Assignment 3: Social recommendations

Due: Saturday, December 16.

This assignment is the next part of Assignment 2.

Problem 2: Recommend by influence

We will now give a different algorithm for computing a friendship score. Consider the following hypothetical situation.

Two of your friends are A and B. A has only two friends (you and one other person). B has 7 billion friends. A and B have no friends in common (besides you). Since A is highly selective in terms of friendship, and is a friend of yours, you are likely to have a lot in common with A's other friend. On the other hand, Tim is indiscriminate and there is little reason to believe that you should be friendly with any particular one of B's other friends.

Incorporate the above idea into your friend recommendation algorithm. Here is the concrete way that you will do so. We call the technique "influence scoring". Suppose that user1 and user2 have three friends in common: f1, f2, and f3. In Problem 1, the score for user2 as a friend of user1 is 1+1+1: each common friend contributes 1 to the score. In this problem, the score for user2 as a friend of user1 is 1/numfriends(f1) + 1/numfriends(f2) + 1/numfriends(f3), where numfriends(f) is the number of friends that f has. In other words, each friend *F* of user1 has a total influence score of 1 to contribute, and divides it equally among all of *F*'s friends.

In the example above, A's other friend would have a score of 1/2, and each of B's friends would have a score of 1/7000000000.

Similar to Problem 1, write a program that produce suggestions for friends for the above recommendation algorithm. Please explain any assumptions you made. (You may find that their implementations are quite similar to code that you have already written in Problem 2; that is OK.)

Any programming language for your assignment is acceptable.

Send your codes at kostas.stefanidis@uta.fi before December 16, 2017. Some instructions on how to run your codes are necessary.

Also, send the top-4 recommendations for 4 particular users, namely, the users with id: 20341, 33722, 35571 and 25017.

Problem 3: Recommendations for groups

In Problems 1 and 2, we recommend to single users friends (i) by the *number of common friends* and (ii) by *influence*. In this problem, we will focus on producing friends recommendations for a given set of users.

For producing group recommendations, we will follow the *recommendations aggregation* approach. According to it, we will first compute individually for each user in the group recommendations, following both (i) and (ii), and then, we will aggregate the individual lists. For aggregation, we will use 2 methods: (a) the Borda count, and (b) the average approach.

Given as input a particular set of users, i.e., a group, write a program that produce suggestions for friends for this set of users, according to the description above. Please explain any assumptions you made.

Any programming language for your assignment is acceptable.

Send your codes at kostas.stefanidis@uta.fi before December 16, 2017. Some instructions on how to run your codes are necessary.

Also, given that the input group of users consists of the users 20341, 33722, 35571 and 25017, compute the top-5 recommendations, when using the recommendation algorithm (i) and (ii), and when using the aggregation strategy (a), and (b). (I.e., there are 4 different outputs.)