CIS 677: Knowledge-Based Interfaces

Designing Social Networks for Human Behavior

QUESTIONS for TEXT Chapter 5

October 14, 2010

Due: Tuesday, October 19 at 10:00am, 200 Deschutes

Answer the following questions with at least a paragraph. Be precise and succinct in your answers. Make two copies: Turn in one copy to Prof. Douglas at beginning of the class; keep the second one for discussion.

1. Suppose that you're working with a group of sociologists who are studying the friendships among students at a boarding school. Students live at this school from the ages of 1 through 18, inclusive, and let's assume that there are students of each of these ages at the school. Simplifying the situation a bit, let's suppose that a strong tie connects each pair of students whose age differs by at most 3 years, and a weak tie connects each pair of students whose age differs by 4 or 5 years. There is no edge in the social network connecting any two students whose age differs by more than 5 years. Suppose this is the information you know about the social network. (See Figure 1.)

![Figure 1](image)

Based on Figure 1 and using NodeXL, do all nodes in the network satisfy the Strong Triadic Closure Property? Possible answers are:

(i) “Yes, all nodes satisfy the Strong Triadic Closure Property.” If this is your answer, explain why all nodes satisfy the property.

(ii) “No, not every node satisfies the Strong Triadic Closure Property” In other words, at least one node in the network violates the Strong Triadic Closure Property. If this is your answer, explain why there is at least one node that violates the property.
(iii) “Not enough information to tell.” If this is your answer, explain why there isn't enough information provided about the network to determine whether all nodes satisfy the property.

I would suggest that you check out the definition of Strong Triadic Closure on Wikipedia <http://en.wikipedia.org/wiki/Triadic_closure>

2. Suppose you're consulting for a large social-networking company, helping them design the part of their system that recommends new friendships to their members (i.e. to the users of the system). The idea is to look at the position of a member X in the overall social network, and try to automatically recommend based on the pattern of links the name of one other user to whom X is not currently connected, but who X might want to connect to. If Y is chosen by the system as the recommendation for X, then X receives a prompt on his/her screen asking if X would like to add Y as a friend. The recommendation is viewed as successful if X accepts the suggestion and adds Y.

You've been attending meetings in which the team in charge of the recommendation system shows the results of the system on various real-life examples, and then you suggest whether you think the system made the right recommendation. In this way, the recommendation team can try identifying deficiencies in their methods.

(a) In one example, the team shows you Figure 2, consisting of the user X and all nodes in the system who are at a distance of either 1 or 2 from X in the social network. In this example, the system recommended user A to X. Do you think this was the best choice? If so, explain why; if not, say what you think would be a better choice, and again explain why. In either case, relate your explanation to principles from class.

![Figure 2](image_url)
(b) Currently the recommendation system is based on looking at small portions of the social network like the one in Figure 2. The recommendation team asks whether you think it would be useful to incorporate other forms of information in deciding which node to recommend to X. (Although the current recommendation system is only using nodes and edges, as in Figure 2, the social-networking system itself is recording all the actions taken by all its users, with time-stamps on all these actions, so there are many sources of information that could potentially be incorporated.) Describe one or more additional sources of information that you think the recommendation system might benefit from looking at, and give an explanation for your answer. Again, try to relate your explanation to principles from class.

(c) Recommendations based on watching a user's actions can never be perfect, and the recommendation team mentions to you an observation they've made over their experience monitoring the system. Their recommendations seem to be particularly effective for new users of the social-networking site -- users who have joined the site only a week or two before receiving the recommendation. On the other hand, recommendations that get made to users who have been on the site for a year or more tend to get rejected much more frequently. Give a possible explanation for this phenomenon (particularly this disparity between the behavior of new users and users who have been on the system for longer).

3. Section 5.4.1 (page 74-75) in the text describes an important concept concerning the number of connections that people tend to have in a social network. Using the Les_Miserables_Example.xlsx data set from the text, plot the data as a power law.