Influence-based community detection in social recommender systems

S. Mojde Morshedi *, Hamidreza Mahyar†, Ali Movaghar

Sharif University of Technology, Department of Computer Engineering, Tehran – Iran

Massive increases in the volume and availability of data on the Internet will certainly result in difficulty of finding interesting choices among various options in a reasonable amount of time. Hence, Recommender Systems (RS) have emerged to solve this problem by helping people to find their preferences effortlessly. Classical RSs are not usable in some domains and applications when the recommendation process involves more than a person. Because, prediction of the recommendations list for each individual user is usually difficult, costly, and sometimes impossible. To this end, Group Recommender Systems (GRS) have been presented to satisfy a prodigious amount of group members about recommended items. Moreover, GRSs provide recommendations for a group of users to overcome the problem of cold start and data sparsity in conventional RSs. However, many researches have taken into account the limited number of users as a group and only a list of recommendations is given to all the members.

Today, with the growth of users in social networks and their various interests, the idea of finding different communities of users with similar preferences seems essential. This idea aims to provide the lists of appropriate recommendations for a large number of users for maximizing users’ satisfaction without full knowledge of network topological structure. All the previous studies have restricted to the assumption that the number of groups and hence the lists of recommendations should be predetermined. Although the number of groups in many applications (e.g. digital marketing) is unknown, the main objective is to find the number of optimal groups with the highest level of users’ satisfaction. There is no alternative to find the optimal groups consisting of people with similar preferences in the literature of GRSs.

In this research, we propose a new approach for identifying optimal users’ communities while the only input is a ratings matrix including items’ score evaluated by users, without full knowledge of network topological structure. In this method, formation the groups of similar users is based on detection of influential users in the networks using only the ratings matrix.

Influential measure indicates how important a user is in the users’ similarity graph. After groups formation based on the top-k influential users, we investigate the effect of recommending each item to each group for finding the best recommendation list to maximize the users’ satisfactory of each group based on a new weighted strategy. Performance of the proposed method has been evaluated for four different types of GRSs and six common strategies in a real dataset. The simulation results demonstrate that the proposed

*Speaker
†Corresponding author: hmahyar@ce.sharif.edu
approach has the most accurate recommendations list in comparison with all the related works in the area of GRSs.

**Keywords:** community detection, influential users, group recommender systems