

Social Network Analysis

customer's network value



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Presentation Overview

- Company Profile
- What is Social Network Analysis ?
- How it came to be
- Overview of Techniques
- Applications in real world problems
- Applications in Telecomm industry
- Roadmap for successful application of SNA

Company profile

Datamine decision support systems

- Founded on Jan 2005
- Offers specialized I.T. solutions, Statistical & Data Mining Services focusing on CRM & Decision Support. Specializes in **Telecommunications & Banking** sectors

Expertise

- Analytical CRM, Business Intelligence, Customer Intelligence
- Advanced Reporting Solutions
- Data warehouse, Traffic processing, Customer Analytics
- Software Engineering, Integration, automation

Major Customers

- Banking Institutions, Telecommunications, ISPs

Major Projects

- **Advanced analytical & reporting** infrastructure
- **Campaign Management** system; Campaign optimization through data mining
- Data Mining Modeling for **Retention, Up/Cross-selling**
- **Executive Reporting, Dashboards, Churn modeling** and data analysis

What is Social Network Analysis ?

- **Networked Age** everybody is talking about networks of (*people, computers, communication, economy, experts, supply, knowledge*)
- Network means **objects and their relations** (*biological, cooperation, membership*)
- Moving from **object centric analysis to the network** (*that is relations of the object and new properties they add to it*)
- SNA focuses on People and their relations
- Tools that focus on:
 - Measuring properties of the Networks
 - Visualizing Networks
 - Simulating Networks

How it came to be

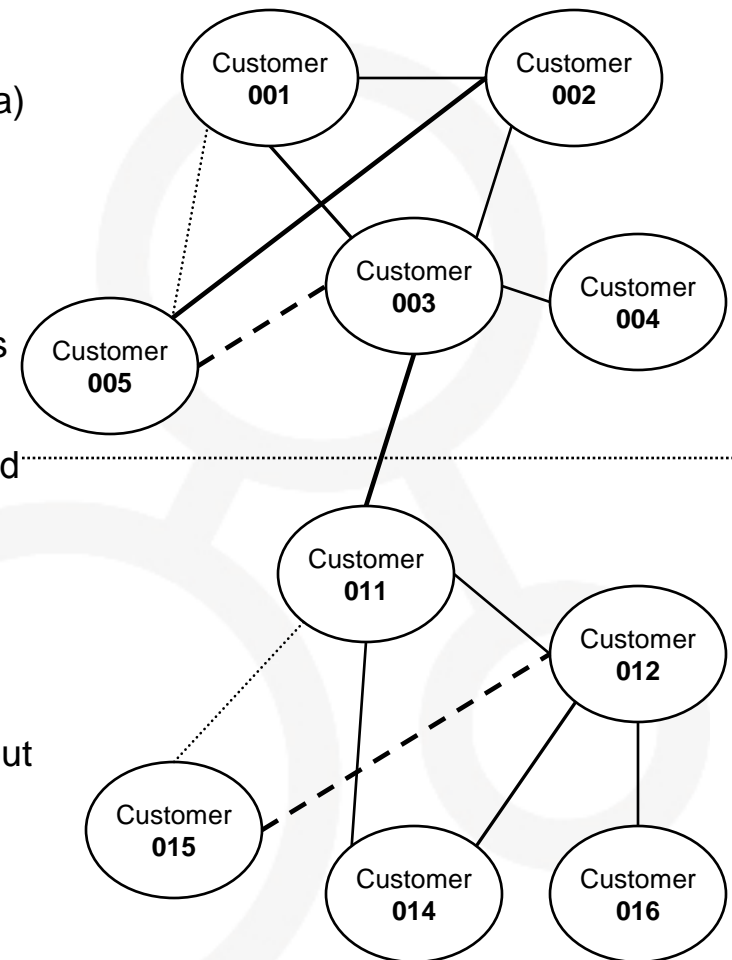
SNA history

- First independent publications ~1935 U.S. (*studied relations among companies and growth of rural areas based on social network properties*)
- Scientists tried to model the world as different networks of nodes and properties and found similar statistical distributions in a multitude of domains
- Psychologists showed interest
- Milgram (1967) — Six degrees of separation theory
- Watts and Strogatz reenacted interest.
- Many research groups analyzing networks
- Last 10 years industry actively using it as a tool

Social Network Analysis

Techniques and Algorithms aiming in the identification of **structure within a set of customers** based on the strength, frequency and type of interactions (traffic data)

- Understand **Customer base dynamics**, monitor the evolutions of key SNA metrics
- Quantitative figures of **customer importance** in terms of 'connections' and their (expected) value
- How many '**cliques**' are there in the customer base and what is the profile of the customers involved
- **Customer base analysis**, such as distribution of customers according to SNA figures, specialized segmentation schemes
- **Churn modelling redefined using** additional SNA input
- **Campaign management optimization**
- **Fraud detection, Bad debt behaviour**, identification and prediction



Overview of Techniques

- **Measurement**
 - Graph based algorithms
 - Exact data to extract mathematical models from
 - Exploit data and measurements
- **Visualization** affected from measurements (*valuable tool to represent social world and reduce complexity of tabular data*)
- **Simulations** (*add remove nodes/properties and simulate activity*)
- The Quality of the Analysis depends **heavily** on data quality/availability.
- Nodes need not only be customers !

Typical Applications

- Group detection
- Reputation / Disease spread
- Identify (existing/developing) key players
- Monitor node integration in the network
- Understanding of customer behavior
- Urban planning
- Network development (for telcos)
- Service usage correlates heavily with network structure
- Web Analytics

Applications: Churn management

Customer Assessment, Churn management, Customer Satisfaction & Loyalty

- Customer assessment procedures must be enhanced with information representing **customer's network value** – *instead of customer's lifecycle value or expected value, network value must be taken into consideration!*
- Assuming a customer – influencer (e.g. central member of a clique) cancels *it is highly probable that other members will cancel as well.*
- SNA technology firstly enables *measuring* and *analyzing* such phenomena and secondly adjusting current policies and procedures in order to act proactively

Applications: Campaign optimization

Campaign optimization, Target group definition, performance assessment

- SNA metrics allow identification and selection of **strong influencers** that are expected to *share – diffuse information* (i.e. a positive customer experience) to their network (through *word-of-mouth*).
- Customer intelligence which enables accurate customer selection, cost minimization with maximum results within a fully controlled and measurable environment.
- Diffuse messages, promotion and relevant material, and monitor SNA on your actual data (e.g. *free access to a telecommunication service for opinion leaders, with the capability to invite other members*)

Applications: **Fraud detection**

Fraud detection & management

- Fraud and bad payment behaviours are highly related to certain clusters of customers, usually forming well-defined groups or cliques
- **Credit Risk & fraud management** (and prediction) systems can significantly benefit from SNA modelling
- New customers with similar behaviours, all members of the same network or clique with some fraud incidents in place, may require *special attention or treatment*.
- An alerting engine could be used in order to trigger SNA checks upon each new fraud case identification or 'watch-list' new entry event.

Applications: **Customer base dynamics**

Customer base dynamics

- Customer base analysis & monitoring from a static view to a dynamic perspective
- New dimensions and metrics for measuring and analyzing each single customer, segments of customers and also your complete customer base (against time dimension).
- **Additional KPIs** and relevant Dashboards can be defined
- Alternative **segmentation schemes**
- Specialized reporting and analysis studies
- OLAP cubes and Analytical applications

Social Network Analysis: **Generated metrics**

Customer information Enrichment

multidimensional structure representing the **sociomatrix** as well as methods for direct access for **SNA** statistics retrieval:

For **any given customer** a large set of SNA statistics can be available including:

- The *number of customers connected group by channel type and or density*
- The *number of customers connected group by provider*
- The *'quality' of the 'network' – clique of the customer (suitable averages, risk score, fraud incidents frequency)*
- *Trends on the network 'positioning' of the customer*
- *Relative figures within the customer base (rankings and scores)*

For **any given pair of customers** the system provides:

- *The degree, closeness of connection if any, The strength of connection, The length of connection and other statistics that describe the relationship between the customers*

Roadmap

Initial data examination aims in obtaining an overall, high level picture of the data scheme. This phase also targets in an optimal configuration/ preparation of the data environment.

Data preparation and preliminary analysis targets in producing suitable metadata and also in generating a series of descriptive statistics. This phase also includes analysis in order to identify *noisy data* and adjust suitably.

Multidimensional modelling The most significant part of the process is the compilation of the **sociomatrix**, a special multidimensional data structure that holds the actual relations among customers through a set of measures and statistics on traffic information.

SNA metrics computation Special metrics computed against preprocessed information available through the sociomatrix.

Data analysis / Customer Base, interpretation / Validation Involves data analysis techniques against the SNA-enriched customer dataset and targets mostly on validation and interpretation of the results.

Questions

Any Comments – Questions ?



Thank you for your attention!



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