



SOCIAL NETWORK ANALYTICS

Introduction to SNA and its Applications

Prakash C O

Department of Computer Science
and Engineering

SOCIAL NETWORK ANALYTICS

Introduction to SNA and its Applications

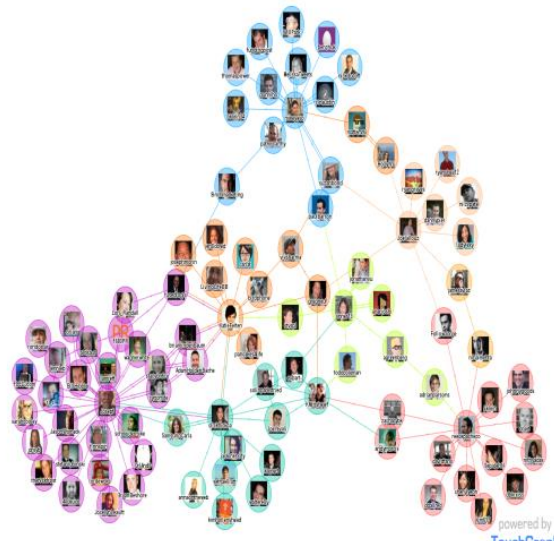
Prakash C O

Department of Computer Science and Engineering

SOCIAL NETWORK ANALYTICS

What is Social Network?

- Social network is any network with social entities (persons, groups, companies, social events,...) as actors and having social interactions and personal relationships between them.
- Examples: Network of friends/family/colleagues/customers/clients/fans/followers ...



Why do we need network analysis?

➤ Different types of data:

- **Attribute data**(attitudes, opinions, behaviors of agents...)
- **Ideational data**(which describe the meanings, motives, definitions, and typifications themselves)
- **Relational data**(contacts, ties and connections, the group attachments and meetings, which **relate one agent to another** and so cannot be reduced to the properties of the individual agents themselves. **Relations are not the properties of agents, but of systems of agents**; these relations connect pairs of agents into larger relational systems.)

➤ Different data needs different analysis

- Variable analysis for attribute data.
- Typological analysis for ideational data.
- **Network analysis** for relational data.

SOCIAL NETWORK ANALYTICS

What is network analysis?

- **Network analysis** is a series of techniques (mathematical, statistical,...) designed to analyze relational data.
- **Social network analysis** is the application of network analysis in the social sciences context.

SOCIAL NETWORK ANALYTICS

What is Social Network Analysis?



- **Social Network Analysis [SNA]** is the process of investigating social structures through the use of network and graph theories.
- Examples of **social structures commonly visualized** through social network analysis include
 - social media networks,
 - memes spread, information circulation,
 - friendship and acquaintance networks,
 - Kinship (relationship, association, affiliation....),
 - disease transmission, etc..

What is Social Network Analysis (SNA)?

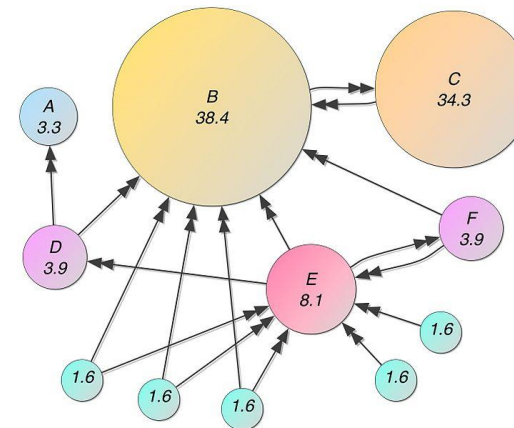
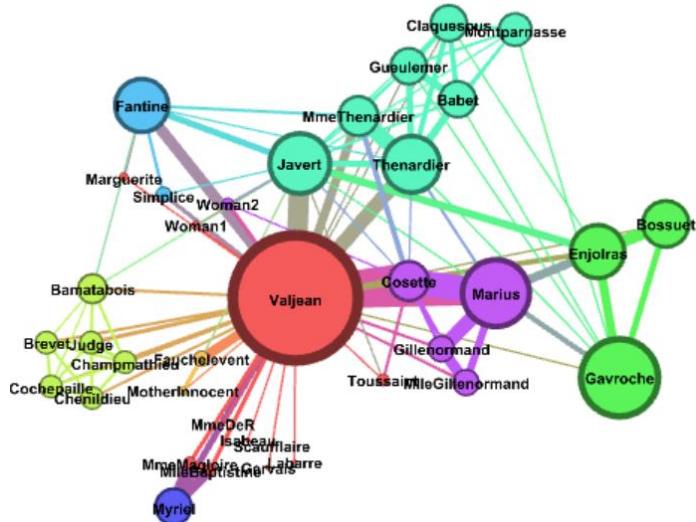
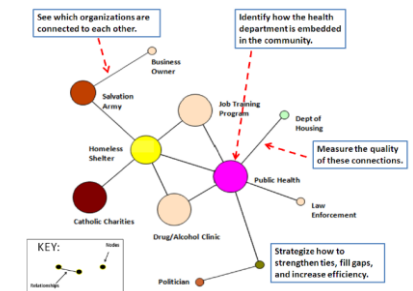
- An analysis technique which studies
 - Relationships between people and groups
 - How those relationships arise
 - Consequences of the relationships

- SNA can be defined as a, “**distinctive set of methods used for mapping, measuring and analyzing the social relationships between people, groups and organizations**”.

Social Network Analysis



- In graph representation of Social Networks or in SNA,
 - the **nodes** represent the **different actors(or social entities) in the network**, and
 - the **lines** represent the **relationships between the various actors**.
 - The **size of the node** often represents **the relative importance of that actor in the network**, and
 - the **thickness of the connecting line** denotes **the strength of the relationship**.



Source:<https://en.wikipedia.org/wiki/File:PageRanks-Example.jpg>

1. **Actor level:** centrality, prestige and roles such as isolates, hubs, etc..
2. **Dyadic level:** distance/path length and reachability, structural and other notions of equivalence, and tendencies toward reciprocity.
3. **Triadic level:** network transitivity.
4. **Subset level:** cliques, cohesive subgroups, components.
5. **Network level:** connectedness, diameter, centralization, density, etc.

▶ Business Applications

- ▶ Businesses use SNA to support activities such as
 - ▶ customer interaction and analysis,
 - ▶ marketing, and
 - ▶ business intelligence needs.
- ▶ Used in recommender systems development.

▶ Security applications

- ▶ SNA is used in intelligence, counter-intelligence and law enforcement activities.
- ▶ The **Security Agencies** can perform Social Network Analysis on Call Detail Records (CDRs) of terrorists, mafia and Criminal gang Networks.
- ▶ The NSA used SNA in realizing 9/11attack (Al-Qaeda Network).

- ▶ **Internet and social media applications**
 - ▶ Facebook, LinkedIn, Twitter, CouchSurfing, etc. are using SNA **to understand their users and improve their functionality.**
 - ▶ SNA has also been applied **to understand online behavior** by individuals, organizations, and between websites.
 - ▶ Hyperlink analysis can be used to analyze the connections between websites/webpages **to examine how information flows as individuals navigate the web.**
- ▶ Political Parties can use SNA **to build a grass roots political campaign.**
- ▶ SNA can be used in **Recipe recommendation** using ingredient networks.

SOCIAL NETWORK ANALYTICS

References

- Social Network Analysis: **Lada Adamic**, University of Michigan.
- <https://en.wikipedia.org/wiki/>
- Current literature





THANK YOU

Prakash C O

Department of Computer Science and Engineering

coprakasha@pes.edu

+91 98 8059 1946

SOCIAL NETWORK ANALYTICS

What is Social Network Analysis?

- **Social network analysis (SNA)** is the mapping and measuring of relationships and interactions(flows) between
 - people,
 - groups,
 - organizations,
 - computers,
 - URLs, and
 - other connected information/knowledge entities.

- The nodes in the network are the people/groups/computers while the links show relationships or flows between the nodes.

- **Social Network Analysis(SNA) techniques studies**
 - Person's importance/influence/popularity in the network
 - Relationships between people/groups/organizations,
How those relationships arise,
Consequences of the relationships,
strength of those relationships.
 - Which people form communities or clusters together.
 - Information or disease transmission in networks.
 - ...