Public Abstract

First Name:Michaela

Middle Name:Marie

Last Name:Hoffman

Adviser's First Name:Doug

Adviser's Last Name:Steinley

Co-Adviser's First Name:

Co-Adviser's Last Name:

Graduation Term:SP 2016

Department:Psychology

Degree:PhD

Title:Applications of Network Analysis in Psychology

Methods and applications for network analysis can be found in a variety fields from computer science and machine learning to sociology and political science. Here I describe some methodological issues and propositions for the network analysis of data, especially in the field of psychology.

Chapters one and two focus on the task of community detection, where the goal is to identify meaningful subgroups of highly connected individuals within a network, particularly in the smaller sized network data sets of the social sciences. Chapter one describes current methodology and proposes a new community detection algorithm. This method is based on the Cohen's kappa similarity measure reflecting how alike two observations are in terms of their connections in the network. Through a simulation and a demonstration on real network data, this method is shown to outperform current methodology. The second chapter extends the use of the Cohen's kappa measure for community detection as a way to determine if the data exhibits community structure.

Chapter three looks at a specific application of network analysis in psychology: creating networks of diagnostic criteria from survey data. The methodology discussed in this paper begins with the criteria as binary variables, indicating whether each subject in the data exhibits each criterion or not. From this data networks are constructed where the criteria make up the vertices, and the edges are estimated from their concurrence in the subjects. This study provides a cautionary remark for the use of this methodology on large data sets, as the estimates of similarity between variables might be inflated by the presence of large numbers of observations who exhibit none of the criteria.