Network Analysis: An Introduction (One-week Workshop)
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Course Description

Network analysis focuses on relationships between social entities. It is used widely in the
social and behavioral sciences, as well as in political science, economics, organizational science,
and industrial engineering. The social network perspective, which will be taught in this
workshop, has been developed over the last sixty years by researchers in psychology, sociology,
and anthropology. The social network paradigm is gaining recognition and standing in the
general social and behavioral science communities as the theoretical basis for examining social
structures. This basis has been clearly defined by many theorists, and the paradigm convincingly
applied to important substantive problems. However, the paradigm requires a new and different
set of concepts and analytic tools, beyond those provided by standard quantitative (particularly,
statistical) methods.

This five-day workshop covers precisely those concepts and tools. The course will
present an introduction to various concepts, methods, and applications of social network analysis
drawn from the social and behavioral sciences. The primary focus of these methods is the
analysis of relational data measured on groups of social actors. Topics to be discussed include an
introduction to graph theory and the use of directed graphs to study structural theories of actor
interrelations; structural and locational properties of actors, such as centrality, prestige, and
prominence; subgroups and cliques; equivalence of actors, including structural equivalence,
blockmodels, and an introduction to role algebras; an introduction to local analyses, including
dyadic and triad analysis; and statistical global analyses, using models such as p1, p*, and their
relatives. The workshop will also cover more specific applications in common software packages
for network analysis: UCINET, Pajek, STOCNET, and pnet.

Prerequisites for this workshop are familiarity with matrix algebra. A background
in linear models and categorical data analysis will be helpful, but not required.
Schedule
The workshop will meet for about seven hours each day at University of Michigan, according to the following schedule:

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>Morning</td>
<td>Lecture</td>
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<tr>
<td>Early afternoon</td>
<td>Computing and Data Analysis (with Ann)</td>
</tr>
<tr>
<td>Late afternoon</td>
<td>Questions and Discussion</td>
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Course texts
There are two particularly helpful texts for this class. The Wasserman & Faust text will be primary.


Additionally, you may find the following texts helpful:


Topics to be taught and the relevant chapters from Wasserman and Faust are:

- Chapter 1: Introduction
- Chapter 2: Social Network Data: Collection and Applications
- Chapter 3: Notation for Social Network Data
- Chapter 4: Graphs and Matrices
- Chapter 5: Centrality, Prestige, Prominence, and Related Concepts
Chapter 7: Cohesive Subgroups
Chapter 9: Structural Equivalence
Chapter 10: Blockmodels
Chapter 13: Dyads

There will also be some readings from Carrington, et al.

Please review chapters 1-3 before you arrive in Ann Arbor.

Computer Programs

We will be using a number of different social network analysis computer programs. All of these are available in the computer labs. All but UCINET are freely available on the web.

UCINET, available in computer labs and for purchase from Analytic Technologies: http://www.analytictech.com

Pajek: http://vlado.fmf.uni-lj.si/pub/networks/pajek/default.htm

Netdraw, comes with the UCINET package or individually at: http://www.analytictech.com

STOCNET: http://stat.gamma.rug.nl/stocnet/ (see also http://stat.gamma.rug.nl/snijders/siena.html)


Network Workbench: http://nwb.slis.indiana.edu/download.html

Other Resources

These are some particularly useful resources on social networks available online.

The International Network for Social Network Analysis (INSNA) is the international and interdisciplinary professional association for people interested in social network research. Its website (http://insna.org) is a wonderful source of information and resources on social networks, including links to many informative sites and to social network computer programs and data.

Complexity and Social Networks Blog (http://www.iq.harvard.edu/blog/netgov/) is a new “online journal” devoted to network analysis.

The listserv, SOCNET, is the main on-line forum for discussion of current topics on social networks. Information on how to join is available through the INSNA site (see above) or at: http://insna.org/INSNA/socnet.html
Connections is INSNA’s newsletter/informal journal. It is available through the INSNA website or directly at: http://insna.org/indexConnect.html

Journal of Social Structure is an peer-reviews online journal with many articles of interest to social network researchers. http://www.cmu.edu/joss/

Steve Borgatti’s web page is a nice source of introductory material and handouts on various topics on social networks. http://www.analytictech.com/networks/

Data examples from Wasserman and Faust are available at the INSNA website.