Introduction to Social Network Analysis

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ABSTRACT

Online communities and social software are revolutionizing the way we interact with the web. Analysing the interactions that take place there is complex. Social Network Analysis (SNA) is a powerful way of doing such analysis. This tutorial provides a detailed introduction to SNA. The theory is backed up with a number of practical case studies.

Categories and Subject Descriptors

H4.3. Information System Applications: Communication Applications; K4.2. Computers and society: Social issues

General Terms

Design, Experimentation, Theory.

Keywords

Social Network Analysis, Online Communities, Online Research Methodologies

1. Motivation

Social network theory views a network as a group of actors who are connected by a set of relationships. Social networks develop when actors meet and form some kind of relation between each other. These can be of an informal as well as of a formal nature. Hereby actors are often people, but can also be nations, organizations, objects etc. Social Network Analysis (SNA) focuses on patterns of relations between these actors. It seeks to describe networks of relations as fully as possible. This includes teasing out the prominent patterns in such networks, tracing the flow of information through them, and discovering what effects these relations and networks have on people and organizations. It can therefore be used to study network patterns of organizations, ideas, and people that connected via various means in an online environment. Figure 1 shows an example of SNA visualization (sociogram).

Although social network analysis could be extensively used to analyze current topics of interest in the area of HCI, e.g. human-human interactions in online communities or the connectivity of organizations on the internet, unfortunately this is very rarely used. We believe that this tutorial at HCI 2007 would be a valuable contribution to the HCI community as it will make the topic more widely known to HCI researchers and practitioners who will find it of use.

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Figure 1: An example of an SNA sociogram

2. Benefit

This tutorial provides an overview of this analytic technique and demonstrates how it can be used in HCI (especially Computer Mediated Communication and CSCW) research and practise. This topic becomes even more important these days with the increasing popularity of social networking websites (e.g. youtube, myspace, MMORPGs etc.) and the research interest in studying them. As people increasingly use online communities for social interaction, new methods are needed to study these phenomena. SNA is a valuable contribution to HCI research as it gives an opportunity to study the complex patterns of online communication.

3. Learning Outcomes

Upon completion of this Full-day tutorial, participants should:

- Be able to understand the basics of social network analysis, its terminology and background (part 1)
- Be able to transform communication data to network data (part 1)
- Know practically how social network analysis (SNA) can be applied to HCI (especially CMC) analysis (part 2)
- Understand the different possible presentations of social networks (e.g in a matrix or a sociogram)
- Get familiar with the use of standard SNA tools and software (part 2)
- Be able to derive practical and useful information through SNA analysis that would help design an innovative and successful online community. (part 2)

- Part 1 will be delivered in the morning and part 2 in the afternoon.

4. Content

This is a full day tutorial and its content is divided into two parts, each of which is structured in small groups to maximize the interaction among participants.

In the first part, we participants will be exposed to the introduction of SNA and online research methodologies, get familiar with the terminology and definitions of SNA. Additionally to the presentation of lecture material, small informal exercises and discussion will be held in order to encourage interaction. This will include:

- Introduction to Online Research Methodologies
- Introduction into the components and characteristics of social networks
- Information about relational data that is used for SNA along with the different ways that the data can be presented
- Presentation of the different measurements of network characteristics within SNA
- Discussion of different approaches towards SNA

The second part will address the practical uses of SNA. Through a series of interactive exercises, a number of case studies will be demonstrated and discussed. Case studies will be draw from diverse areas (e.g. use of SNA to study age differences in CMC, use of SNA in universal design and research). Ways of using SNA to study new forms of CMC such as MMORPGs, Wikis, blogs etc. will also be discussed.

Furthermore, exercises will take part to encourage the participants to think about the application of SNA in their work or research area. As SNA is a flexible method that can be applied in different ways, we think it is important to create space in the tutorial for discussing and elaborating on the possibilities of SNA to the research or working areas of the participants. This will be further supported through demonstrations of popular SNA tools (e.g. netminer, pajek)

5. Target Audience

We welcome practitioners and academics interested in computer mediated communication, universal design, especially researchers and practitioners who are interested in

domains that social network analysis can be applied. As the tutorial will be introductory, no background knowledge about Social Network Analysis or statistics is required.

Figure 2: A characteristic SNA centrality diagram

6. Past Delivery of this Tutorial

A similar tutorial has been accepted at HCII 2007 and will be delivered this summer in China. The content of the tutorial is also delivered as part of two lectures of the Inclusive Design module of the Human-Centred Systems course we have at City University. The presenters of this tutorial have published extensively in this area including a paper in TOCHI on SNA, a full paper at CHI 2007 on empathic online communities, a chapter on online communities in the HCI handbook (by Sears and Jacko), two special issues on computer games and HCI (with strong emphasis on communities around computer games). In addition the authors are currently editing a special issue of the ACM Transactions on Accessible Computing (TACCESS) on online communities for people with disabilities.