



NATIONAL RESEARCH
UNIVERSITY

Network Science Project 1: VK graph

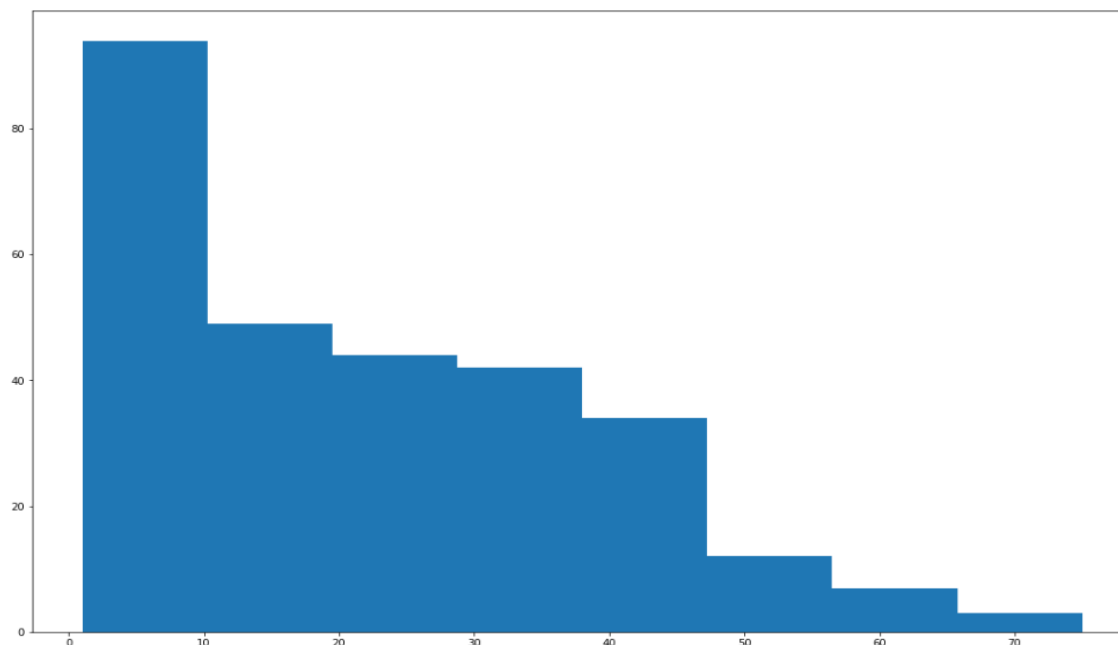
Petrosuan ARtur
HSE Data Science, ISSA

Source: VK.com open API service

Graph properties:

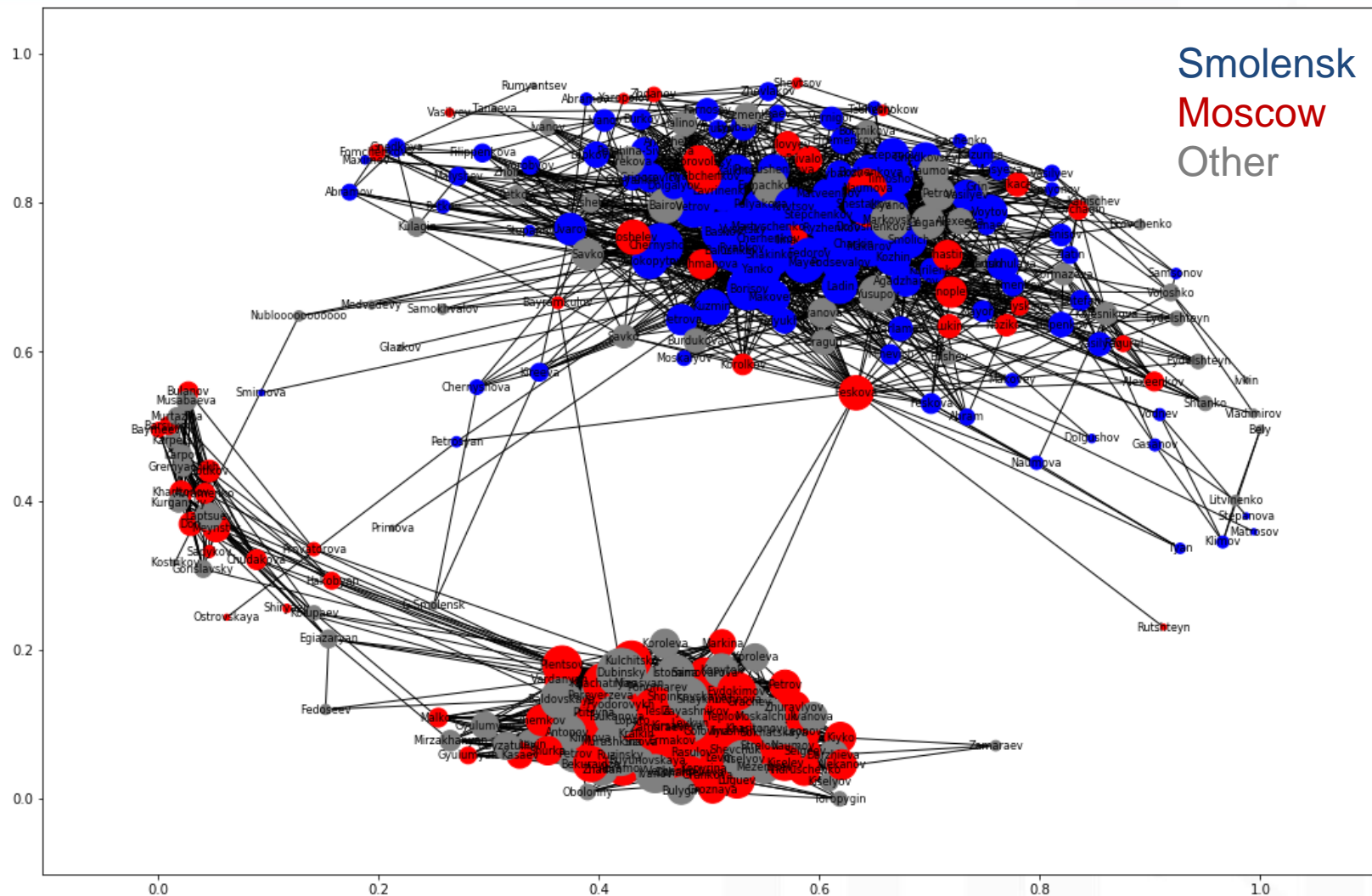
- **Number of friends: 285**
- **Number of edges: 3181**
- **Diameter : 9**
- **Radius : 5**
- **Average SPL: 3.34**
- **Average CC: 0.52**
- **Max degree : 75**
- **Average degree: 22.3**
- **Min degree: 1**

Degree distribution





Some pictures



Degree Centrality

- Ryabkov
- Dubinsky
- Chernenkov
- Yanko
- Tesla

Pagerank

- Ryabkov
- Yanko
- Chernyshov
- Chernenkov
- Borisov

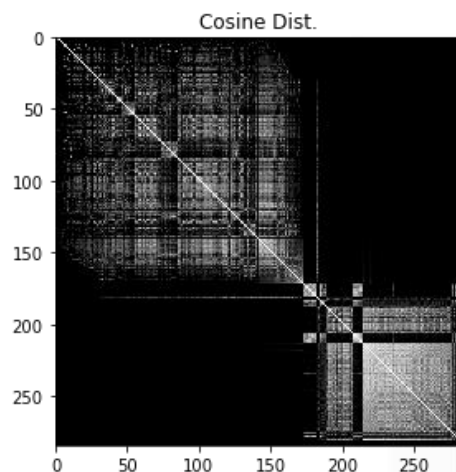
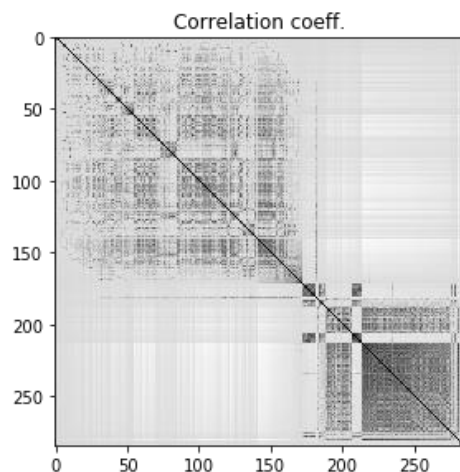
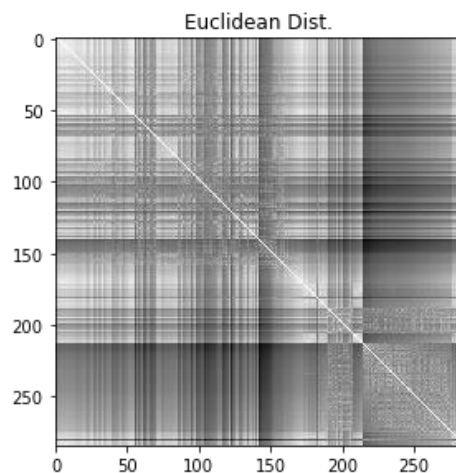
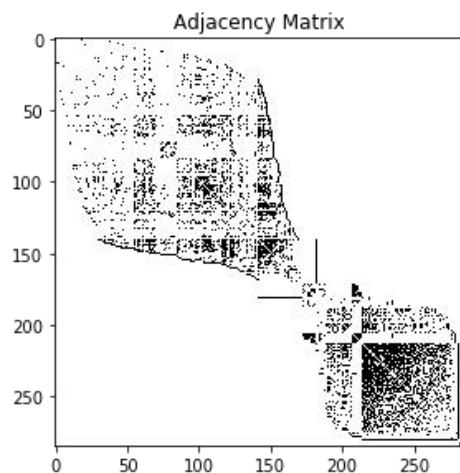
Closeness Centrality

- Feskova
- Ryabkov
- Vysotsky
- Chernenkov
- Chernyshov

Betweenness centrality

- Feskova
- Golovina
- Plentsov
- Ryabkov
- Borisov

Structure Analysis Assortativity



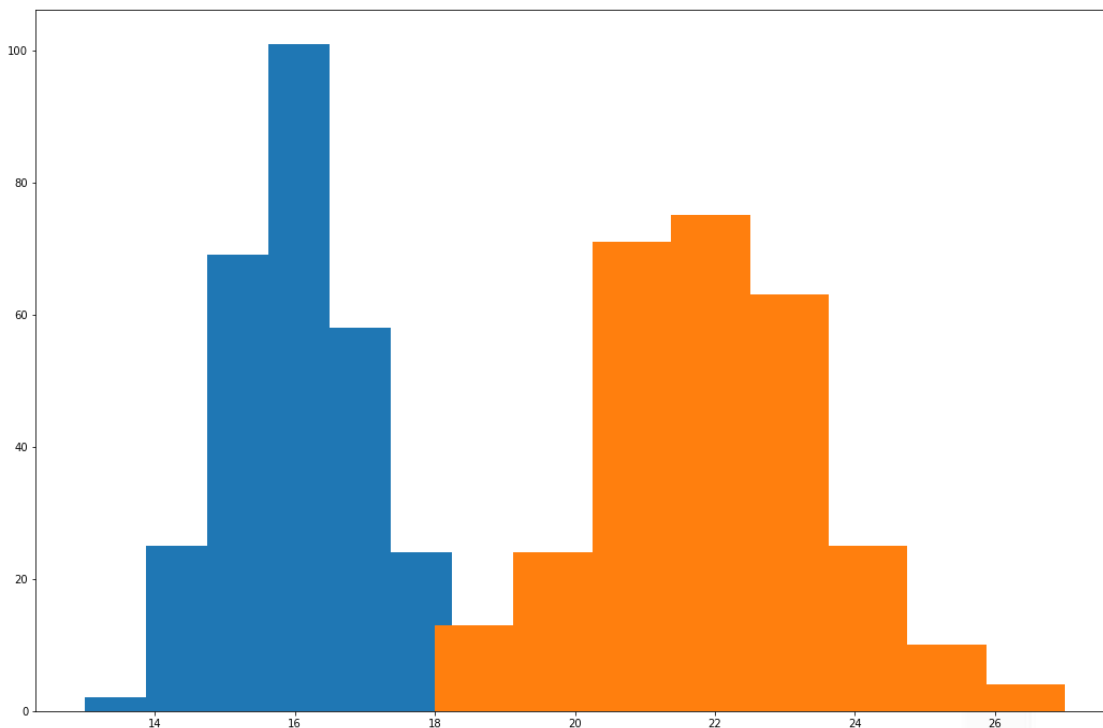
Assortativity coeff : 0.11

Assortativity by city: 0.22

Two big groups of people:
From Smolensk and from Moscow

Random model selection

Best model is Small world. But it is still very bad



Number of friends (connections): 285
Number of edges: 2280

Diameter : 5
Radius : 4

Average Shortest Path Length : 2.7860143316
Average Cluster Coefficient: 0.516504083699

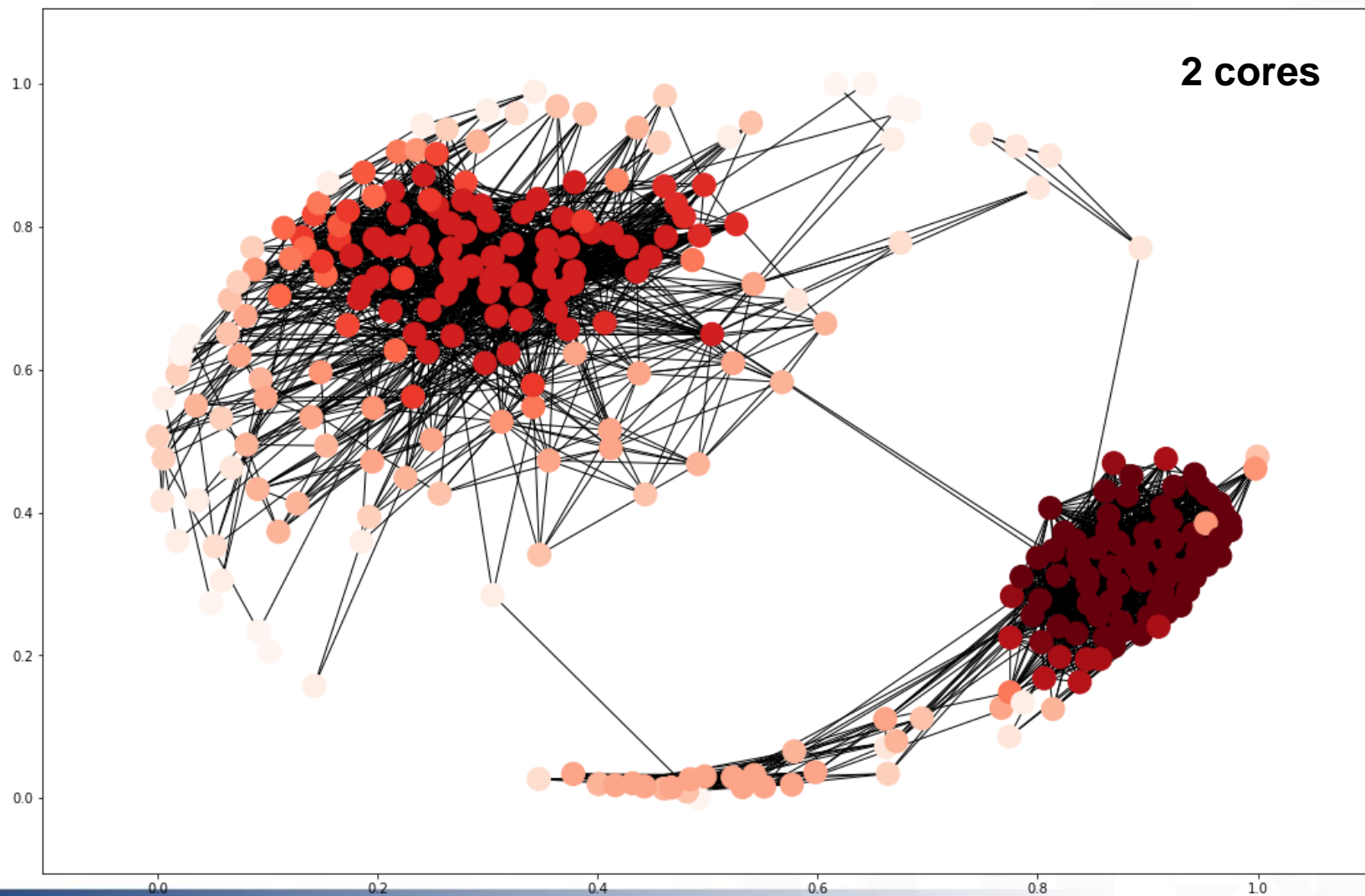
Max degree 20
Av degree 16.0
Min degree 13
Number of friends (connections): 285
Number of edges: 3135

Diameter : 4
Radius : 3

Average Shortest Path Length : 2.52194217939
Average Cluster Coefficient: 0.528575526422

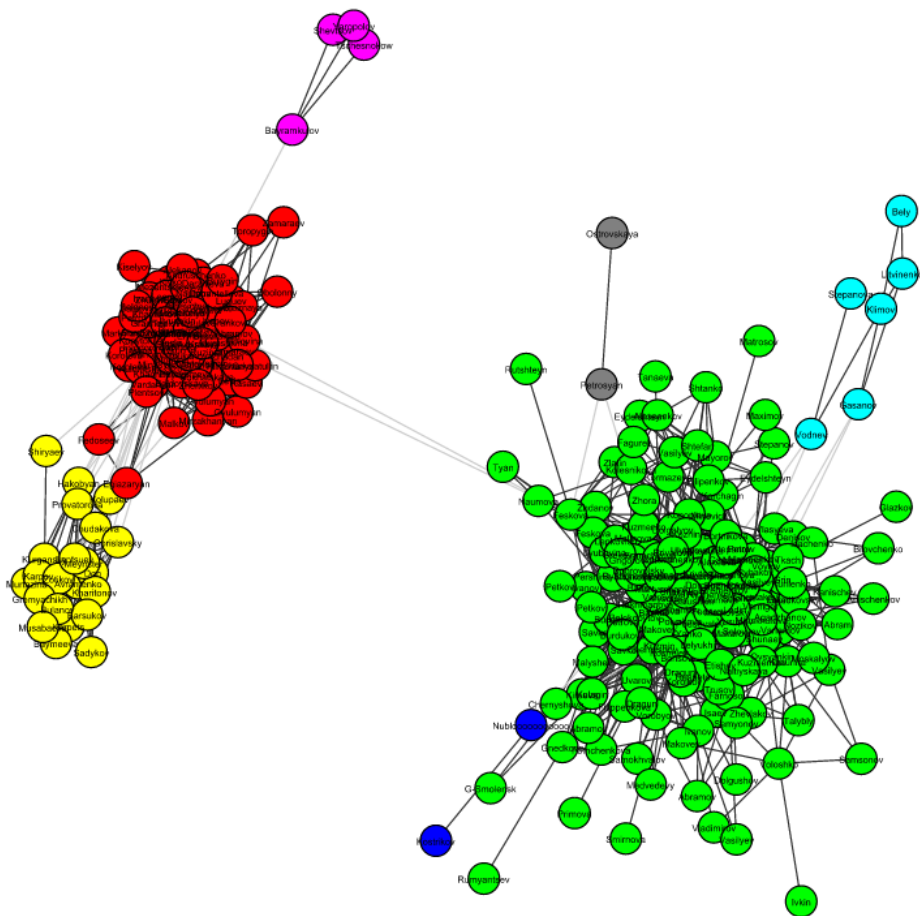
Max degree 27
Av degree 22.0
Min degree 18

K-core



Community detection

Out[66]:



Igraph package
 detect communities
 pretty nice

Red: HSE students of
 economics faculty
Yellow: HSE students of
 computer faculty
Green: Friends from home-
 city – Smolensk
Turquoise: Friends from little
 town in Smolensk region
Purple: CMF MSU students

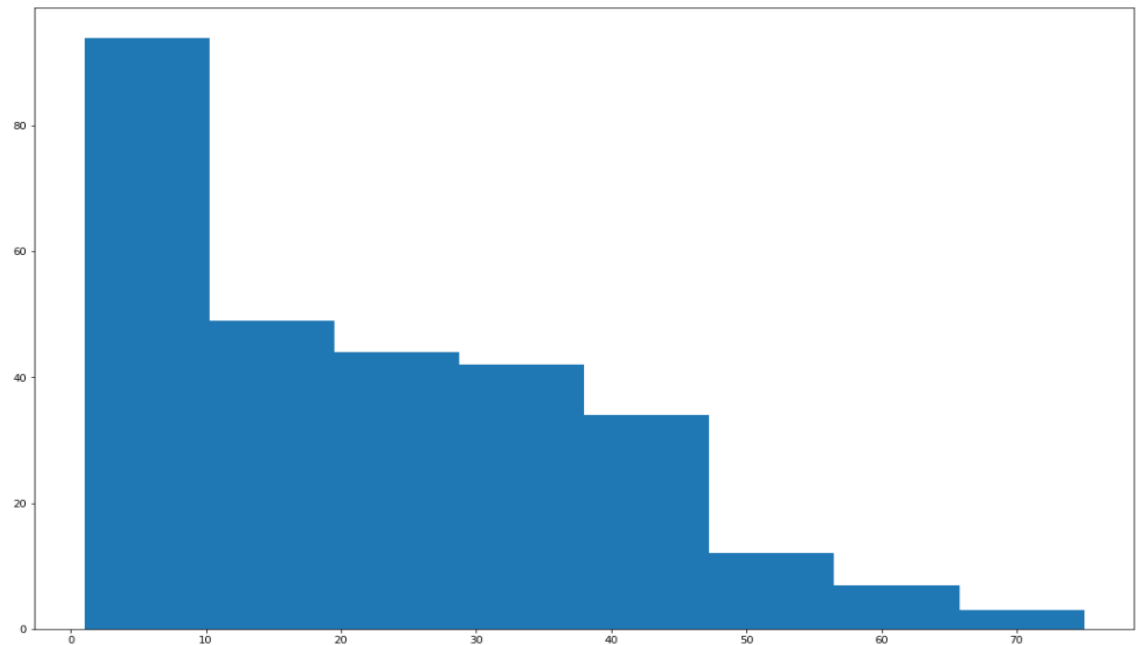
 Other: fake communities

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Thank you for your attention!

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