Assignment 2: Hubs and foci

Sociology 204: Social Networks

Due: Wednesday, February 22, 2017

*Please upload your homework to Blackboard.*

1) Given the results of the beta model --- Watts and Strogatz (1998) --- what would you expect to be true of the network of relationships on Facebook? [10 points]

1. clustering coefficient much higher than an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length much higher than an Erdos-Reyni random graph with the same number of nodes and edges
2. clustering coefficient much higher than an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length about the same as an Erdos-Reyni random graph with the same number of nodes and edges
3. clustering coefficient much higher than an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length much lower than an Erdos-Reyni random graph with the same number of nodes and edges
4. clustering coefficient about the same as an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length much higher than an Erdos-Reyni random graph with the same number of nodes and edges
5. clustering coefficient about the same as an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length about the same as an Erdos-Reyni random graph with the same number of nodes and edges
6. clustering coefficient about the same as an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length much lower than an Erdos-Reyni random graph with the same number of nodes and edges
7. clustering coefficient much lower than an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length much higher than an Erdos-Reyni random graph with the same number of nodes and edges
8. clustering coefficient much lower than an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length about the same as an Erdos-Reyni random graph with the same number of nodes and edges
9. clustering coefficient much lower than an Erdos-Reyni graph with the same number of nodes and edges & characteristics path length much lower than an Erdos-Reyni random graph with the same number of nodes and edges

For each of the following distributions, please indicate whether you think it follows a power law or not.

2) Distribution of shoe sizes in the United States [5 points]

power law distribution

Not a power law distribution

3) Distribution of wealth in the United States [5 points]

power law distribution

Not a power law distribution

One important feature of a network is whether it is directed or undirected. For each network, please indicate whether it is directed or undirected.

4) friendships on Facebook [3 points]

Directed

Undirected

5) following on Twitter [3 points]

Directed

Undirected

6) links on Wikipedia [3 points]

Directed

Undirected

7) When studying the needle sharing network among drug users for the purposes of understanding the spread of HIV, does it make more sense to study this network as a directed or undirected network? [5 points]

Directed

Undirected

8) Why? [2 points]

9) What is one question or issue that you would like to discuss in precept? [5 points]

10) What is one way that you think class could be improved? [4 points]

11) Barabasi and colleagues have claimed that most networks have “scale-free” degree distributions. It is the case, for example, that Hartsfield-Jackson Airport in Atlanta had almost 1,000,000 take-offs or landings in 2007. This is certainly thousands of times more flights than smaller airports like Ithaca, NY. But, is the human acquaintanceship network “scale-free”? Do there seem to be similar “hubs”? We will use the data that has already been collected by Facebook to try to decide. [If you don’t have a Facebook account please use a friend’s account.] How many friends do you have on Facebook? [1 point]

12) Now pick 10 of your friends on Facebook who you think have the most friends. How many friends does each of them have? [1 point]

13) Do any of them have twice as many friends as you? [1 point]

Yes

No

14) 10 times as many friends? [1 point]

Yes

No

15) 100 times as many friends? [1 point]

Yes

No

16) What does this suggest about the existence of ``hubs'' in the acquaintanceship networks? [2 points]

17) Now let's look at a different network: Twitter. According to this blog post (http://www.jeffbullas.com/2014/04/16/15-twitter-facts-and-figures-for-2014-you-need-to-know/), the average Twitter user has 208 followers. Assume that this true. Now visit <http://twittercounter.com/pages/100> and see the number of followers for the 10 most popular people on twitter. What does this suggest about whether the Twitter network is scale-free? Use data to support your answer. [5 points]

18) Please read “How to build your network” which was published by Brian Uzzi and Shannon Dunlap in the *Harvard Business Review*. Now you are going to complete an activity modeling on the “How to Map Your Network” activity in the article. However, are going to also add in ideas from Feld (1981), particularly the idea that there are extra-network bases for friendship ties. In particular, Feld defines a focus as a “social, psychological, legal, or physical entity around which joint activities are organized.”

Following the directions of Uzzi and Dunlap, “starting with the left-column on the worksheet, fill in the names of the most important contacts in your network---people you rely on for the exchange of private information, specialized expertise, advice, and creative inspiration.” Please do this for 10 key contacts. Then, complete the other questions about each contact. [40 points]

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| --- | --- | --- | --- |
| Name of contact (first name or initials) | Who introduced you to the contact? | In what foci did you meet this person? | To whom did you introduce the contact? |
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19) What percentage of the time does “me” appear in the second column? (Also, note that I’m not sure where the 65% number that Uzzi and Dunlap cites comes from.) [1 points]

20) Do you think the three principles that Uzzi and Dunlap describe---self-similarity principle, proximity principle, and shared activities principle---make sense when talking about your personal network? Why or why not? [2 points]