CSC 641 Network Science, Fall 2015
Instructor: Dr. Natarajan Meghanathan

Project 1: Analysis of a Facebook Network and a Classical Network (using Gephi)

Due: November 9, 2015

In this project, you will primarily use the Gephi tool to analyze and visualize networks. Gephi is a complete stand-alone application (available at: http://gephi.github.io/) that you can download and install on your computer. You will analyze two networks: Your Facebook network of friends and a classical network (assigned to each of you) that has been commonly used for research in Network Science.

Facebook network analysis: As illustrated in one of my demo videos, go to your Facebook account, use netvizz to download your connections as a GDF file. Load the GDF file in Gephi and analyze it as demonstrated in the demo video.

Classical network analysis: The following networks are assigned for each student. If you get the .gml files for your network, you could directly load them to Gephi and analyze. If you get the topology information as nodes and edges, copy and paste them appropriately in Excel, delete the unnecessary columns; insert the required columns titles and save them as .csv files (look at the demo videos for how I do these). Then, go to the Data laboratory of your project in Gephi, upload the nodes and edges .csv files, visualize and analyze the networks.

Data for a majority of the networks assigned in this project are available at: http://www-personal.umich.edu/~mejn/netdata/

Student name   Network assigned
Karthik Reddy - Word adjacencies
Anirudh Reddy - Dolphins' Social Network in NZ
Yashwanth Divanji - Books about US Politics

Network Metrics: For each of the above two network analysis, you will determine the following and show the appropriate visualization:
(1) Degree distribution (node degree vs. probability of node degree) and a plot of the same in Excel
(2) A suitable network layout depicting the tradeoff and/or correlation between node degree and local cluster coefficient
(3) A suitable network layout depicting the tradeoff and/or correlation between the authority scores and the PageRank values
(4) A suitable network layout depicting the tradeoff and/or correlation between Closeness Centrality and Betweeness Centrality values
(5) A suitable network layout depicting the tradeoff and/or correlation between the Hub and Authority scores.
(6) A suitable network layout depicting the different communities of nodes in your network and the Eigenvector Centrality values of the nodes.
(7) What is your average path length, network diameter and modularity score?

Submission:
Report and discussion: Compile a report for the network metrics evaluated for your Facebook network and the classical network assigned to you. Include screenshots for all the figures and layouts.
Video(s): Record video(s) demonstrating your analysis of the Facebook network and the classical network. If the demonstration runs for a longer time, you could record separate videos (one for each of the two networks) and upload them to Googledrive sent to my email address: natarajan.meghanathan@jsums.edu.