Descriptive Network Analysis B
–Seminar–

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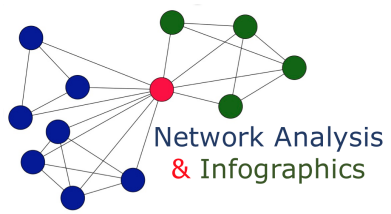

Week 5: 25 February 2022

Learning Outcomes

	Learning outcome	Assessment mode
1	Explain the concept of network and list the main network indicators	ESS
2	Describe and apply the major techniques for the collection of network data and their statistical analysis	ESS, GPN + GWS
3	Identify the main characteristics of networks by means of network measures	ESS, GPN + GWS
4	Employ network analysis techniques to produce network data-based infographics	GPN + GWS

Note: ESS: Essay; GPN: Group Presentation; GWS: Group Written Submission

Overview

1. Centrality measures [recap]
2. Centrality measures in *igraph*

Centrality measures [recap]

Centrality measures [recap]

Centrality measure	Interpretation
Degree	How many nodes can a node reach directly? *information flow, popularity, influence*
Closeness	How fast can a node reach every node in the network? *speed, diffusion, efficiency*
Betweenness	How likely is a node to be part of the most direct route between two nodes in the network? *control, fragmentation, brokerage*
Bonacich's centrality	How well is an actor connected to other well-connected actors in the network? *power, comprehensive view of the network*
Weighted centrality	Use of the information about the strength of the ties (and distribution of these in the case of Opsahl's centrality)

Centrality measures in *igraph*

Centrality measures in *igraph*

Your source of all igraph functions: `http://igraph.org/r/doc/`

Centrality measures in *igraph*

Measure	**igraph function**
Degree	**degree(...)**
Closeness	**closeness(...)**
Betweenness	**betweenness(...)**
Centralization	**centr_degree(...)** **centr_clo(...)** **centr_betw(...)**
Bonacich's centrality	**power_centrality(...)** (see section other scripts for calculation)
Weighted degree Weighted closeness Weighted betweenness	**strength(...)** **closeness(...)** **betweenness(...)**
Opsahl' weighted centralities	**degree_w(...)** **closeness_w(...)** **betweenness_w(...)** from the **tnet** package (see section other scripts for calculation)

Group Exercise

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- Creating network(s) by using real data
  - Create at least one network
  - Apply related network/node level measures
  - Interpret the results in a comparative/complementary way
- UKRI-MRC Research Grants Data for the year 2006-2020
  - 250 projects as a sample
  - Use full data to create your network(s) or create a subgraph(s)
  - Use country, sector, year, expenditure variables as attributes to complement your analysis
- Randomly selected groups
- Coming weeks...
  - Apply the metrics/concepts that we will learn weekly
  - Each group will make a short presentation

Next time ...

Next time ...

- **Lecture: Descriptive network analysis C**
  - Node-level measures (brokerage measures)
- **Seminar: Descriptive network analysis C**
  - Assessment of node-level measures (brokerage measures)