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論 文 要 旨

Abstract

論文題目

Title

A Study on Parallel Hybrid Evolutionary Algorithms and their Applications

並列ハイブリッド進化計算アルゴリズムとその応用に関する研究

Exploring a solution space technically in an effective way in any optimization algorithm helps not only to find good quality solutions, but also to reduce computation time. This work proposes an optimization technique that utilizes hybridization, strategic search, parallelization, and asynchronous cooperation to solve large scale and complex optimization problems. A master-slave topology has been formulated in which the master strategically sorts out portions of the search space in four phases with the help of a clustering algorithm and assumes the role of an estimation of distribution algorithm to model the solution distribution within the space using a Gaussian mixture model without variable dependency. The algorithm models a solution distribution by considering not only the mean vector of clustered solutions obtained from previous searches, as per the continuous univariate marginal distribution algorithm, but also by including information about the quality of solutions from previous searches. With probability distributions assigned by the master, slaves use genetic algorithms to extensively explore the solution space. The effect of our proposal has been experimentally analyzed in continuous and combinatorial optimization problems, and has shown significant improvements both in finding relatively good quality solutions and in reducing computation time. Real life application of our algorithm in VANET's routing optimization has also shown some promising results in finding best parameter configurations for AODV. Phase automation mechanism has helped shortening the computation time while maintaining quality of solutions when applied to VANET's routing optimization.

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