Fast Description-Oriented Community Detection using Subgroup Discovery
(Abstract)

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Abstract

Communities can intuitively be defined as subsets of nodes of a graph with a dense structure. However, for mining such communities usually only structural aspects are taken into account. Typically, no concise and easily interpretable community description is provided. For tackling this issue, we focus on fast description-oriented community detection using subgroup discovery, cf. [1, 2]. In order to provide both structurally valid and interpretable communities we utilize the graph structure as well as additional descriptive features of the contained nodes. A descriptive community pattern built upon these features then describes and identifies a community given by a set of nodes, and vice versa. Essentially, we mine for patterns in the "description space" characterizing interesting sets of nodes in the "graph/community space"; the interestingness of a community is then evaluated by a selectable quality measure.

We aim at identifying communities according to standard community quality measures, while providing characteristic descriptions of the respective communities at the same time. In order to implement an efficient approach, we propose several optimistic estimates of standard community quality functions. Together with the proposed exhaustive branch-and-bound algorithm, these estimates enable fast description-oriented community detection. This is demonstrated in an evaluation using five real-world data sets, obtained from three different social media applications.

References

1. Atzmueller, M., Doerfel, S., Mitzlaff, F.: Description-Oriented Community Detection using Exhaustive Subgroup Discovery. Information Sciences (2015), http://dx.doi.org/10.1016/j.ins.2015.05.008
2. Atzmueller, M., Mitzlaff, F.: Efficient Descriptive Community Mining. In: Proc. 24th International FLAIRS Conference. pp. 459 – 464. AAAI Press, Palo Alto, CA, USA (2011)

This abstract summarizes the paper [1].