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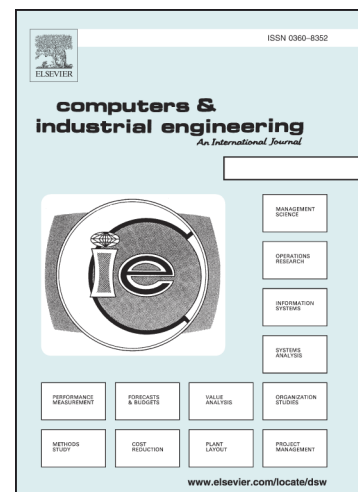
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# A hybrid algorithm based on community detection and multi attribute decision making for influence maximization

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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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