Beyond the hype: Reassessing Social Network Analysis as an Intelligence Tool

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Social Network Analysis in the Media Spotlight

Saddam Hussein

Operation Red Dawn

13 December 2003

Network analysis focussed on clan and tribal ties

Links to the 'Fat Man' led to the location of Saddam Hussein



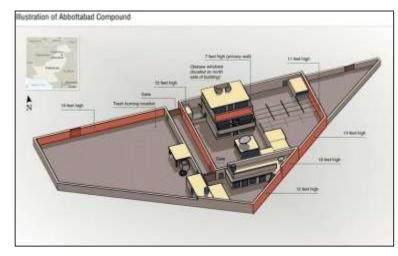


Osama Bin Laden

Operation Neptune Spear 02 May 2011

Identification of a courier led to the Abbottabad compound

Pattern of life analysis of the compound built up the intelligence picture prior to the operation





The Effect:

- Reaffirmation within government thinking that Social Network Analysis is effective
- Industry incentivised to introduce Social Network Analysis into its products
- Heightened research into Social Network Analysis as an intelligence method
- Greater public awareness of Social Network Analysis as an intelligence tool

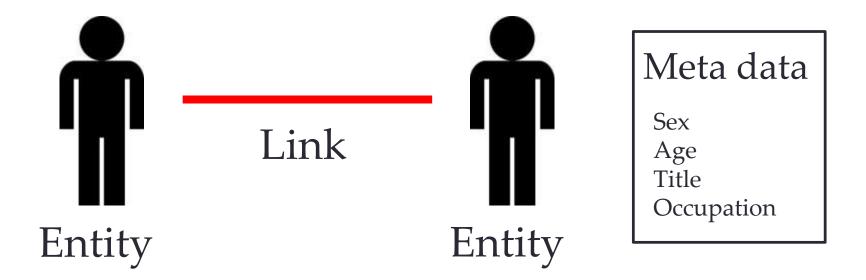
An Overview of Social Network Analysis

SNA: An overview

A method of analysing social networks.

- Relationships between actors in a network
- The component parts are referred to as nodes and ties, or entities and links
- The count of links and position of nodes can be used to make mathematical inferences as to roles of a node and characteristics of a network

Components of a network



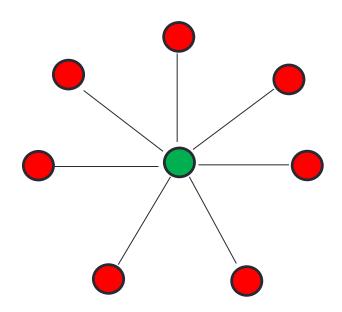
Social Network Analysis helps to identify key nodes in a network through quantitative analysis of (predominantly) qualitatively-derived relationship links.

Key concepts in SNA

Degree Centrality

The number of links a node has.

The green node has a degree centrality score of 7.



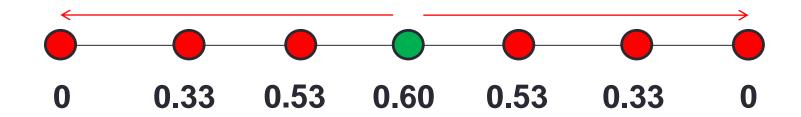
Operational Use

Used to identify the individual with the highest number of contacts – such as a supplier in a narcotics network.

Key concepts in SNA

Between-ness

A node's importance is based on its position in a network and whether it sits at the centre or the periphery of a network.



Operational Use

In identifying core, or more senior, members of a network – such as leadership figures.

Key concepts in SNA

Closeness

A node's importance is based on its distance to every other node in a network.

The green node has a closeness score of 1, all red nodes have a score of 0.538.

Operational Use

In determining a key node in the command and control node in a network – such as an operational commander.

Examples of SNA in Academia

A Social Network Analysis of Jemaah Islamiyah: The applications to counter-terrorism and intelligence

Stuart Koschade, 2006

- Bali Bombings, 12 October 2002
- Network analysis of operatives involved in the attack
- Data set based on open source material and official data made available to the public

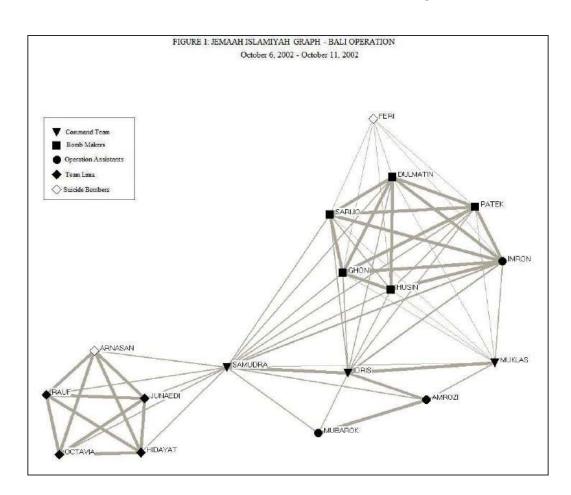




Coding of data based on:

- Content
- Duration
- Frequency

Based on these criteria, links are given a strength of relationship ranged from 1 – 5.



Key Findings

- Identified "most important" individuals in the cell, based on high centrality scores.
- Cell had a higher focus on efficiency and was less covert, based on high density and degree of connexion scores.
- Identified the weakest node in the cell.

Social Network Analysis:

"[bestows] the analyst with a potent weapon of prediction in the fight against terrorism, and the ability to evaluate the best and most effective methods of disruption against a terrorist cell."

Examples in academia: 9/11

Mapping networks of terrorist cells

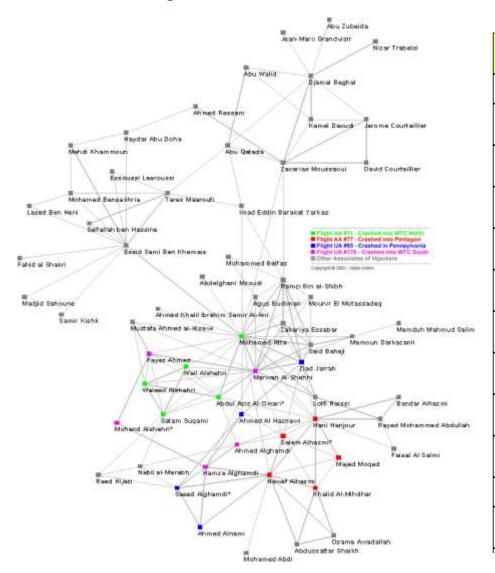
Valdis E. Krebs, 2002

- Network analysis of hijackers
- Data set based on open source information
- Three strengths of links coded according to evidence of working together





Examples in academia: 9/11



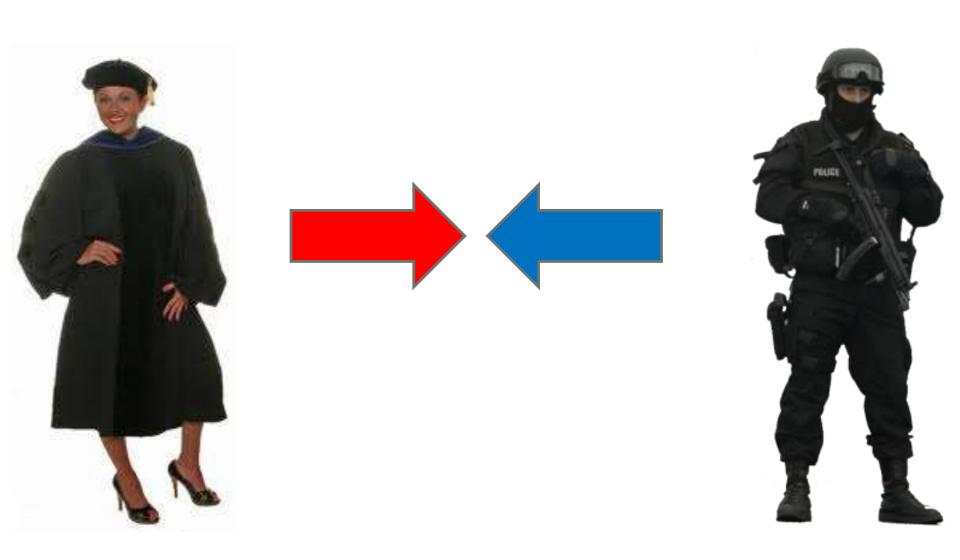
Degrees * possible false ID		Betweenness		Closeness	
0.361	Mohamed Atta	0.588	Mohamed Atta	0.587	Mohamed Atta
0.295	Marwan Al-Shehhi	0.252	Essid Sami Ben Khemais	0.466	Marwan Al- Shehhi
0.213	Hani Hanjour	0.232	Zacarias Moussaoui	0.445	Hani Hanjour
0.180	Essid Sami Ben Khemais	0.154	Nawaf Alhazmi	0.442	Nawaf Alhazmi
0.180	Nawaf Alhazmi	0.126	Hani Hanjour	0.436	Ramzi Bin al- Shibh
0.164	Ramzi Bin al- Shibh	0.105	Djamal Beghal	0.436	Zacarias Moussaoui
0.164	Ziad Jarrah	0.088	Marwan Al- Shehhi	0.433	Essid Sami Ben Khemais
0.148	Abdul Aziz Al- Omari*	0.050	Satam Suqami	0.424	Abdul Aziz Al- Omari*
0.131	Djamal Beghal	0.048	Ramzi Bin al- Shibh	0.424	Ziad Jarrah
0.131	Fayez Ahmed	0.043	Abu Qatada	0.409	Imad Eddin Barakat Yarkas
0.131	Salem Alhazmi*	0.034	Tarek Maaroufi	0.409	Satam Suqami
0.131	Satam Suqami	0.033	Mamoun Darkazanli	0.407	Fayez Ahmed

An Appraisal of SNA as an intelligence method

Three problems with SNA

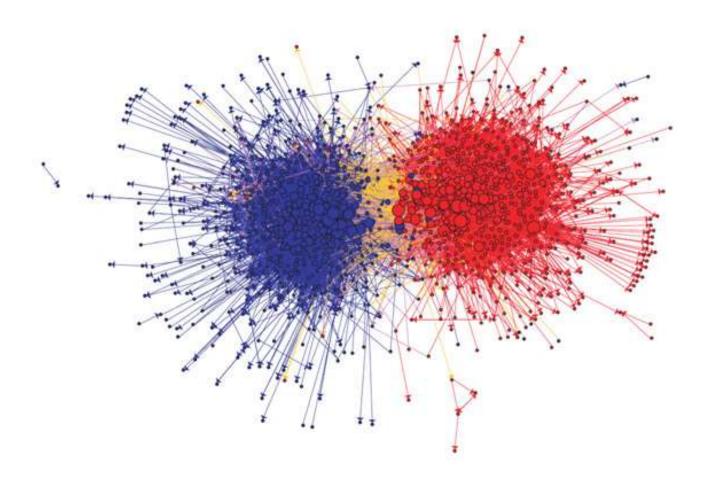
- Perceptions of Social Network Analysis as a solution
- Suitability of intelligence reporting as a source of data
- Application in a dynamic intelligence environment

Perceptions of Social Network Analysis



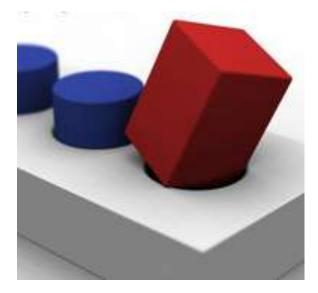
Perceptions of Social Network Analysis

Just because it looks complicated doesn't mean it's useful.



Perceptions of Social Network Analysis

- Look beyond the hype not a silver bullet
- Solution oriented can it inform decision making?
- Can it be applied in my working environment?



Fundamentally about the analytical process of SNA

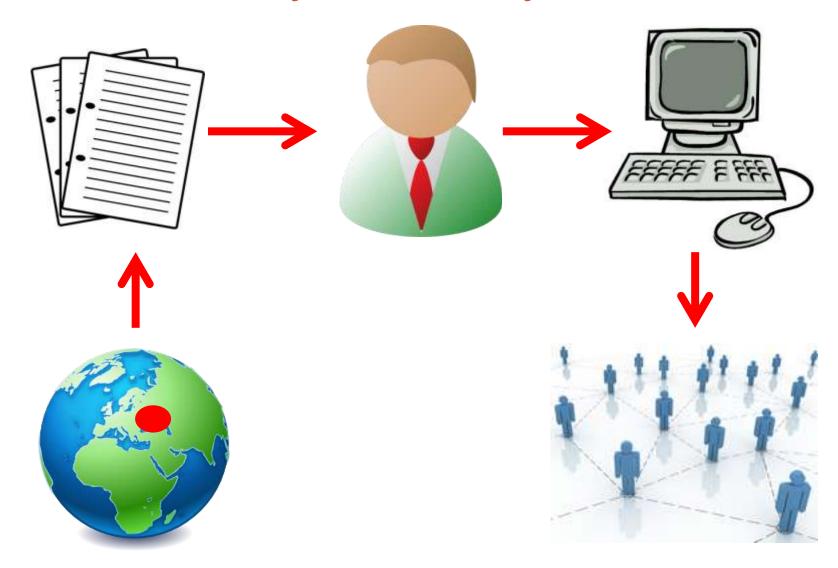
- SNA generates assessment based on link values and position of nodes in a network
- Can these values be relied upon as representative of the real world?
- Is data collected with social network analysis in mind?

Data in an intelligence database is evidential and accumulative

Evidential – Not a measure of 'how many' links but an indication of a link existing

<u>Accumulative</u> – Established entities in your database grow larger and larger as intelligence continues to be collected on them

The result – The frequency of links is largely irrelevant



Intelligence as a SNA dataset: A shaky foundation **Analysis** Coding **Dissemination** Production Collection

An intelligence derived dataset:

- Heavily influenced by biases in its production
- Lack of consistency in formatting, content, language
- Large gaps in knowledge

Coding this dataset:

- A subjective exercise: variation in coding method
- Inconsistent coverage: to code or not to code
- Dependent on manpower: coding suffers if priorities shift

Application in a Dynamic Intelligence Environment

Social Network Analysis in an intelligence cell:

- Time intensive: Coding reporting is burdensome
- Quality dependent: Requires corporate knowledge and strict coding standards
- No substitute for context: The content of links and understanding its relevance, or not, is paramount

In summary:

- SNA is presented as a solution, but this is unrealistic
- A relational database based on intelligence cannot be relied upon for a representative metric of network relationships.
- SNA does not lend itself to the fast paced working environment of an intelligence cell

What now?

Take a step back: Link Analysis

Information management and exploitation

- Storing unstructured data in a systematic way
- Allowing means to search and visually display that data

A database is a repository of information, not a predictive tool.

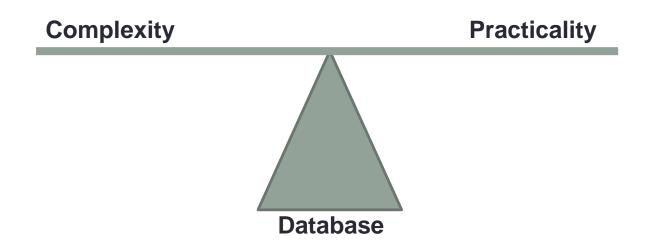
- It is used to represent information pictorially
- As a reference point of stored information
- To explore relationships

There are three areas in which you can improve link analysis as an intelligence method:

- 1. Data Management and database design
- 2. Situational Awareness of the analyst
- Expectations of the customer

The data manager

What is feasible and what is desirable?



The Analyst

Learn to question your data and how it is produced.

Awareness of intelligence environment

- Collection focus
- Style of reporting
- Limitations of sources

The customer

- Know the limitations of the database: classification, date parameters of the dataset
- Understand that a node's position on a network chart does not necessarily relate to hierarchical status

Concluding Points

- Social Network Analysis is by no means redundant, just not applicable for intelligence
- Automation of data sources a way forward? A higher quality of data, a more relevant assessment?
- It all boils down to the analyst:
 - Does he know the subject area?
 - Are his assessments sound?
 - Can he convey his message clearly and succinctly?

Questions?

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