A Fast Genetic Algorithm Based Static Heuristic for Scheduling Independent Tasks on Heterogeneous Systems

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Abstract:

Scheduling of tasks in a heterogeneous computing (HC) environment is a critical task. It is also a well-known NP-complete problem, and hence several researchers have presented a number of heuristics for the same. The paper begins with introducing a new heuristic called Sympathy, and later a variant called Segmented Sympathy. A new Genetic Algorithm based heuristic using the Segmented Sympathy heuristic is proposed, which is aimed at improving over the speed and makespan of the implementation by Braun et al [1]. Finally, the results of Simulation reveal that the proposed Genetic Algorithm gave up to 8.34% better than makespans and 3.42% better on an average. The new heuristic is also about 160% faster with respect to the execution time.

References:

[1] Tracy D. Braun, Howard Jay Siegel, Noah Beck, Ladislau L. Boloni, Muthucumaru Maheswaran, Albert I. Reuther, James P. Robertson, Mitchell D. Theys, Bin Yao, Debra Hensgen and Richard F. Freund, "A Comparison of Eleven Static Heuristics for Mapping a Class of Independent Tasks onto Heterogeneous Distributed Computing Systems", Journal of Parallel and Distributed Computing, 2001.