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Detecting community structure in signed and unsigned social networks by using weighted label propagation

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Abstract

Detecting community structure is one of the most important problems in analyzing complex networks such as technological, informational, biological, and social networks and has great importance in understanding the operation and organization of these networks. One of the significant properties of social networks is the communication intensity between the users, which has not received much attention so far. Most of the proposed methods for detecting community structure in social networks have only considered communications between users. In this paper, using MinHash and label propagation, an algorithm called weighted label propagation algorithm (WLPA) has been proposed to detect community structure in signed and unsigned social networks. WLPA takes into account the intensity of communications in addition to the communications. In WLPA, first, the similarity of all adjacent nodes is estimated by using MinHash. Then, each edge is assigned a weight equal to the estimated similarity of its end nodes. The weights assigned to the edges somehow indicate the intensity of communication between users. Finally, the community structure of the network is determined through the weighted label propagation. Experiments on the benchmark networks indicate that WLPA is efficient and effective for detecting community structure in both signed and unsigned social networks.

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