Scientific Modeling Computer Laboratory

Project: Time Evolving Networks

Third Bi-weekly Presentation

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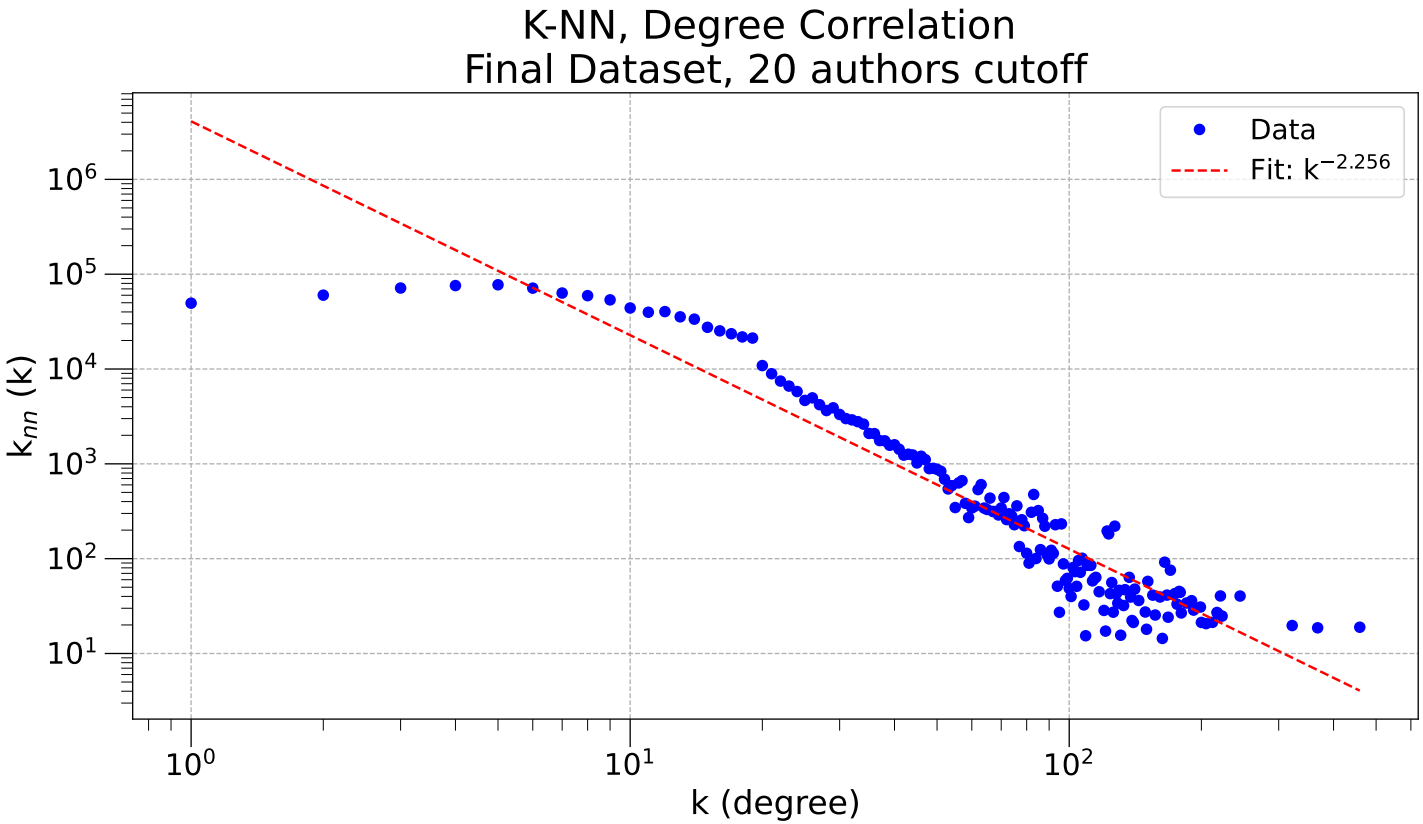
Previously

- What is MTMT?
  Hungarian Repository of Scientific Works
- How to acquire data?
  ReST API Queries
- What part of the data is needed?
  Authors for a given publication

Previously

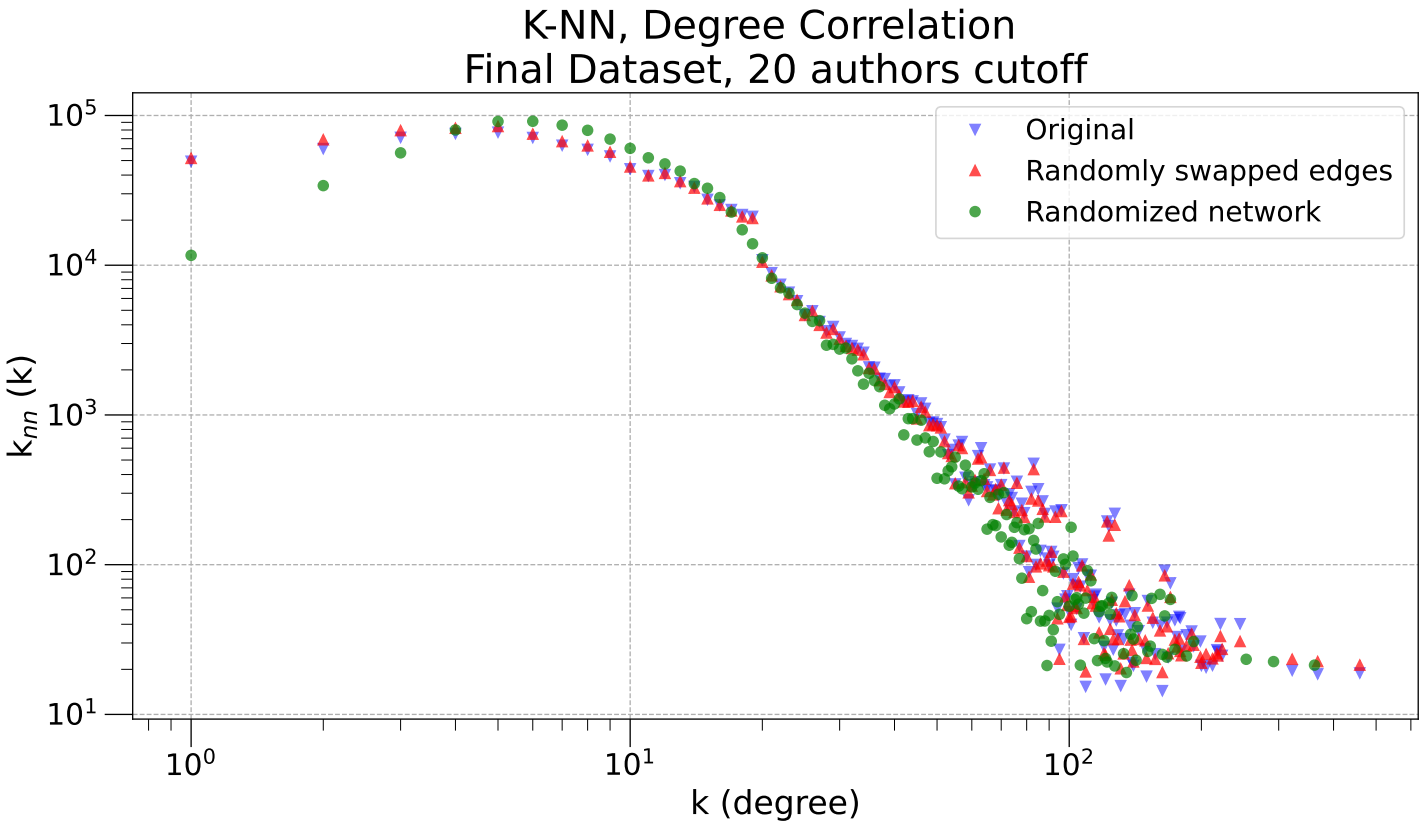

K-NN, Degree Correlation
Final Dataset, 20 authors cutoff
Data
Fit: k^−2.256
k_nn (k)
k (degree)
10^0
10^1
10^2
10^1
10^2
10^3
10^4
10^5
10^6

Structural Disassortativity I.

Structural disassortativity is introduced due to the usage of simple graph.
Solution?

- Compared it to a randomized network
- Allow multi-connected nodes

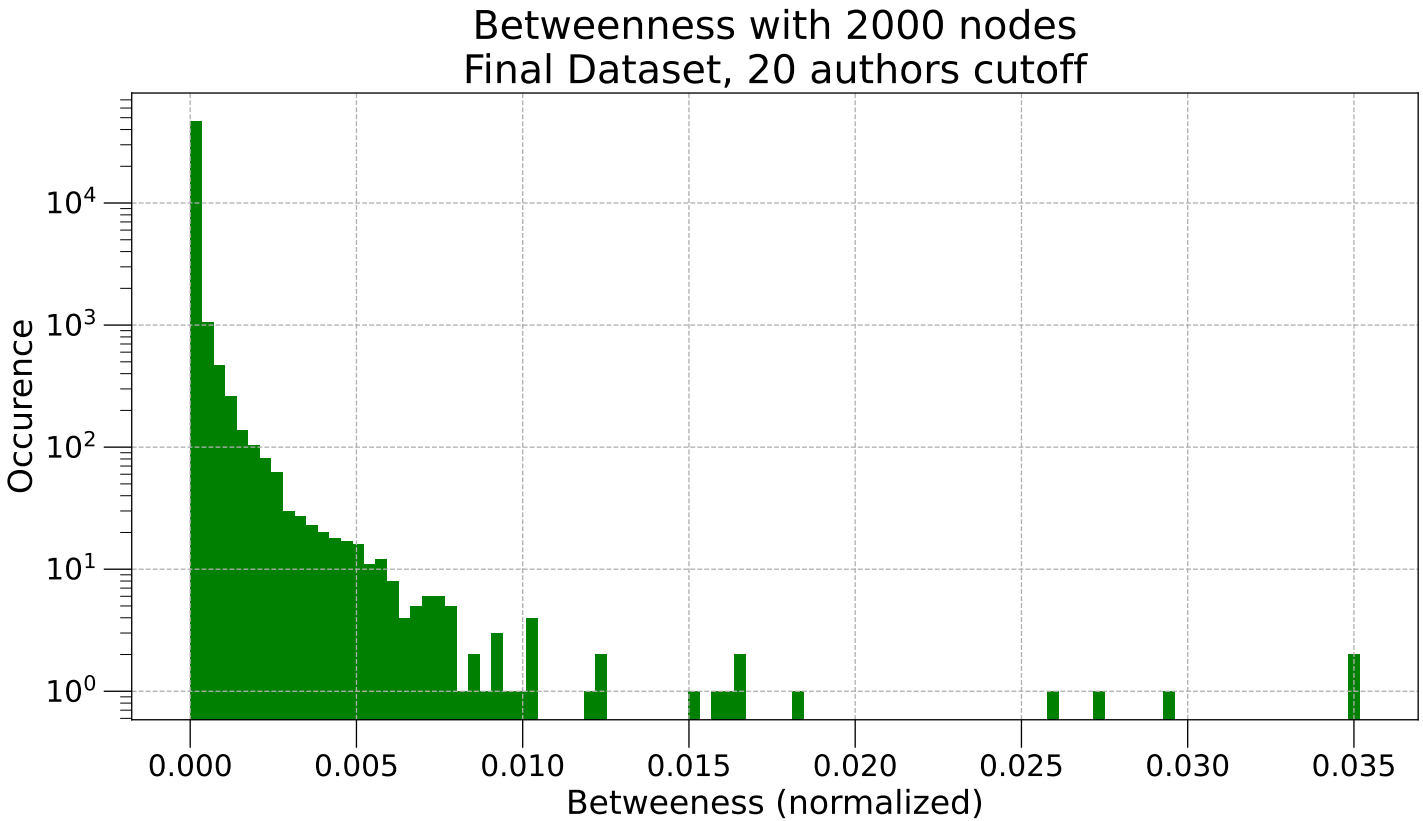
Structural Disassortativity II.



Betweenness I.

Betweenness is another centrality measure like the average shortest path length.
It measures how many of the shortest paths going through a given node, which is not the endpoint of the paths.

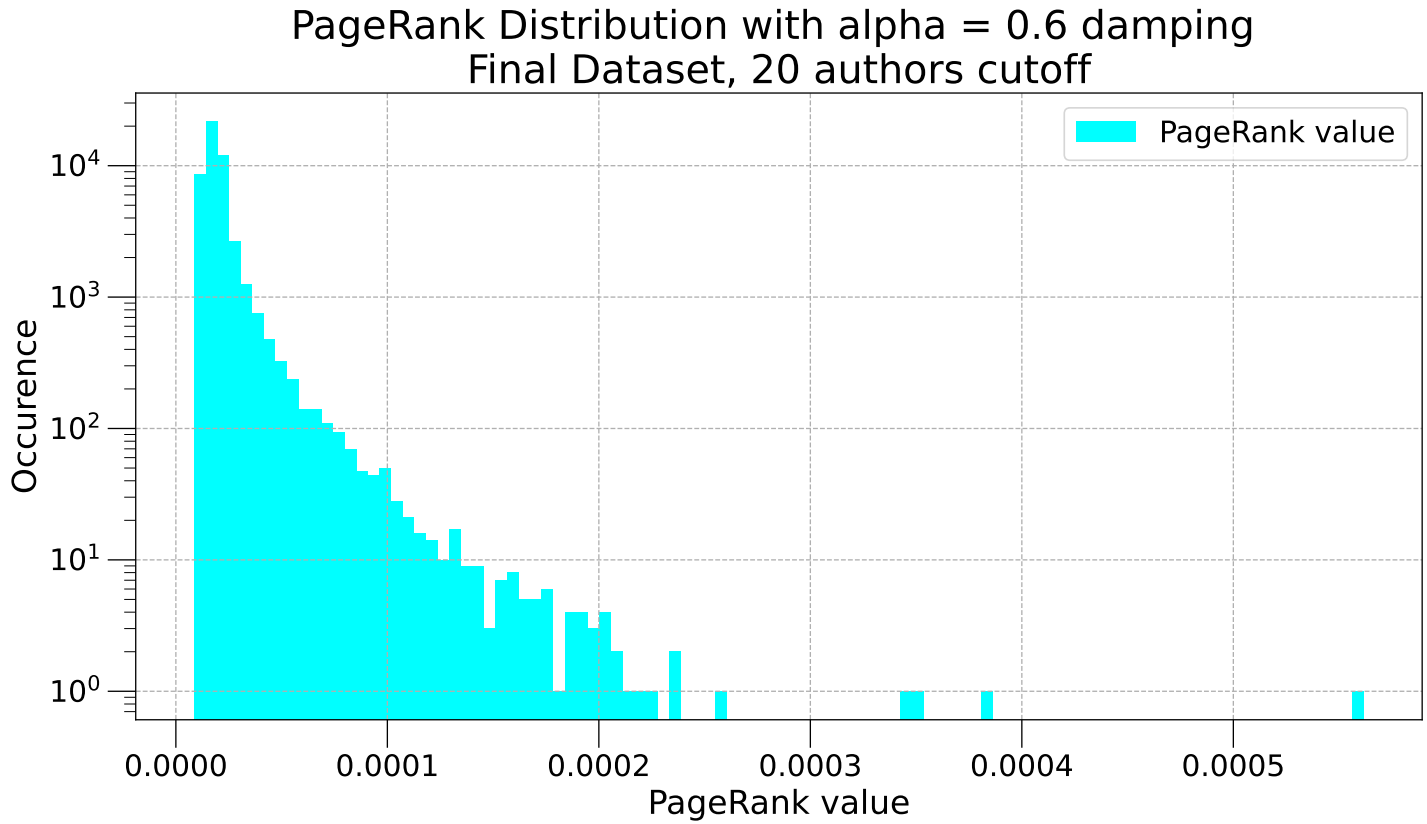
Betweenness II.



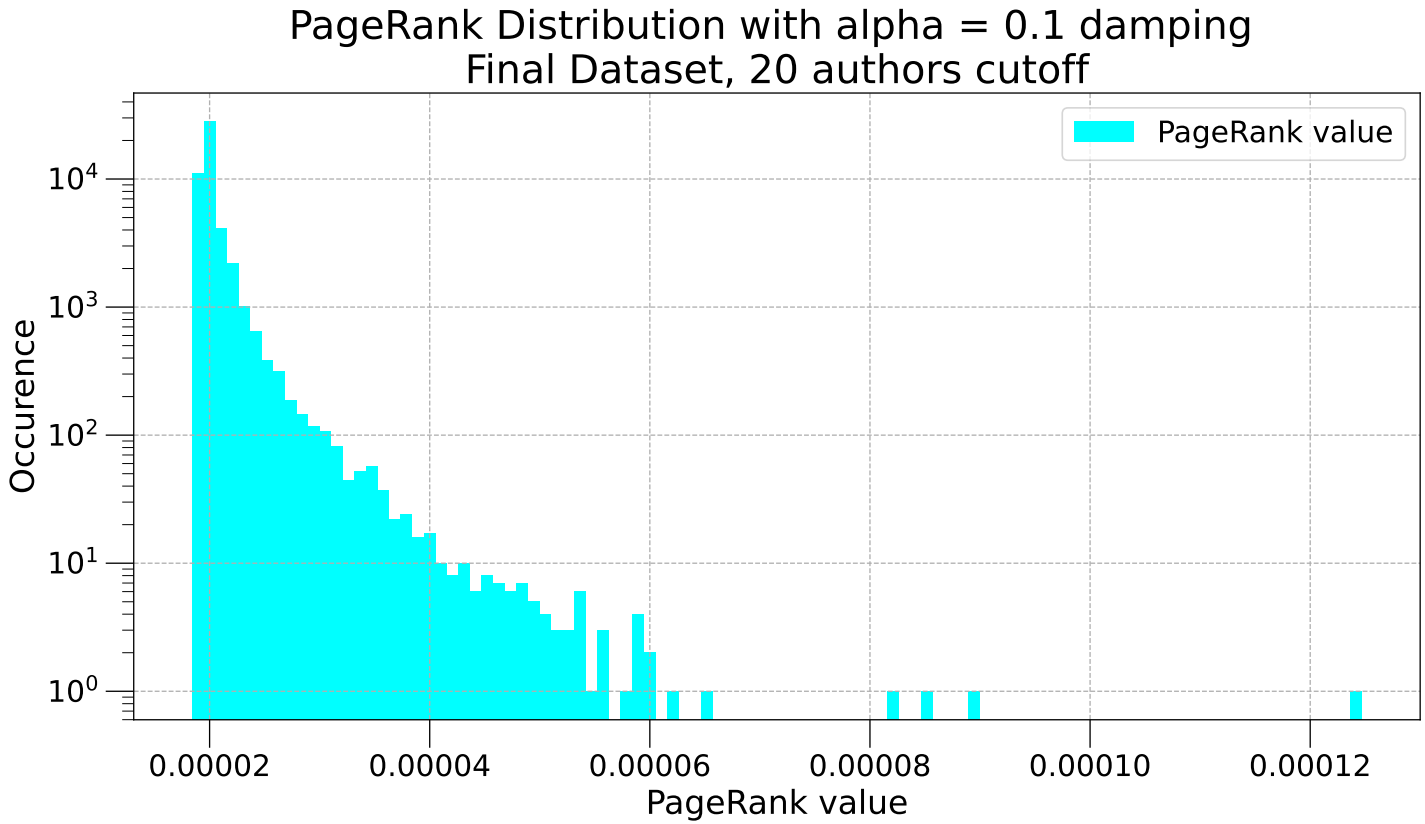
PageRank I.

PageRank was originally used to get the importance of a web-site by the usage of hyperlinks.
In this case, we can measure the importance of a node in the network.

PageRank II.


PageRank Distribution with alpha = 0.6 damping
Final Dataset, 20 authors cutoff
PageRank value
Occurence
10^4
10^3
10^2
10^1
10^0
0.0000
0.0001
0.0002
0.0003
0.0004
0.0005
PageRank value

PageRank III.

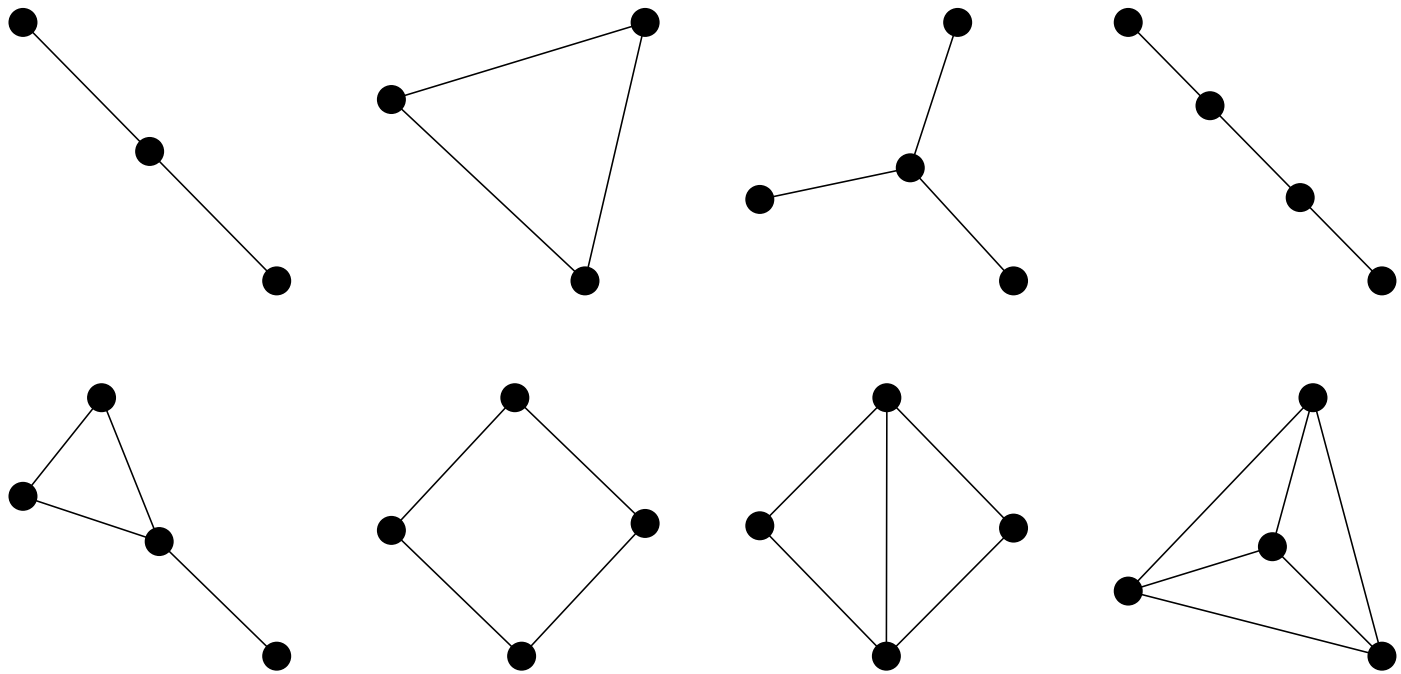


Motifs I.

Motifs are little graph with a given structure. The search for these graphlets are the enterance for group searching.

Unfortunately, the more nodes a motif has, the more expensive it becomes to find them.

Motifs II.



References

[1] Albert-László Barabási. "Network Science". In: *http://networksciencebook.com* (2012).

[2] Aric A. Hagberg, Daniel A. Schult, and Pieter J. Swart. *Exploring network structure, dynamics, and function using NetworkX, in Proceedings of the 7th Python in Science Conference (SciPy 2008)*. 2008.

[3] Xiaoming Liu et al. *Co-Authorship Networks in the Digital Library Research Community*. 2005.

Thank you for your attention!