IDS 564: Dr. Ali Tafti, Spring 2016

Advanced Lab 1: Visualizing the dynamic network of corporate acquisitions at the industry level

This is a dynamic network of acquisitions between industries. In this lab, you will import the dataset "MergerNet_Jan9_2016.csv" into Gephi, and set it up as a dynamic directed network. Every row represents an edge list corresponding to acquisition activity between two industries in a given year. The industries are given at the three-digit NAICS level, and you can find more about them here: http://www.census.gov/eos/www/naics/

Consider the first row of the dataset:

year	Source	Target	numberacquisitions
2000	522	525	25

This row example above shows that in the year 2000, there were 25 instances in which a firm in industry 522 (Credit and Intermediation) acquired a firm in industry 525 (Funds, Trusts, and Other Financial Vehicles).

Here is a useful tutorial for importing dynamic data into Gephi:
http://www.clementlevallois.net/gephi/tuto/gephi_tutorial_dynamics.pdf

You can find more information about importing dynamic networks in Gephi here:
https://github.com/gephi/gephi/wiki/Import-Dynamic-Data.

Let me suggest a few things for your visualization.

1) Follow the steps in the section entitled "Tranform existing column in Time Interval" in this tutorial web page: https://github.com/gephi/gephi/wiki/Import-Dynamic-Data. I believe much of the other information on this page can be safely ignored for the purpose of this exercise.
2) Remember to enable the timeline in the Overview window.
3) Before importing the .csv file, add another column that transforms the edge weights by using the natural logarithm function. This reduces the skewed distribution and might make the edges easier to see in the network graph. Try this formula as another column in the Excel, ln(numberacquisitions + 1), to ensure that weights are positive.
4) In Gephi, in the Data Table screen, copy the values of the log transformed numberacquisitions column to the Weight column, in order to show the corresponding edge weights in the diagram.

Using your visualizations, please describe how the network configurations of industries change over time. Provide any observations of interest. Which industries become more central over time, and which become less central? You can look up some of the industries based on 3-digit NAICS codes, using the Census government website provided above. How has the community structure of industries changed over time, as some industries move together and others move apart? Write a brief report (3 pages of text, or less), plus any accompanying network diagrams, to describe the evolution of the acquisition network over time. Describe any observations that can help us understand the evolution of this network.

Please submit a PDF document with your visualizations and analysis, as well as your final .gephi file.

You can find an example of a working research paper that uses this data, in the Blackboard Resources folder: "Proximity to software and labor inequality: Examining the industry-level network of corporate acquisitions," by Ali Tafti, Pouya Rahmati, and J. Christopher Westland (2015).