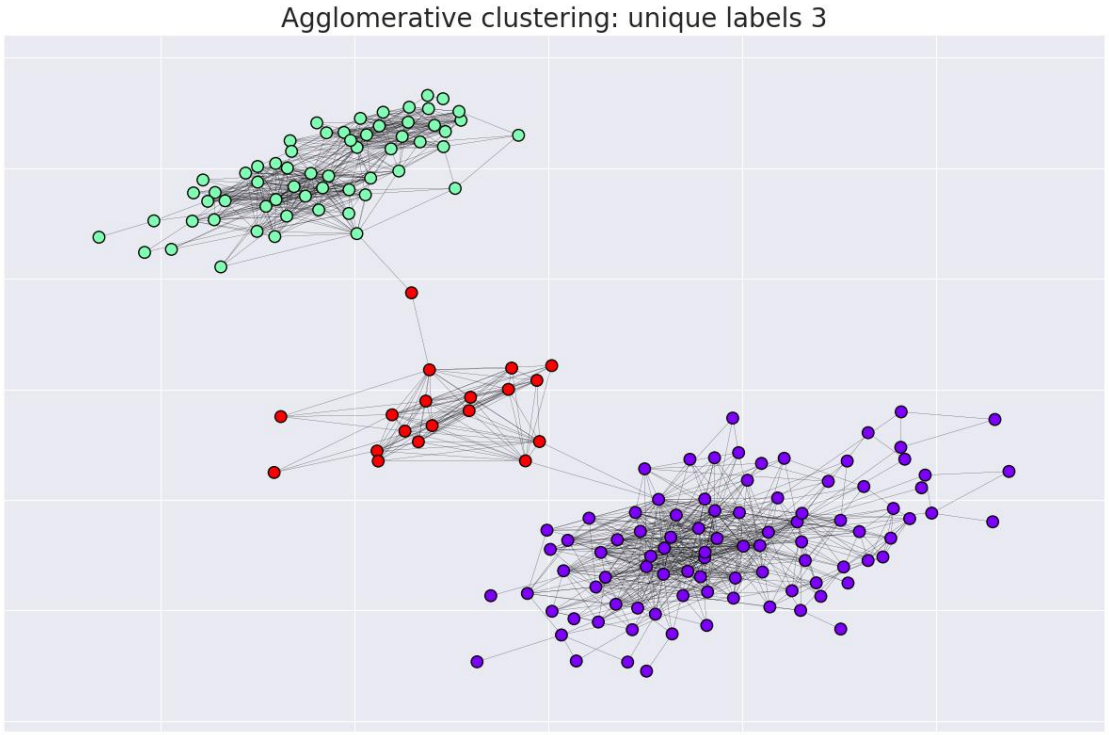


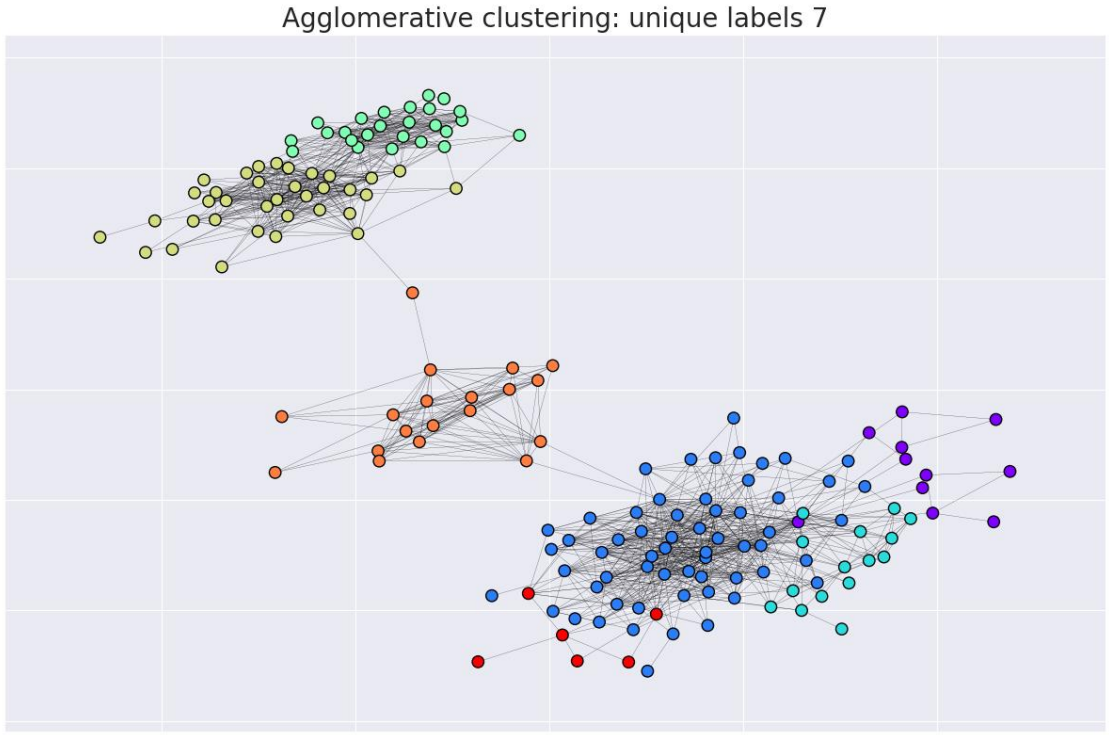
Girvan-Newman algorithm, 7 communities



For 7 communities: hard to determine

Community Detection: Agglomerative clustering





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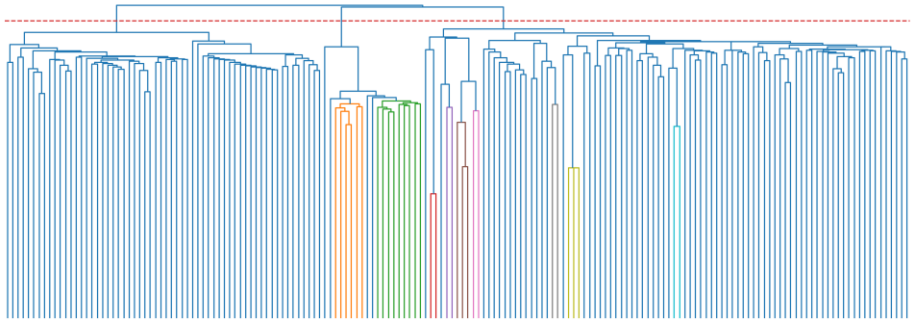
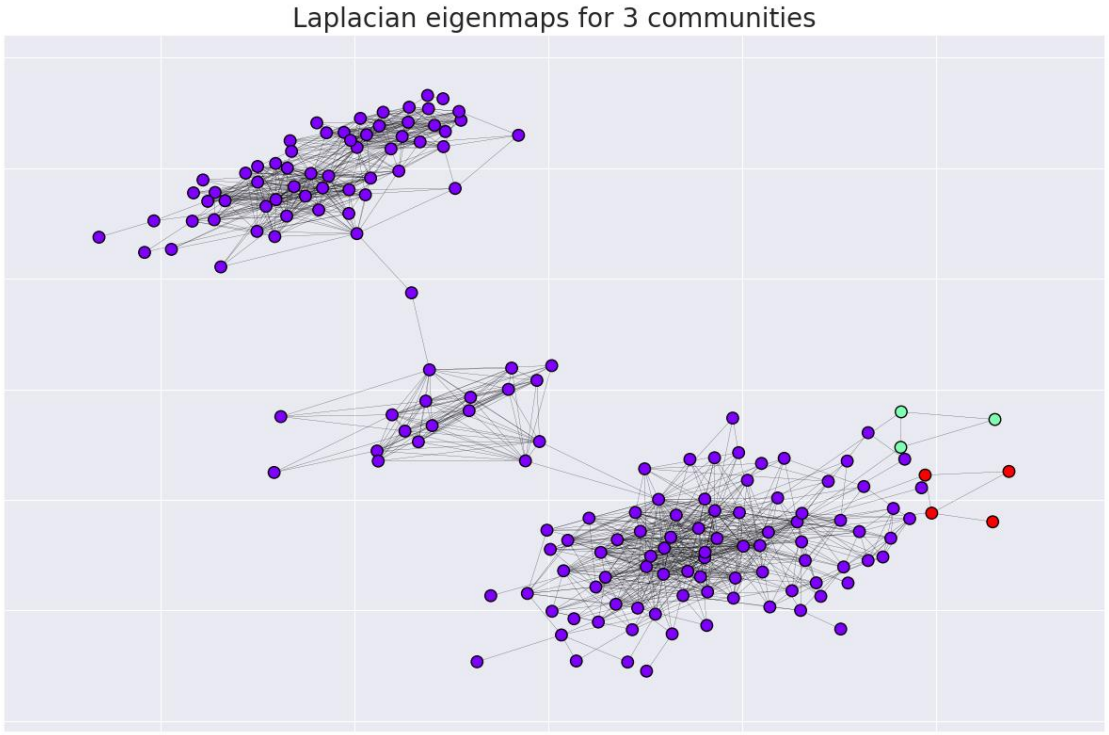
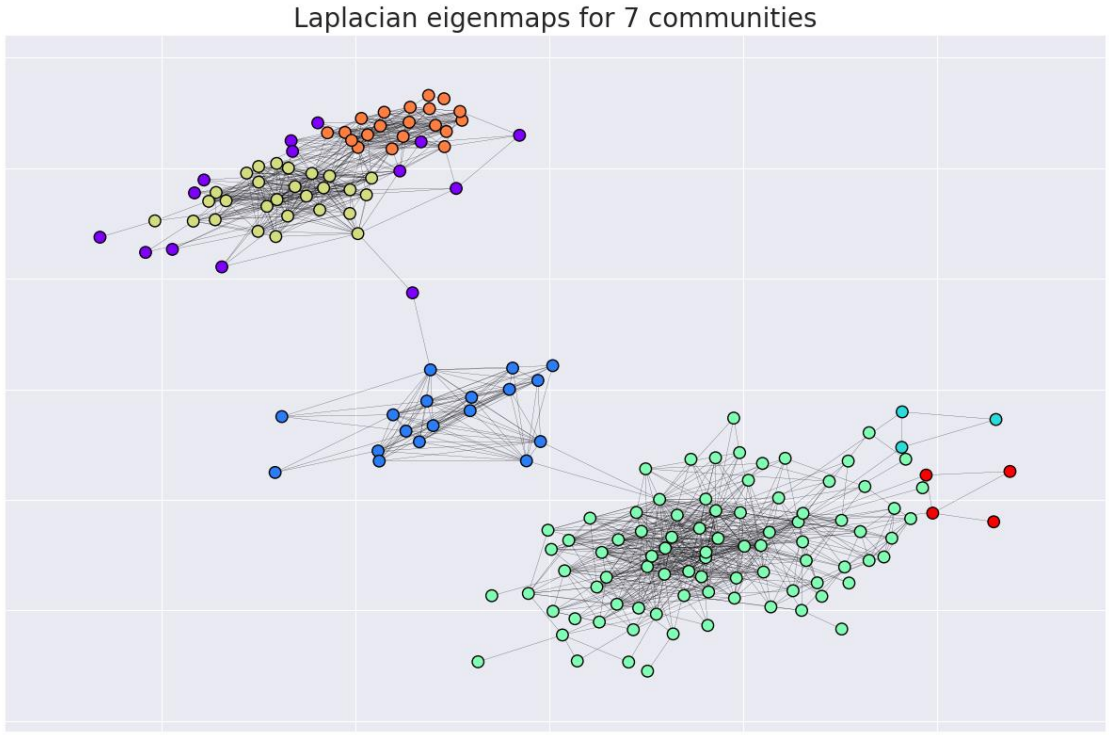


For 7 communities: hard to determine

Community Detection: Agglomerative clustering





For 3 communities:
- green - school friends
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For 7 communities: hard to determine

Thank you for your attention!