

Novabase



Social Network Analysis for Criminal Investigation

Novabase - Business Intelligence

Risk, Compliance and Fraud Management

Observatório de Economia e Gestão de Fraude

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Social Network Analysis for Criminal Investigation

Brief introduction to social network analysis

A social network is a (social) structure composed of entities/individuals related among themselves:

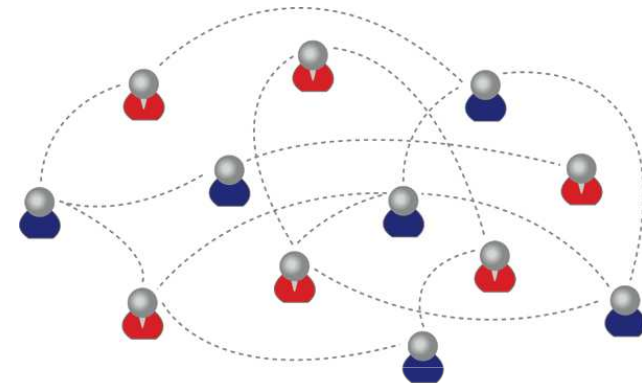
- Organized crime networks (*gangs*)
- *Money laundering* networks
- Networks of suppliers and purchasers

Relevant characteristics of social networks:

- Small world phenomenon
- Strongly connected networks
- Existence of hubs
- Communities form naturally

Social network analysis is a scientific research field that results from a combination of efforts between:

- **Sociology**
 - Under study since 1940, Stanley Milgram experience as a flagship
 - Relationships are as important and informative as personal attributes
 - Individuals are viewed as interdependent
- **Mathematics**
 - Graph Theory
 - Focused on analyzing networks using mathematics and statistics, in order to understand and classify individuals.



Some mathematical measures:

- Centrality
 - Intermediation
 - Popularity
 - Proximity
- Centralization
- Paths (shortest, average)
- Importance
- Clustering potential
- Cohesion

Social Network Analysis for Criminal Investigation

Applications of social network analysis to criminal investigation

Concept	Meaning	Application
Small world phenomenon	The average distance/path between individuals is small	If you know a member of a criminal organization, it's easier to reach the rest of it
Strongly connected networks	Several connections between several individuals tie the network together	Indicates how easy it may be to collapse a criminal organization
Existence of hubs	Some individuals have a greater number of connections	Indicates who should be targeted in order to collapse the network
Communities form naturally	Individuals sharing common acquaintances are likely to associate	If there's a weakly connected criminal organization, it's likely it'll evolve and become more cohesive
Intermediation power	Some individuals can keep a low profile and still hold great influencing power	Target intermediaries to make communication and interaction harder
Popularity	Some individuals have a greater number of connections	Target popular individuals to isolate connections and prevent the network from growing in cohesion
Closeness	Some individuals can keep a low profile and still be closer to many others	An individual that is close to others has a broader action/interaction power.
Clustering potential	Some individuals are more able to create new connections than others	Target those who can grow the organization, either directly or by association
Cohesion	The structure of connections determines the network's cohesion	Indicates how "tight" the criminal organization is and helps identify who makes it cohesive.

Social Network Analysis for Criminal Investigation

Information is power



Communication records

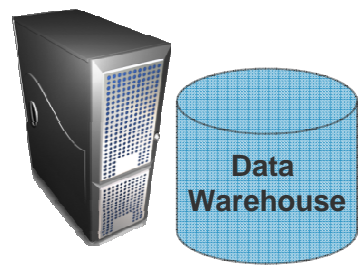


Surveillance

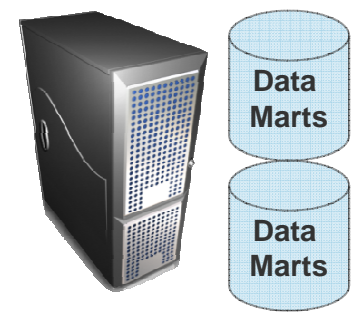
Information Exchange



Intelligence reports



Data Warehouse



Data Marts

Data Marts

