

Users' Relationship Analysis

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Nowadays, many people are actively using social networks services. Usually these social network services are used to share ideas and to communicate with other people. These information about the user's interaction can be useful in various tasks of Web to user improvements (as the recommendation, information filtering etc.)

In our work we aim to analyze data containing information about users and their activities in social network service and propose method, which will set the likelihood of influence between users. In this method we are focusing on to take public action log which contains interactions one user with subnetwork (this subnetwork contains user's neighbors) and find out which other users was reacting to his public activities and find out which users influence other users in the network.

Our method is based on the computing likelihood of influence between two users, from user's statistics evaluation (count of neighbors, count of publications, count his public reactions to others) and as we mentioned mainly his public action log. We are also considering time as one of the part that likelihood depends on. We persuade that as time flows from last made action, the probability of influence will be lower. Other one part that is important in our method is the order of the reactions, which were made for public action. This information provides us create a model of possibilities, by whom could be influenced user in the network [1] (in Figure 1 we can see an example of posting status and next reposting this status in order of action was made, and directed pipes means possible spread of influence in the network).

Subsequently, we are modeling influence flow in the network, what help us to verify, that our proposed method are right, by simulating real event. This event development will be supposed by using our method to evaluate edges in the network, which is used in model to monitor influence range and user activities. There are two options, how we can model the spread of influence. Linear threshold model is the first one model, which we can use to model spread of influence in the network. This model is based on simulating users activation, by adding each user threshold and when sum of user's edges, which are connected to activated neighbors, is greater than user's threshold, user is activated. Second one model is independent cascade model. This

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model is based on evaluating edge probability, which expresses probability that already activated user will activate other user directly connected with evaluated edge. We used both of these models for showing different aspects. First model show us, when user is activated from network view and second model we use, when we want see user activation from user to user view.

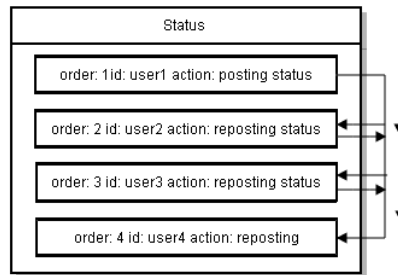


Figure 1. Influence model in public action called "posting status"

Next step is maximizing influence in network by using one of models we already mentioned before. Maximize influence means minimize activated users at the beginning of the simulation and trying to maximize the number of activated users at the end of the simulation. Also we are monitoring, whether activation flow goes through the whole network or stops in step of simulation.

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References

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