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# Solving maximum clique problem in stochastic graphs using learning automata

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## ABSTRACT

The maximum clique of a given graph G is the subgraph C of G such that two vertices in C are adjacent in G with maximum cardinality. Finding the maximum clique in an arbitrary graph is an NP-Hard problem, motivated by the social networks analysis. In the real world applications, the nature of interaction between nodes is stochastic and the probability distribution function of the vertex weight is unknown. In this paper a learning automata-based algorithm is proposed for solving maximum clique problem in the stochastic graph. The simulation results on stochastic graph demonstrate that the proposed algorithm outperforms standard sampling method in terms of the number of samplings taken by algorithm.

## INDEX TERMS

- **IEEE Terms**
  Learning automata , Probability distribution , Sampling methods , Social network services , Standards , Stochastic processes , Vectors
- **Author Keywords**
  NP-Hard , learning automata , maximum clique problem , social networks , stochastic graph

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