The 'What' and 'How' of Network Analytics

Network Theory and Network Data

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Outline

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There Are Several Families of Networks

Family	**Example**
Biological networks	A living organism's neural system
Cultural networks	A model of the 'returns of education'
Financial networks	A cryptocurrency
Information networks	Information sharing among BA students
Inter-organizational networks	Technological alliances among pharma industry players
Organizational networks	Knowledge sharing among financial analysists
Social networks	Friendship among BA students
Transportation networks	The Tube

Networks Have a 'Hard' and a 'Soft' Component

The hard component

A network is a collection of nodes and edges, what is formally called a 'graph':

$$G = \{V, E\} \tag{1}$$

where V is the array of nodes

$$\{v_1, v_2, ..., v_i, ..., v_N\}$$

and E is the set of edges reflecting connections among pairs of nodes

$$\{..., \{v_i, v_j\}, \{v_i, v_k\}, ...\}$$

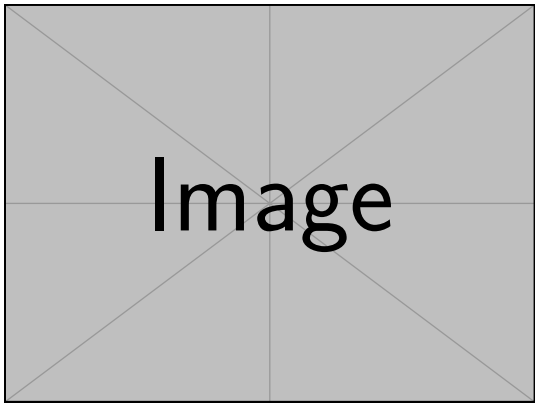
The soft component

The soft component is the relationship that maps the connections onto the pairs of nodes. Examples of relationships are affilition to a club, music collab (i.e., a 'feat'), friendship, marriage, mentoring, tube route.

!! Pay attention !!

A network is more than a graph. Two nodes may be connected for many reasons — when it come to analyze network data, we must be specific about the concrete relationship under investigation.

A Real-World Example: The Soundcloud Networks



Some key general points emerging from the analysis of the Soundcloud example:

- The same pair of nodes can be connected because of multiple relatonships (i.e., 'like,' 'repost,' 'comment')
- The nodes of a network may have the same type (e.g., 'following') or different types (e.g., 'like')
- Analytically seprated networks may be correlated (e.g., one tends to like her/his followings' likes)

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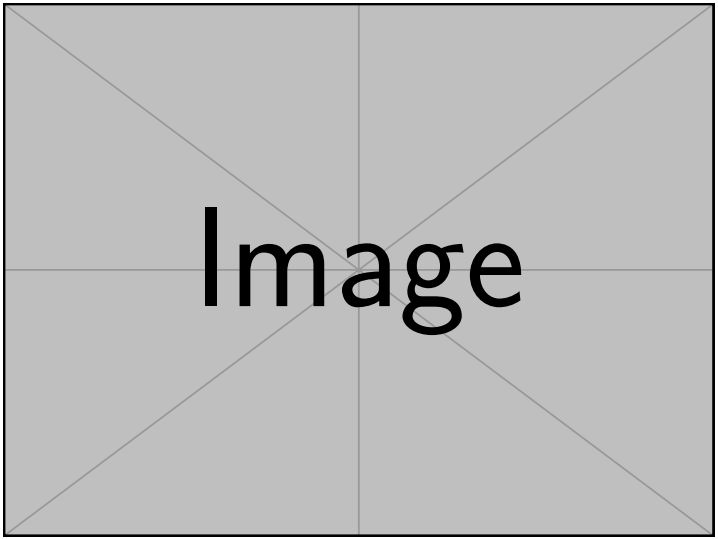
What Are the Components of a Network Analytics' Project?



Outline

	Level			
Objective function	**Individual**	**Team**	**Organization**	**Inter-orgs**
Coordination				
Knowledge sharing . . .				
Task performance				
Innovation				
Economic performance				

Sample of Real Business Problems Raised by Industry Partners

Outline

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References