

Tracing Strength of Relationships in Social Networks

Ivan SRBA*

Slovak University of Technology
Faculty of Informatics and Information Technologies
Ilkovičova 3, 842 16 Bratislava, Slovakia
srba07@student.fiit.stuba.sk

Nowadays we witness rapid expansion of new generation of services known as the Web 2.0. One kind of these services are social networks where people can arrange and express many types of relationships. The strength of these relationships among users can be really different and can rapidly change in the time. If we know about strong or weak relationship intensity between two users we can provide actions which depend on actual context of deployment. For example we can provide adaptive recommendation. Also the user can control evolution of his or her relationships to friends.

We have proposed a method for analysis of the evolution of user's relationships and its evaluation by means of developed web-based application, which approximates the user's relationships with other users in the time. This approximation is based on varied user's activities performed in social networks. Example of this activity is sending a message or uploading common photography. Such activity we denote as a rate factor. The rate factor can be shared among several *sources* of user's activities (social networks). Meanwhile for each source it can have different importance, which is represented numerically by a *weight*. The weight of rate factor expresses relative influence of the rate factor to the final relationship intensity. Weight for each source and rate factor is assigned experimentally. Examples of rate factors with weights determined according analysis and monitoring of users' behaviors are:

- common photography (positive influence, weight 0.13),
- boyfriend/girlfriend relationship (positive influence, weight 0.95),

Not only weight but also the count of all appearances of the rate factor (not only in relationship of two users who are traced) influences final relationships strength. This fact assures that also the frequency of using the social network has effect to result. Partial relationship intensity depends on time and the duration of influence too. To

* Bachelor degree study program in field: Informatics
Supervisor: Professor Mária Bieliková, Institute of Informatics and Software Engineering,
Faculty of Informatics and Information Technologies STU in Bratislava

include these effects we differentiate rate factors of single activity, interval activity or unbounded activity. All mentioned effects are included in sequence of calculation.

We can use many sources of user's activities to evaluate proposed method. We chose for experiment well known and popular social portal Facebook. We developed web system Intensity Relationship Analyzer & Presenter (see Figure 1) to realize the proposed method. This application uses wrapper to connect to social network Facebook and to data mine rate factors via Facebook API.



Figure 1. Presenting calculated results in Relationship Analyzer & Presenter.

In the experiment we hypothesize three results: first one is that the calculated intensity will describe similar distribution of user interaction among friends as in [1]. Second one is that the calculated intensity will represent similar evolution of relationships in time as it was described in [2]. Finally, third expected result is that the method will calculate relationship intensity for first ten best friends with 80% reliability.

Acknowledgement. This work was partially supported by the Scientific Grant Agency of Slovak Republic, grant No. VG1/0508/09.

References

- [1] Wilson, C., Boe, B., Sala, A.: User interactions in social networks and their implications. In: *Proc. of the 4th ACM European conf. on Computer systems*, Nuremberg (Germany): ACM New York, 2009, pp. 205-218.
- [2] Viswanath, B., Mislove, A., Cha, M., Gummadi, K.P.: On the evolution of user interaction in Facebook, In: *Proc. of the 2nd ACM workshop on Online social networks*, Barcelona (Spain): ACM New York, 2009, pp. 37-42.