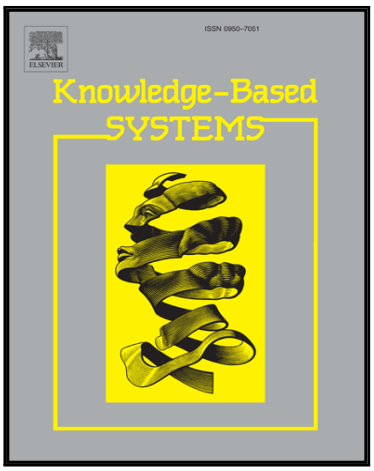

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Tracking the Evolution of Overlapping Communities in Dynamic Social Networks

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Abstract

Overlapping community detection, dynamic community identification and community evolution analysis are the three important problems for social network analysis. It is a challenging task to simultaneously address all these three problems with one single method, thus most traditional studies focus on only one or two of them. This paper proposes a novel Dynamic Overlapping Community Evolution Tracking (DOCET) method to solve the three problems simultaneously with one single model, i.e. topology potential field. Specifically, the proposed DOCET method first detects the initial overlapping community structure based on node location analysis in the peak-valley structure of the topology potential field; then it incrementally updates the dynamic community structure based on influence scope analysis in the topology potential field; finally it tracks community evolution events based on the variation of core nodes in the topology potential field. Experiment results on both synthetic and real-world networks show that our proposed method achieves remarkable performance over the existing state-of-the-art methods. It can both accurately partition dynamic overlapping social networks and efficiently track all kinds of community evolution events.

Keywords: Social network, Overlapping community, Community evolution,

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