Introduction to Social Network Analysis (SNA) Using R

Fatemeh Salehian Kia

fsalehia@sfu.ca

March 22nd, 2018

Facilitator

- PhD student at SIAT, SFU

- My research focus: Big data and information visualization

- My background:
  - Researcher at UC Berkeley as a data scientist
  - Master of Science in Software Systems Engineering from RWTH Aachen University in Germany

Intro. to SNA Using R   Fatemeh Salehian Kia

Outline

1. Creating network graphs
2. Analyzing network graphs
3. Visualizing a network

Intro. to SNA Using R   Fatemeh Salehian Kia

Hands-on File

- Please go to the following link and sign up to our workspace to download the file (You are required to sign up with your ***SFU email address***):

https://sciprogworkshops.slack.com

Intro. to SNA Using R   Fatemeh Salehian Kia

Undirected Graph

0	14	6	13	10	24
0	21	6	20	11	12
1	13	6	29	12	15
1	16	7	15	12	29
1	17	7	17	15	19
2	6	8	12	16	24
2	9	8	14	23	26
2	21	8	17	23	28
2	28	4	18	25	29
3	4	11	23	26	27
4	14	9	12	26	29
4	22	10	23		

Intro. to SNA Using R   Fatemeh Salehian Kia
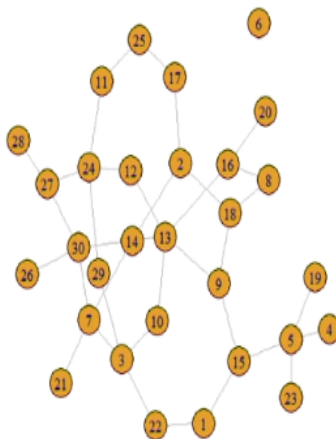
Undirected Graph

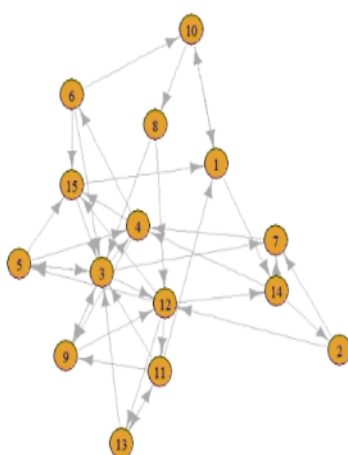Intro. to SNA Using R   Fatemeh Salehian Kia

Directed Graph

0	9	5	2	11	10
0	13	5	9	11	12
1	6	5	14	11	13
1	11	6	3	11	14
2	3	7	2	12	2
2	4	7	11	12	10
2	6	8	2	13	1
2	8	8	11	13	3
2	11	9	0	13	6
3	5	9	7	14	0
3	8	10	0	14	2
4	14	10	2		
6	2	10	8		
7	3	10	12		
4	14	11	4		

Intro. to SNA Using R   Fatemeh Salehian Kia

Directed Graph

Intro. to SNA Using R   Fatemeh Salehian Kia

1. Creating network graphs

- Download and install sna and igraph
- Format data for social network analysis
- Creating a graph from existing data
- Create sample graphs

Intro. to SNA Using R   Fatemeh Salehian Kia

DEMO

- Open RStudio and follow me

Intro. to SNA Using R   Fatemeh Salehian Kia

2. Analyzing Network Graphs

- Measure connectedness of points
- Measure betweeness of points
- Calculate network density
- Identify clique in a graph
- Find components of a graph
- Take a random walk on a graph

Network Measures

- **Degree**: Number of links from each vertex
- **Betweenness**: The higher the score associated with a vertex, the more of a bridging role it plays within the network.
- **Density**: Number of connections divided by the total possible connects
- **Clique:** as a group of vertices where all possible links are present

Cont. Network Measures

- **Component**: A group of connected network nodes
- **Random walk**: identifying a path or a process

DEMO

- Open RStudio and follow me

3. Visualizing a Network

- Visualize a network
- Change edge and vertex colors
- Write out a graph

DEMO

- Open RStudio and follow me

Further Resources

- Read Social Network Analysis by John Scott (Sage)
- Read Exploratory Social Network Analysis with Pajek by Wouter de Nooy et al. (Cambridge)
- Download Pajek from http://mrvar.fdv.uni-lj.si/pajek
- Download Gephi from https://gephi.org/users/download

Intro. to SNA Using R   Fatemeh Salehian Kia

Q & A

Intro. to SNA Using R   Fatemeh Salehian Kia