A Learning Automata based Algorithm for Solving Traveling Salesman Problem improved by Frequency-based Pruning

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Authors:
Mir Mohammad Alipour

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Abstract

Many real world industrial applications involve finding a Hamiltonian path with minimum cost. Some instances that belong to this category are transportation routing problem, scan chain optimization and drilling problem in integrated circuit testing and production. Distributed learning automata, that is a general searching tool and is a solving tool for variety of NP-complete problems, together with 2-opt local search is used to solve the Traveling Salesman Problem (TSP). Two mechanisms named frequency-based pruning strategy (FBPS) and fixed-radius near neighbour (FRNN) 2-opt are used to reduce the high overhead incurred by 2-opt in the DLA algorithm proposed previously. Using FBPS only a subset of promising solutions are proposed to perform 2-opt. Invoking geometric structure, FRNN 2-opt implements efficient 2-opt in a permutation of TSP sequence. Proposed algorithms are tested on a set of TSP benchmark problems and the results show that they are able to reduce computational time, while maintaining the average solution quality at 0.62% from known optimal.

References

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Index Terms

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Keywords

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