Chapter 6
Use of Social Network Analysis in Telecommunication Domain

Sushruta Mishra
KIIT University, India

Hrudaya Kumar Tripathy
KIIT University, India

Brojo Kishore Mishra
C. V. Raman College of Engineering, India

Monalisa Mishra
C. V. Raman College of Engineering, India

Bijayalaxmi Panda
BPUT Rourkela, India

ABSTRACT

Social network analysis (SNA) is the analysis of social communication through network and graph theory. In our chapter the application of SNA has been explored in telecommunication domain. Telecom data consist of Customer data and Call Detail Data (CDR). The proposed work, considers the attributes of call detail data and customer data as different relationship types to model our Multi-relational Telecommunication social network. Typical work on social network analysis includes the discovery of group of customers who shares similar properties. A new challenge is the mining of hidden communities on such heterogeneous social networks, to group the customers as churners and non-churners in Telecommunication social network. After the analysis of the available data we constructed a Weights Multi-relational Social Network, in which each relation carry a different weight, representing how close two customers are with one another. The centrality measures depict the intensity of the customer closeness, hence we can determine the customer who influence the other customer to churn.

INTRODUCTION

The process of defining social communication by the help of network and graph theory is known as Social Network Analysis (SNA).(Otte et al, 2002). The network structure is characterized in terms of actors, people or things associated by ties or links. Social network analysis is described by different social media networks, collaboration graphs, kinship. (Pinheiro, 2011; D'Andrea et al 2009). The representation of network is done through a diagram called sociograms where nodes are represented as points and links as lines. A social network can be established between person, groups or organizations. It indicates the ways in which they are connected through various social familiarities ranging from casual acquaintance to close familiar bonds (Hanneman and Riddle, 2005). Different scenarios can be modeled in social networks such as email traffic, disease transmission, criminal activity etc. The co-ordination and flow between people, groups, organizations, or other resources information sharing is analyzed by Social network analysis. People in the network represented as nodes and groups, while the links show relationships or flows between the nodes. A mathematical or graphical analysis of human relationship can be established by Social network analysis. This method is also used as Organizational Network Analysis by Management consultants for business clients. Social structure of the organization is described by groupings. As a whole the behavior of the network is explained by number, size, and connections between sub-groupings in a network. (Hanneman and Riddle, 2005). Some of thefeatures of sub-group structure can define the behavior of the networkby solving following questions. How fast will things move across the actors in the network? Will conflicts most likely involve multiple groups, or two factions? To what extent do the sub-groups and social structures overlap one another? The basic approaches for collecting data are questionnaires, interviews, observations, and some other secondary sources. (Breiger 2004).

A sample example of SNA is represented in Figure 1. Social network research understands individuals within their social context, acknowledging the influence of relationships with others on one's behavior. Hence, social networks can promote innovation processes and expand opportunities for learning. Despite the consensus regarding the value of social network approaches, there is a lack of empirical investigations in innovation and futures studies that use Social Network Analysis (SNA). In most cases, the scientific literature uses the concept of social networks metaphorically, ignoring the chances presented by SNA methods. At the same time, conventional empirical research in innovation and futures studies often disregards relational information. Hence, analyses of statistical data on structural and individual levels are treated as separately. Activities that are expected to have impacts on

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