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## Efficient Method for Identifying Influential Vertices in Dynamic Networks Using the Strategy of Local Detection and Updating

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### Abstract

The identification of influential vertices in complex networks can facilitate understanding and prediction of the behaviour of real systems. In this paper, we propose an efficient method for identifying influential vertices in dynamic networks by exploiting the strategy of local detection and updating. The essential strategy of the proposed local detection and updating method is to locally detect the altered vertices in dynamic networks and locally update the influence metrics of the altered vertices, without the need to globally calculate the influence of all vertices. To evaluate the computational efficiency of the proposed local detection and updating method, we design 15 groups of experimental tests for three types of complex networks (the Barabási-Albert (BA) scale-free network, the Watts-Strogatz (WS) small-world network, and the Erdős-Rényi (ER) random network). Experimental results demonstrate that: (1) the sequential version of the proposed method is approximately 3 times faster than the global calculation method for the small-world networks and random networks; (2) the parallel version of the proposed method,

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