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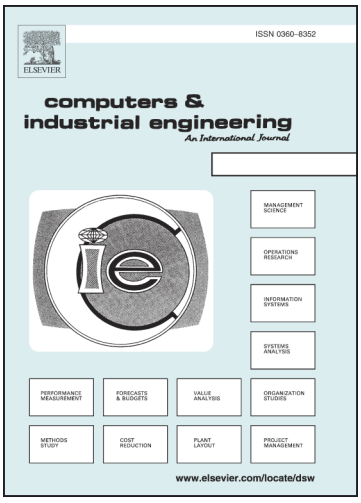

A hybrid algorithm based on community detection and multi attribute decision making for influence maximization

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A hybrid algorithm based on community detection and multi attribute decision making for influence maximization

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Abstract

Influence maximization problem is trying to identify a set of *K* nodes by which the spread of influence, diseases or information is maximized. The optimization of influence by finding such a set is *NP-hard* problem and a key issue in analyzing complex networks. In this paper, a new greedy and hybrid approach based on a community detection algorithm and an MADM technique (TOPSIS) is proposed to cope with the problem, called, 'Greedy TOPSIS and Community-Based' (GTaCB) algorithm. The paper concisely introduces community detection and TOPSIS technique, then it presents the pseudo-code of the proposed algorithm. Afterwards, it compares the performance of the solution which found by GTaCB with some well-known greedy algorithms, based on *Degree Centrality*, *Closeness Centrality*, *Betweenness Centrality*, *PageRank* as well as TOPSIS, from two aspects: diffusion quality and diffusion speed. In order to evaluate the performance of GTaCB, computational experiments on eight different types of real-world networks are provided. The tests are conducted via one of the renowned epidemic diffusion models, namely, Susceptible-Infected-Recovered (SIR) model. The simulations exhibit that in most of the cases the proposed algorithm significantly outperforms the others, chiefly as number of initial nodes or probability of infection increases.

Keywords: Influence Maximization; Social Network Analysis; Community Detection; SIR model

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