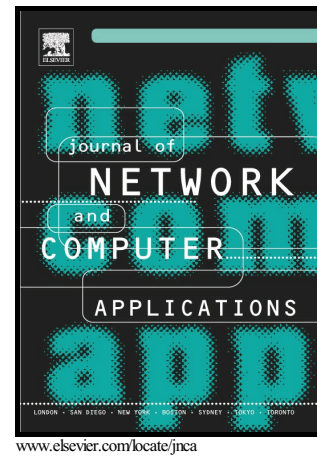


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# Scalable Influence Maximization under Independent Cascade Model

Feng Lu<sup>a</sup>, Weikang Zhang<sup>a</sup>, Liwen Shao<sup>a</sup>, Xunfei Jiang<sup>b</sup>, Peng Xu<sup>a</sup>, Hai Jin<sup>a</sup>

<sup>a</sup>*Services Computing Technology and System Lab, Cluster and Grid Computing Lab,  
School of Computer Science and Technology, Huazhong University of Science and  
Technology, Wuhan, China 430074*

<sup>b</sup>*Department of Computer Science, Earlham College, Richmond, IN, USA 47374*

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## Abstract

Influence maximization is a fundamental problem that aims at finding a small subset of seed nodes to maximize the spread of influence in social networks. Influence maximization problem plays an important role in viral marketing, which is widely adopted in social network advertising. However, finding an optimal solution is NP hard. A more realistic approach is to find a balanced point between the effectiveness and efficiency. A greedy algorithm and its improvements (including *Cost-Effective Lazy Forward (CELF)* algorithm) were developed to provide an approximation solution with errors bounded at  $(1-1/e)$ . But the method still suffers from high computational overhead. In this paper, we analyse the bottleneck of the greedy algorithm, and propose a more efficient method to replace the time-consuming part of the greedy algorithm. Then, we design a CascadeDiscount algorithm to solve the influence maximization problem. The experimental results on real-world datasets demonstrate that: 1) our CascadeDiscount algorithm maintains a close influence spread to CELF, and performs better than two heuristics methods, DegreeDiscountIC and TwoStage; 2) our CascadeDiscount method runs two orders of magnitude faster than CELF over real-world datasets.

*Keywords:*

Influence Maximization, Viral Marketing, Greedy Algorithm, Heuristics

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\*Corresponding author

Email address: [jiangxu@earlham.edu](mailto:jiangxu@earlham.edu) (Xunfei Jiang)

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