Social Network Analysis

School of Information Studies
Syracuse University

Social Network Analysis (SNA)

"Study of human relationships using graph theory"

Used to analyze people or collections of people

Origins in social sciences and network analysis

Unique perspective on how society functions

Focuses on relations between individuals, groups, and social institutions

Why and When to Use SNA

When studying a social network

Want to visualize data to uncover patterns

Want to follow paths that information follows

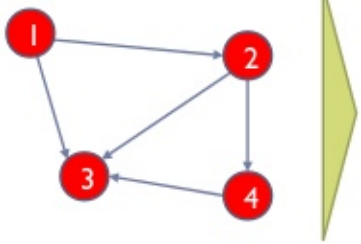
When doing quantitative research

Analyzing SNSs, OCs, and social media

Directed Graph of Networks

Entering data on a directed graph

Graph (directed)



Edge list

Vertex	Vertex
1	2
1	3
2	3
2	4
3	4

Adjacency matrix

Vertex	1	2	3	4
1	-	1	1	0
2	0	-	1	1
3	0	0	-	0
4	0	0	1	-

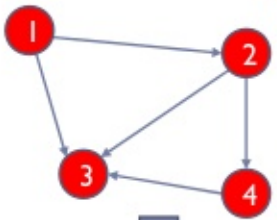
10 CNM Social Media Module – Giorgos Cheliotis (gcheliotis@nus.edu.sg) NUS

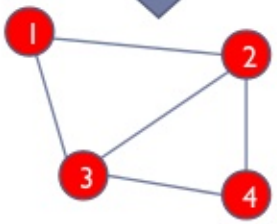
Undirected Graph

Representing an undirected graph

Directed

(who contacts whom)





Undirected

(who knows whom)

Edge list remains the same

Vertex	Vertex
1	2
1	3
2	3
2	4
3	4

But interpretation is different now

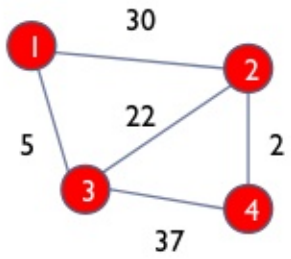
Adjacency matrix becomes symmetric

Vertex	1	2	3	4
1	-	1	1	0
2	1	-	1	1
3	1	1	-	1
4	0	1	1	-

11 CNM Social Media Module – Giorgos Cheliotis (gcheliotis@nus.edu.sg) NUS

Strong/Weak Ties in Network

Adding weights to edges *(directed or undirected)*



Weights could be:

- *Frequency of interaction in period of observation*
- *Number of items exchanged in period*
- *Individual perceptions of strength of relationship*
- *Costs in communication or exchange, e.g. distance*
- *Combinations of these*

Edge list: add column of weights

Vertex	Vertex	Weight
1	2	30
1	3	5
2	3	22
2	4	2
3	4	37

Adjacency matrix: add weights instead of 1

Vertex	1	2	3	4
1	-	30	5	0
2	30	-	22	2
3	5	22	-	37
4	0	2	37	-

14 CNM Social Media Module – Giorgos Cheliotis (gcheliotis@nus.edu.sg) NUS

Key Players

Centrality Measure	Possible Interpretation
*Degree	Music Collaborations: How Many People?
*Betweenness	Spies: Who Collects the Most Information?
*Closeness	Sexual: How Fast Will an STD Spread?
*Eigenvector	Paper Citations: Which Author is Most Cited?

Network's Structure: Cohesion

Density

- Number of edges over total possible edges
- Measure of well-connected

Clustering

- Closed nodes as compared with all triplets
- Identify communities within networks

Preferential Attachment

Popularity

- Associated with popular people, ideas, and so on

Quality

- Objective criteria
- Higher quality attracts attention

Mixed model

- Nodes of similar attributes
- Reach “critical” mass first—STARS