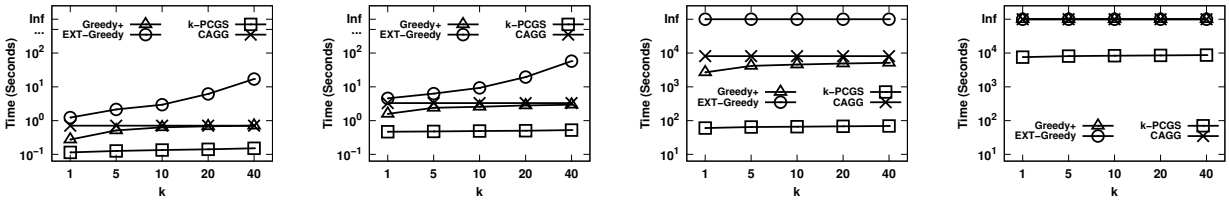
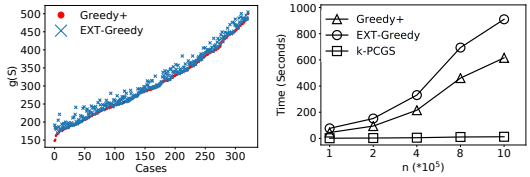


(a) ANIM (b) IMAGE (c) YAGO (d) UCI

Figure 6: Efficiency evaluation of Greedy+, EXT-Greedy, k-PCGS **and** CAGG **methods on DAGs**



(a) Approximation evaluation (b) Scalability test

Figure 7: Evaluation on synthetic DAGs.

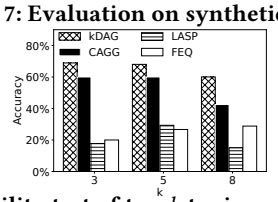


Figure 8: Usability test of top-k topic recommendation.

Top-k diversification. There exist several studies on the top-k graph diversification [5, 10, 12, 13, 21, 22, 29–31]. Qin et al.[21] investigate the diversified top-k search results in a graph. Ranu et al. [22] propose NB-Index to solve the top-k representative queries on graph databases. Based on a level-wise subgraph search, DSQL is proposed for top-k diversified subgraph querying in [29]. Long et al. [30] find top-k maximal cliques that can cover most number of nodes in a graph. Different from the above works on the top-k diversification on graph databases, subgraph queries, and cliques, this paper studies the graph summarization problem in hierarchical DAGs.

9 CONCLUSION

In this paper, we formulate and study a new kDAG-problem, which finds k representative vertices to summarize a hierarchical DAG associated with vertex weights. Due to the problem NP-hardness, we propose efficient greedy algorithms to tackle it. In addition, we develop two improved algorithms to find better answers with a theoretical guarantee in quality and be faster with theoretical complexity analysis, respectively. The k-PCGS method is scalable based on the candidate pruning and DAG compression. Extensive experiments validate the effectiveness and efficiency of our proposed algorithms.

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