Chapter 1: Intorducing Network Analysis in R

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1 Introducing Network Analysis in R

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What Are Network ? (1)

- 네트워크는 어디에나 있음.
  - Businesses work
  - interlocking networks of trade
  - Public health, NGO, Nations

What Are Network ? (2)

Every social network is made up of

- a set of actors (also called nodes)
- social relationship (also called a tie).

a set of actors (also called nodes) that are connected to one another via some type of social relationship (also called a tie).

소셜패턴

1. The social patterns that are displayed in the network figures are not random.
2. They reflect underlying social processes that can be explored using network science theories and methods.
3. Network analysis can be used to reveal these patterns that reflect the underlying rules and regularities.

What is Network Analysis?

Social Network Analysis is

the process of investigating social structures through the use of network and graph theories.

What for?

1. visualize networks,
2. describe specific characteristics of overall network structure as well as details about the individual nodes, ties, and subgroups within the networks,
3. build mathematical and statistical models of network structures and dynamics.
4. most of the methods used in network analysis are quite distinct from the more traditional statistical tools used by social and health scientists.

Five Good Reasons to Do Network Analysis in R (1)

1.Scope of R

Most other network analysis programs (e.g., Pajek, UCINet, Gephi) are stand-alone packages, and thus do not have the advantages of working within an integrated statistical programming environment.

2.Free and Open Nature of R

This is formally ensured via the GNU General Public License (GPL) that R-code is released under

Five Good Reasons to Do Network Analysis in R (2)

3.Data and Project Management Capabilities of R

Although there are many good network analysis programs available which can handle a wide variety of network descriptive statistics and visualization tasks, no other network package has the same power to handle often complex data and project management tasks for larger-scale network analyses compared to R

Five Good Reasons to Do Network Analysis in R (3)

4.Breadth of Network Packages in R

The primary reason R is ideal for network analysis is the breadth of packages that are currently available to manage network data and conduct network visualization, network description, and network modeling. There are dozens of network-related packages, and more are being created all the time.

5.Strength of Network Modeling in R

R is the only generally available software package that includes comprehensive facilities to do stochastic network modeling (e.g., exponential random graph models), dynamic actor-based network models that allow study of how networks change over time, and other network simulation procedures.

Roadmap

Chapter	Packages	Datasets
Introduction		FIFA_Nether, Krebs
5 number summary	statnet, sna	Moreno
Network data	statnet, network, igraph	DHHS, ICTS
Basic visualization	statnet, sna	Moreno, Bali
Graphic design	statnet, sna, igraph	Bali
Advanced graphics	arcdiagram, circlize, visNetwork, networkD3	Simpsons, Bali
Prominence	statnet, sna	DHHS, Bali
Subgroups	igraph	DHHS, Moreno, Bali
Affiliation networks	igraph	hwd
Mathematical models	igraph	lhds
Stochastic models	ergm	TCnetworks
Dynamic models	RSiena	Coevolve
Simulations	igraph	

Table 1.1 User's Guide roadmap

Figure 1: Book Roadmap

Resource

- library(devtools)
- install_github("DougLuke/UserNetR", force=TRUE)
- library(UserNetR)
- help(package='UserNetR')