Modeling Happiness and Discomfort in the Social Space: Graphical Models and their Application in Network Analysis

Angela Bohn and Wilhelm Geiger

May 19, 2010

Abstract

Graphical models use graph theoretical concepts to examine the conditional dependence relationships between variables. Thereby, variables are represented as nodes and edges connecting nodes indicate that they are dependent. By decomposing the resulting graph into subgroups, the association between different groups of variables can be understood more easily and the estimation of the model can be computed more efficiently.

Network analysts have discovered the concept when they were looking for a way to model edge dependencies in social networks. Subnetworks of size tree (triads) are simple but yet informative elements of the original graph, as they reveal powerful positions as well as uncomfortable constallations (structural balance theory). Being able to capture these triads, exponential random graph models based on graphical models are now one of the most widely used methods to explain the characteristics of networks.