Symmetric Travelling Salesman Problem Using Parallel Simulated Annealing

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***Abstract*—**

I. Introduction

Travelling Salesman Problem (TSP) [1] is a problem easy to describe but hard to solve. It can be simply described as: Given a list of cities and their coordinates, what is the best route for a travelling salesman to to through all cities by the shortest path?

TSP represents a larger class of problems known as *combinatorial optimization problems*. The TSP problem belongs in the class of such problems known as NP-complete [2]. Therefore, optimisation algorithms are usually applied to solve TSP, like Ant Colony, Hill Climbing and Simulated Annealing [1].

This report proposed

II. Related Work

A. Solving TSP by Simulated Annealing

Simulated Annealing is an optimisation algorithm to optimise an initial solution by changing a small part of a solution iteratively. In eact iteration the modification contributes to the solution. If the solution is better, the modification will be accepted. If the solution is worser, a possibility is given that determines if the solution will be accepted or not [3].

TSP can be solved by Simulated Annealing, where a pair of cities are swapped in each iteration, as described in [3].

B. Parallelising Simulated Annealing

[4] designed two parallelised Simulated Annealing schemes. The first one is to start multiple tasks and make them compare their results periodically, where the best result is chosen for the next period for all tasks, called the Cluster Algorithm. The second one combines Genetic Algorithm with Simulated Annealing.

III. Design and Implementation

A. The Sequential Simulated Annealing

B. The Parallel Simulated Annealing

IV. Benchmark

V. Conclusion

References

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