Advanced Cost based Graph Clustering Algorithm for Random Geometric Graphs

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Abstract

There is an increasing interest in the research of clustering or finding communities in complex networks. Graph clustering and graph partitioning algorithms have been applied to this problem. Several graph clustering methods are come into the field but problem lies in the model espoused by the state-of-the-art graph clustering algorithms for solving real-world situation. In this work, an attempt is made to provide an advanced cost based graph clustering algorithm based on stochastic local search. The proposed algorithm delivers significant improvement in robustness and quality of clustering in case of real-world complex network problems. The approach is to compute the cost (scaled cost) accurately when a target node is moved from source to destination cluster. The accurate cost is obtained by computing the induced effect which is evaluated by considering the relevance of nodes related to both source and destination clusters other than the target node during clustering. In our algorithm, moves are only made if the target node has neighbouring nodes in the destination cluster (moves to an empty cluster are the only exception to this instruction). Another important attachment in our approach is in inclusion of the aspiration criteria for the best move (lower-cost changes) selection when the best non-tabu move contributes much higher cost compared to a tabued move then the tabued move is acceptable otherwise the best non-tabu move is approved. Extensive experimentation with synthetic and real random geometric graph (RGG) benchmark
datasets show that our algorithm outperforms state-of-the-art graph clustering techniques on the basis of cost of clustering, cluster size, normalized mutual information (NMI) and modularity index of clustering results.

References

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**Index Terms**

Computer Science

Algorithms
Keywords
RGG  Cost of clustering  Cluster size  Normalized mutual information (NMI) and Modularity index of clustering results