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Personal Sharing in Small Groups-A Case Study

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Abstract

In this paper we discuss the concept of reciprocity in social network. The concept taken for the study is personal sharing among students of second year post graduate programme in two different Universities in India. The data collected is represented as a directed graph in which an arc from one vertex to another vertex represents the existence of personal sharing between the corresponding students. An analysis of these directed graphs is carried out and influential actors in the network are identified. Further the pattern of personal sharing between male and female students reveals a substantial difference of behaviour between the two Universities.

1. Introduction

Reciprocity refers to responding to a positive action with another positive action and it creates, maintains and strengthens various social bonds. It is the foundation of social order and is a major key to success. This applies not only in social networking but also in all rounds of human activities.

The potential for reciprocal actions by players increases the rate of contribution to the public good and reciprocity is a form of social obligation and is a motivation for returning favors from others. Reciprocity was studied and evaluated from the beginning of SNA in the 1930's. A measure of reciprocity is a number which gives the extent to which support is both given and received in a relationship.

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In this paper we discuss the concept of reciprocity in directed graphs. The concept of reciprocity in social networks and marital networks, which were constructed using the data collected from the households of a village in West Bengal in India was investigated in (Rao, 1995). Several measures of reciprocity are given in (Rao and Bandobadyay. Rao 1987). Several methods for standardizing the number of reciprocal pairs in a network, so that the resulting reciprocity measure can be used for comparing the reciprocities of two different social networks are given in (Rao 1997). Reciprocity refers to the presence of the arc (i, j) when (j, i) is an arc. If (i, j) is an arc and (j, i) is not, we may call (i, j) a one way or unreciprocated arc and such arcs usually represent hierarchical or patron-client relationships, whereas reciprocated arcs indicate some sort of balance. For example, the social network of a village determined by help relation, where the vertices are the households and an arc joins i and j if i goes to j for help at times of crisis gives a directed graph. If the frequency of help is also taken into account we get a weighted directed graph where the weight of the arc (i, j) represents the number of times i goes to j for help during a fixed period of investigation.

2. Reciprocity in Social Networks - A Case Study of a Small Network

We now illustrate the concept of reciprocity with the directed graph given in Figure 2.1, which represents the social network constructed using a set of data collected from 30 students of a post-graduate class of Kalasalingam University in India.

A part of this work has been presented in (Arumugam and Vasanthi, 2011). When the data were collected from students, they had already spent one year together and hence all of them knew each other very well. Each student was asked to provide the list of students in the class with whom he/she shares his/her personal problems and the same were crosschecked for validation. Since sharing of personal problems is not a symmetric relation, the above data gives a directed graph $D = (V, A)$ where the vertex set V is the set of 30 students and (u, v) is an arc in A if u shares his personal problem with v. The resulting directed graph is given in Figure~2.1.
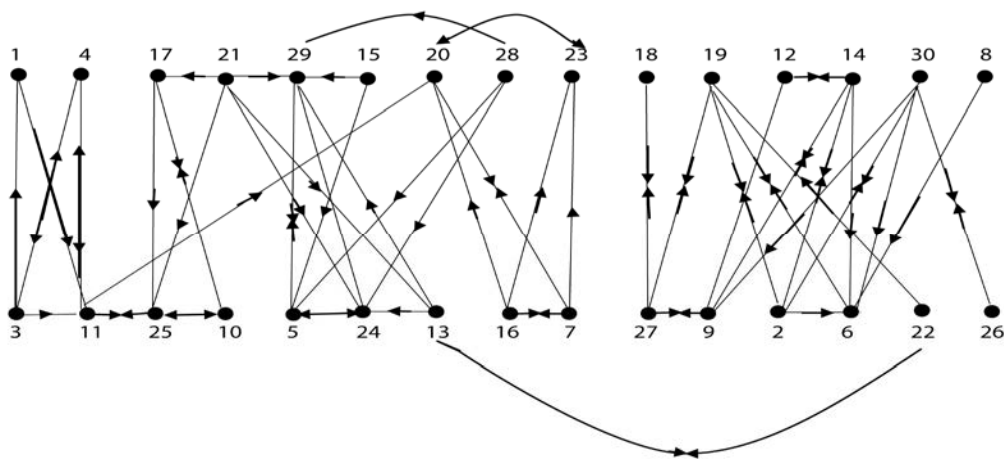

Figure 2.1 Directed graph based on data of personal sharing.

The number of arcs in the directed graph is 71 and the number of reciprocal pairs of arcs is 22. Since the maximum number of arcs in a directed graph on 30 vertices is 30×29 = 870, the density of the directed graph is 71/870 = 0.0815.