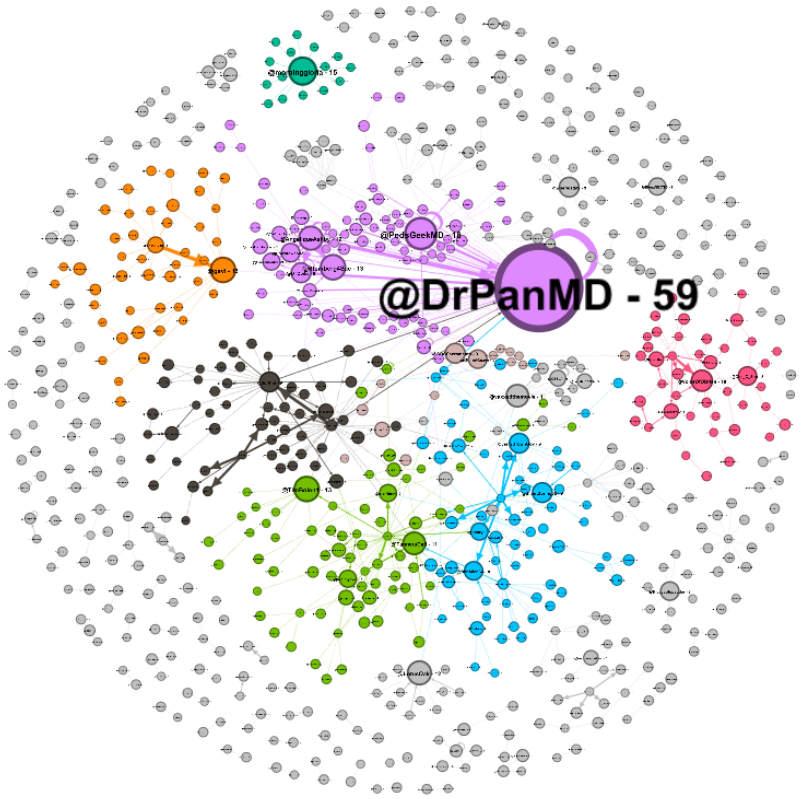
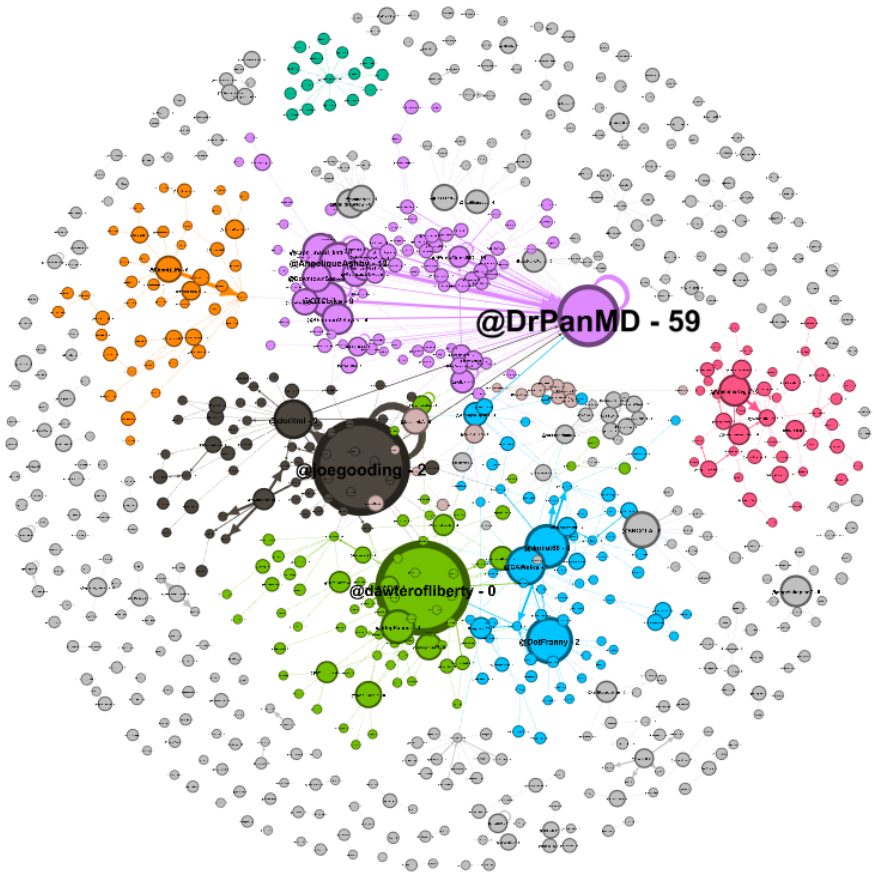
GEOG 594: Lab 6: Gephi
Submitted by Harshal Sanap
Dated 11/8/2018

1. Display the In-degree network screenshot and the Out-degree network screenshot in Gephi and explain which layout scheme do you select in this exercise.



In Degree Screenshot



Out Degree Screenshot

For this analysis I started with Force Atlas then Fruchterman Reingold layout followed by Yifan Hu proportional. Finally I used the Label adjust layout and I manually dragged few nodes to reach the above diagrams. I also adjusted the label size to suit the visualization.

From the in degree network it can be observed that a lot of people are referring or tagging @DrPanMD thereby making it the biggest node in the indegree network. He/She seems to be popular among the twitter users as s/he is getting tagged the most.

From the out degree network we can understand that @DrPanMD is not so frequent on tagging other people in the tweets. However, @Joegooding seems to be the user tagging a lot of individuals in his or her tweets.

2. Explain the meanings of "**Network Diameter**", "**Graph Density**", and "**Modularity**". What are the values of these parameters in the lab06 example network?
Response:

Network Diameter:
It is basically maximum number of connections required to traverse the graph between two of the most farthest or distant nodes in the graph. The graph complexity seems to increase with respect to the increase in size of the graph. In my example the network diameter is 5.

Graph Distance Report

Parameters:

Network Interpretation: directed

Results:

Diameter: 5
Radius: 0
Average Path length: 2.212840571891017

Graph Density:

It refers to the measure of how close the network is to get completed. It refers to the number of connected edges in the graph as compared to number of possible edges. The value of graph density varies between 0 to 1. The most dense graph would have the value 1 whereas the least dense graph would have value closer to 0. My example is relatively sparse as its value is shown to be 0.02

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Graph Density Report

Parameters:

Network Interpretation: directed

Results:

Density: 0.002

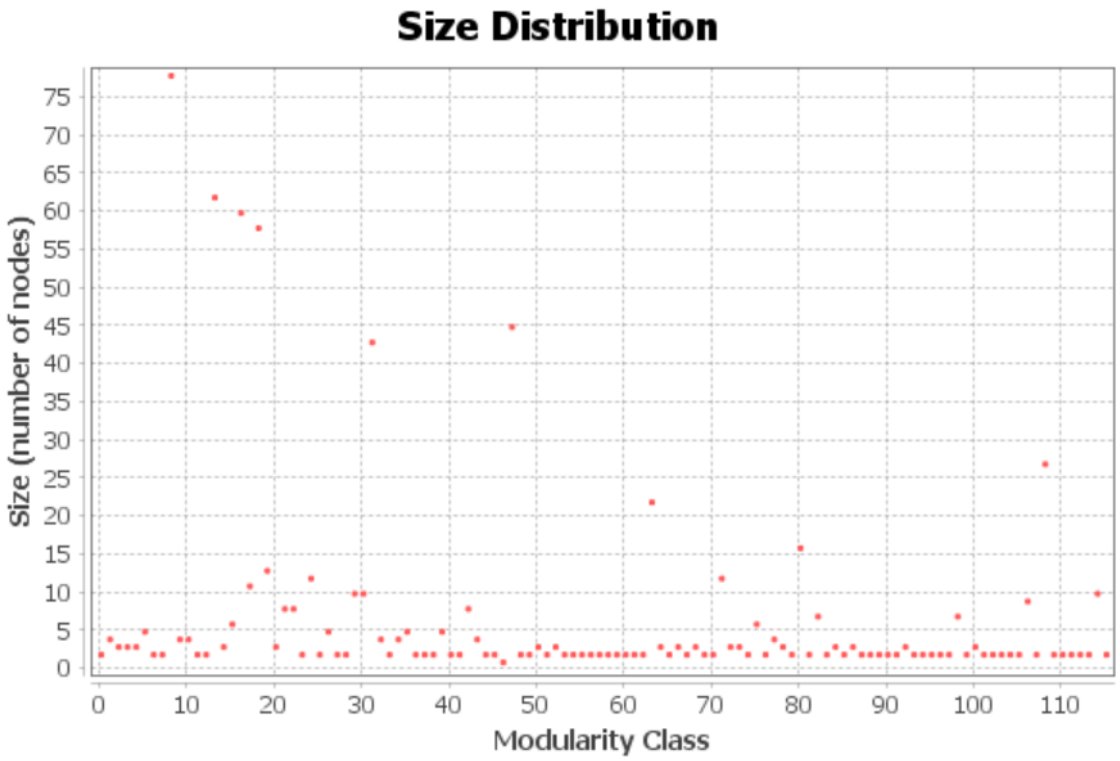
Modularity: It's a measure of network structure, which is used as a tool in the clustering algorithm. It generally refers to how the given data can be divided into modular communities or community structures/clusters. A well defined clustered data is known to have high modularity. My image showed 0.846 modularity which describes my image to be well clustered given good modularity value.

Parameters:

Randomize: On
Use edge weights: On
Resolution: 1.0

Results:

Modularity: 0.846
Modularity with resolution: 0.846
Number of Communities: 116



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Is this example network similar with random networks, or small world networks, or scale-free networks? WHY?

Response:

My network seems to be an example of small world network as the distribution of tweets seems to be following power law distribution as most of the tweet tagging seems to be done by 20% of the population. The random network however is believed to be following normal distribution.

Degree Report

Results:

Average Degree: 1.231