# Social Network Analysis

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# Overview

# Network Summary

- Number of nodes: 104
- Nodes' attribute: sex, city of location, number of friends
- Number of connected components: 11
- Number of nodes in GCC: 91
- Diametr for GCC: 8
- Clustering coefficient:0.43
- Degree assortativity coefficient: 0.15
- Assortativities by attribute: (sex, 0.17), (city, 0.1), (friends, -0.01)

# Degree Distribution

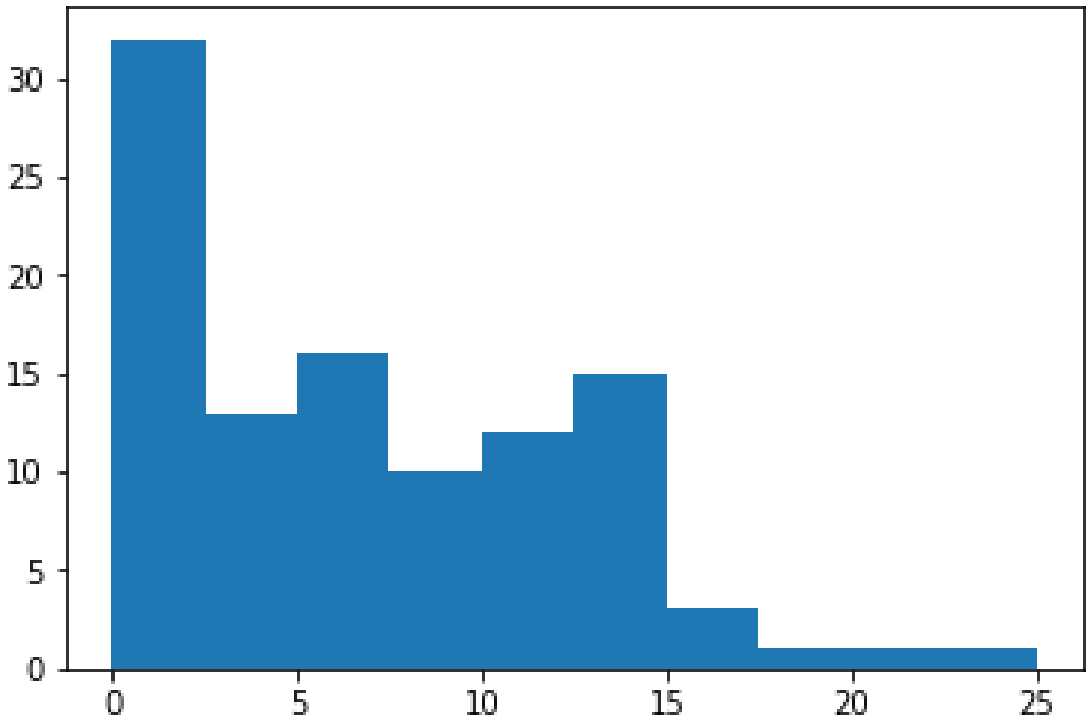


Figure: Degree Distribution

# Graph visialization

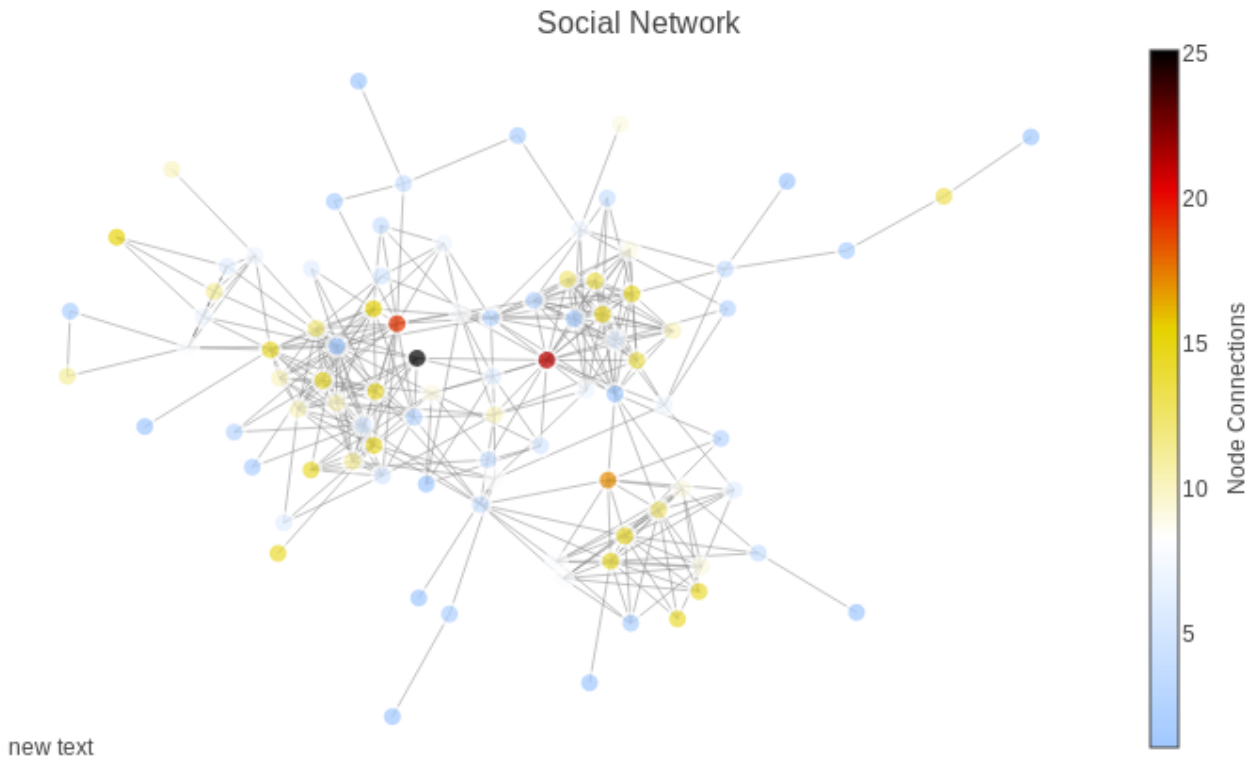


Figure: Graph colored with respect to node's degree

# Degree vs. Closeness centrality

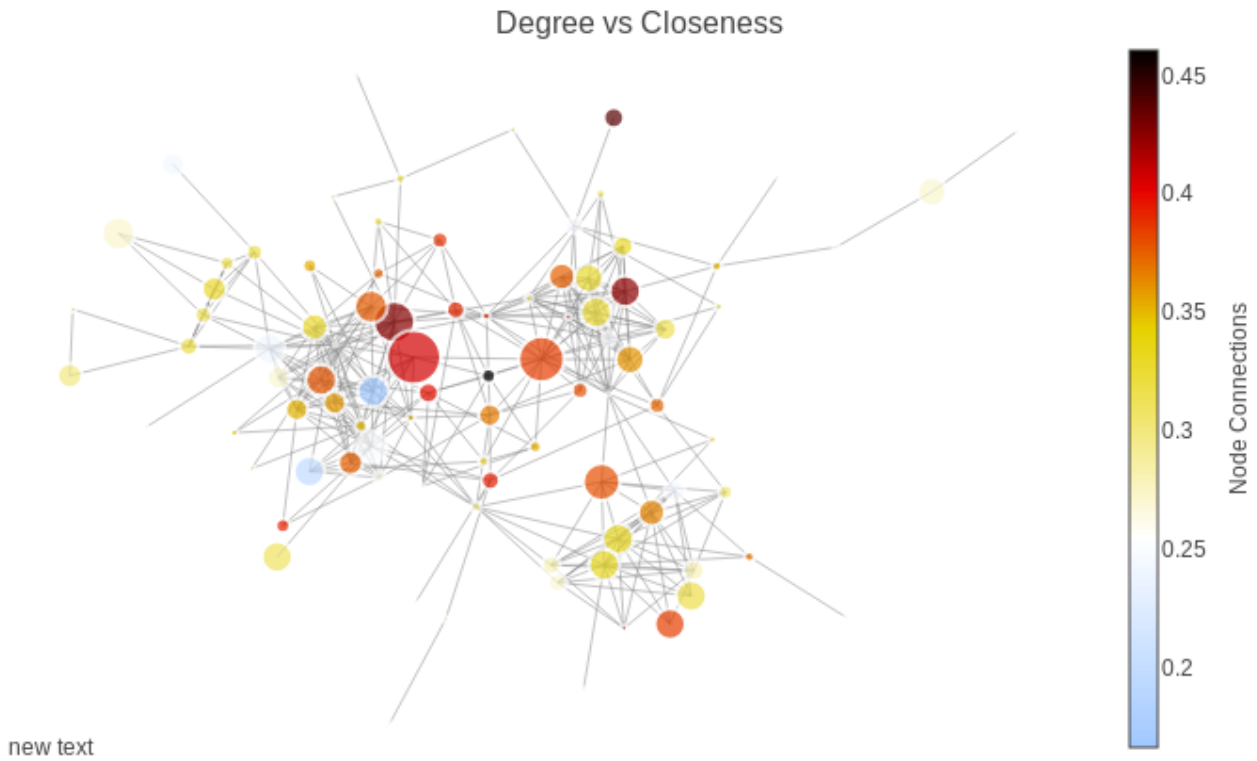


Figure: Nodes are colored by closeness and sized by degree

# Closeness vs. Betweenness centrality

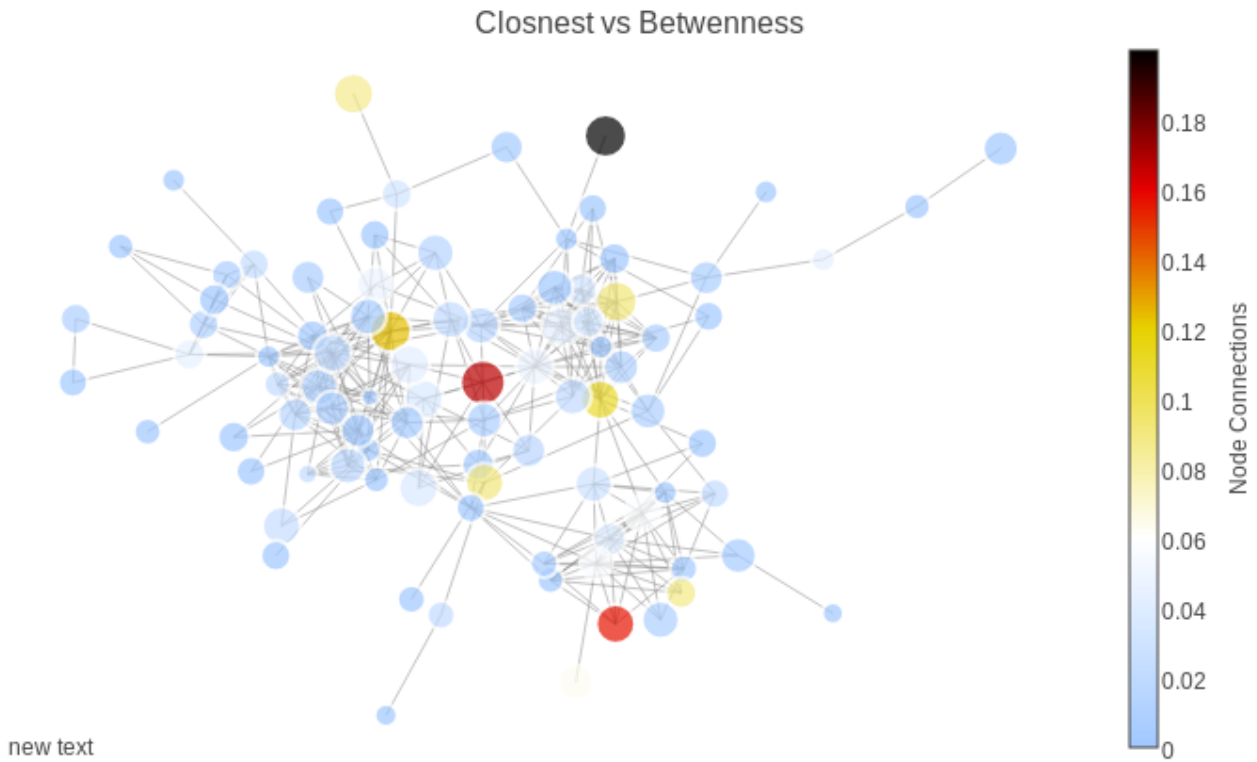


Figure: Nodes are colored by betweenness and sized by closeness

# Betweenness vs. Degree centrality

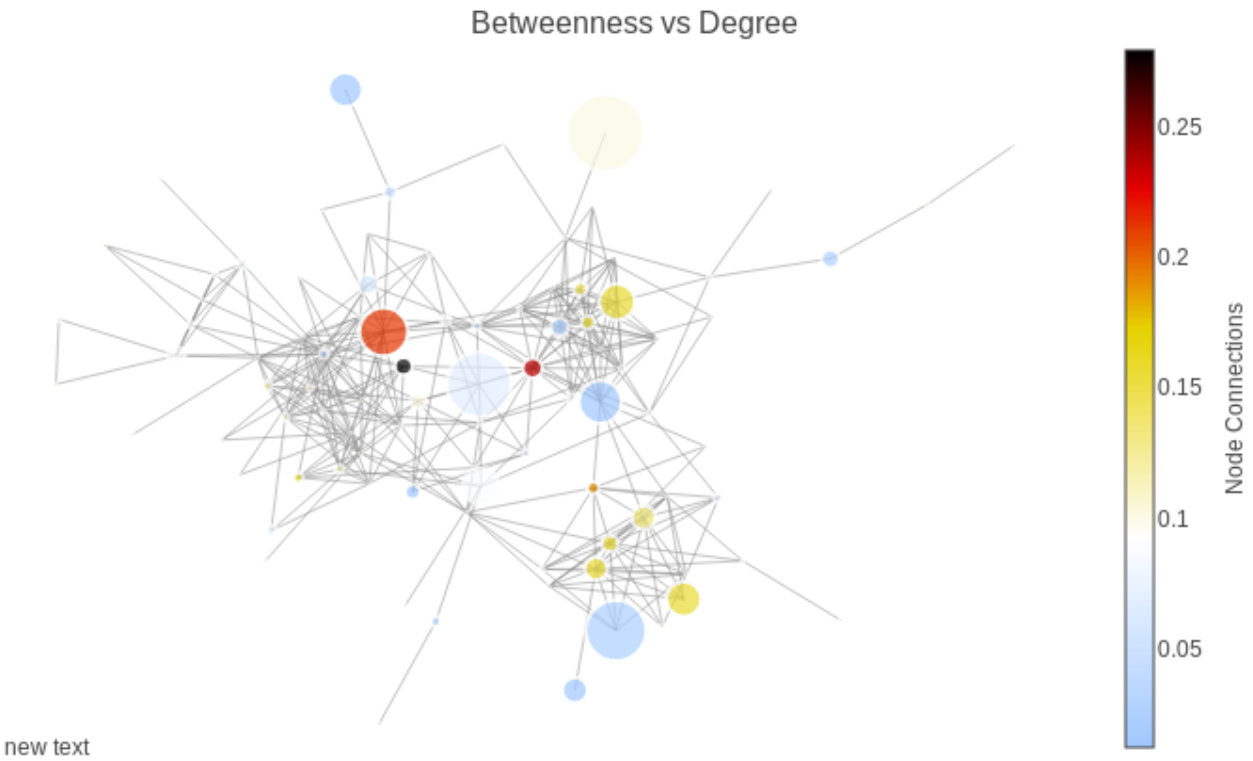


Figure: Nodes are colored by degree and sized by betweenness

# Pagerank vs Centrality

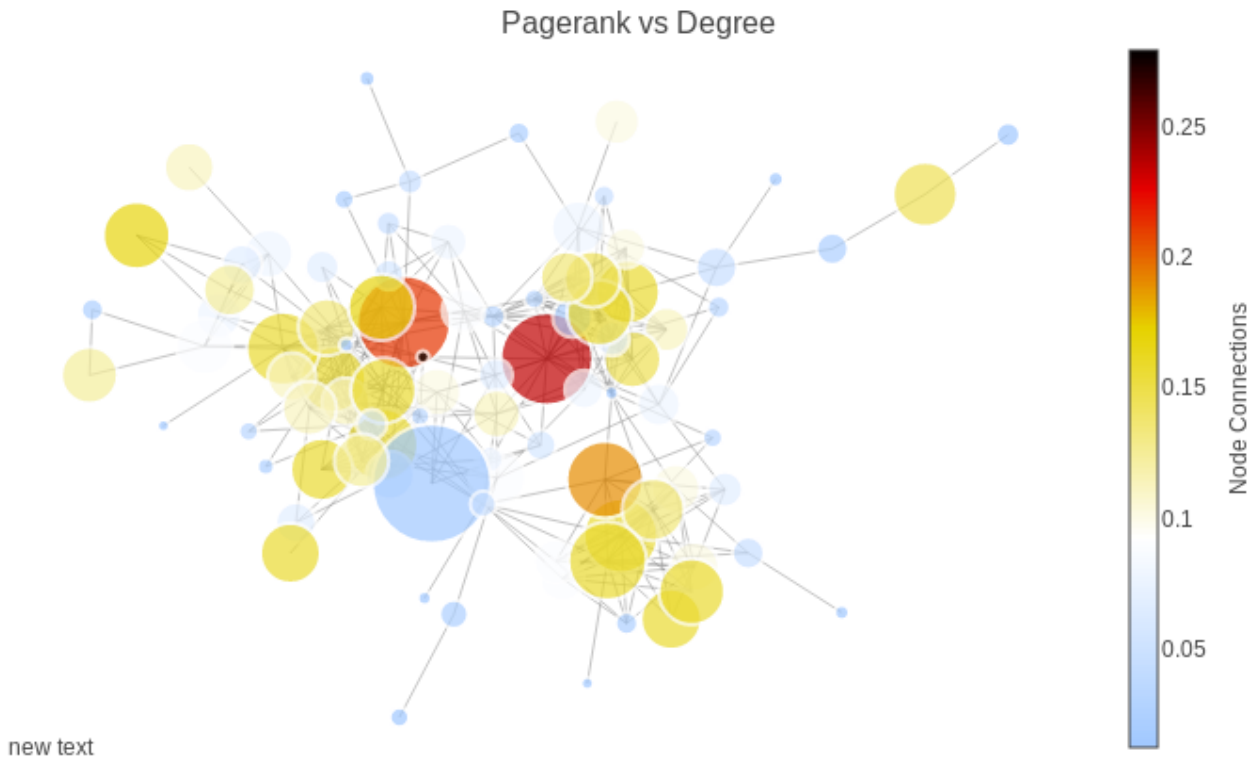


Figure: Nodes are colored by degree and sized by pagerank

# Fitting model

Degree distribution is closer to scale-free, so we try to fit Barabasi-Albert model.

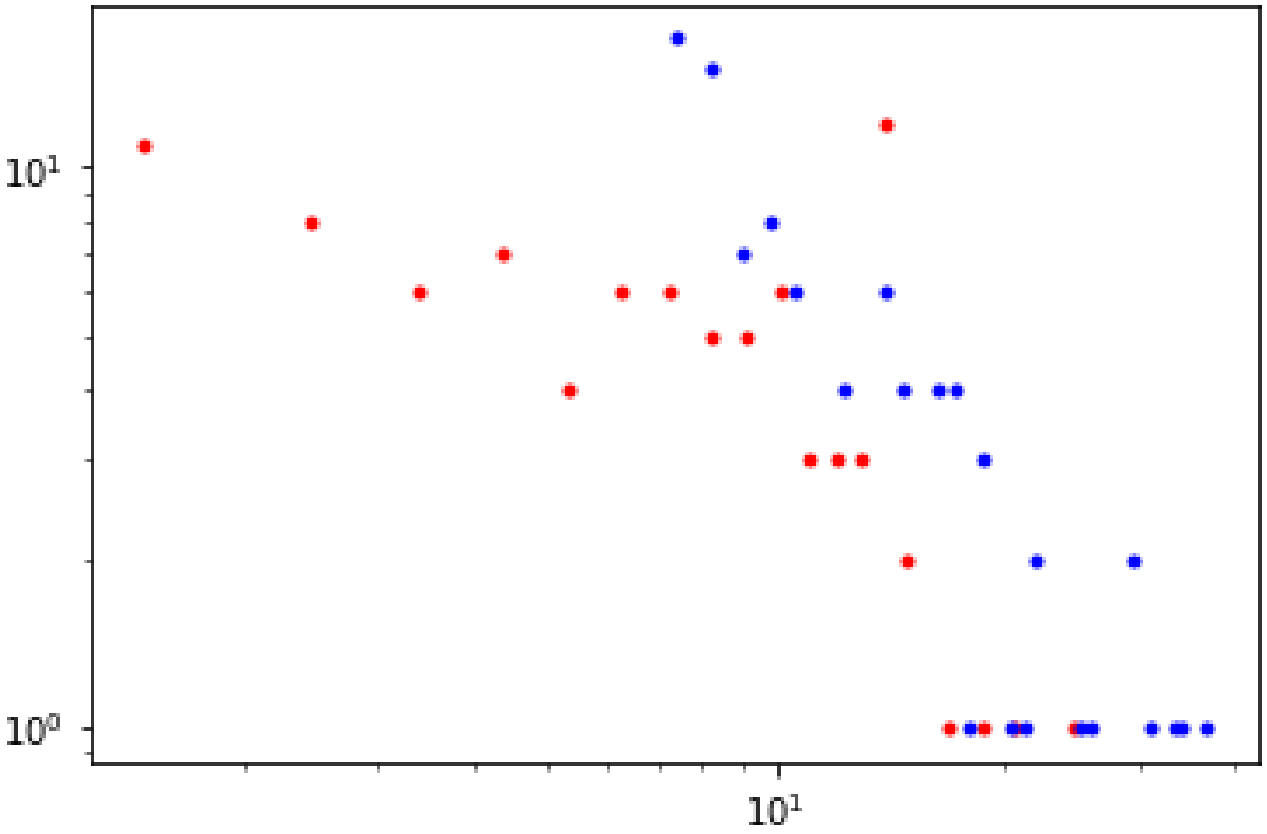


Figure: Blue - original, Red - model

# Fitting model

Let's look at global statistics:

| Model | deg mean | deg std | deg median | aver clustering | aver path |
|---|---|---|---|---|---|
| Real | 7.7 | 5.3 | 7 | 0.49 | 3.15 |
| BA | 12.9 | 6.9 | 10 | 0.218 | 2 |
| SM | 6 | 0.6 | 6 | 0.49 | 3.8 |
| ER | 8.1 | 2.6 | 8 | 0.09 | 2.38 |

# FastGreedy

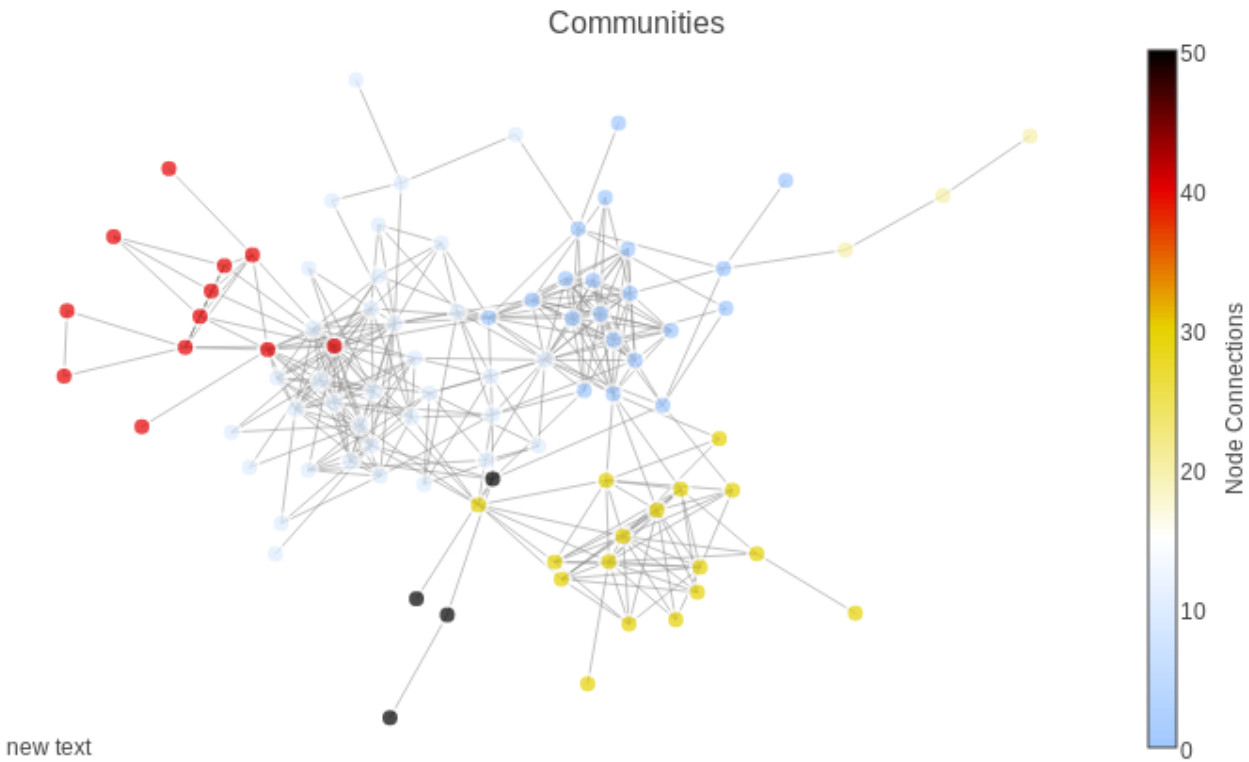


Figure: Community detection by fast greedy algorithm

# Edge betweennes

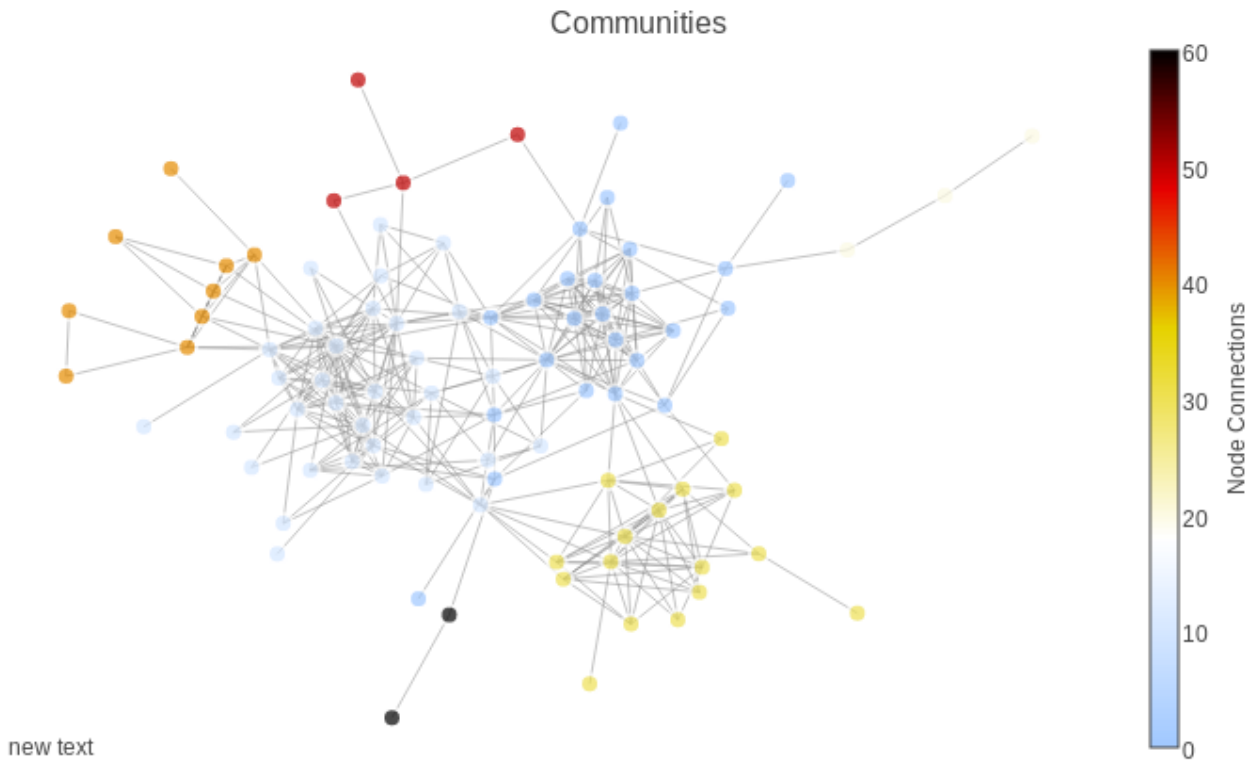


Figure: Implemented community detection by edge betweennness

# The End