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An experimental study of parallel multi-objective genetic algorithms

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Many of the optimization problems in the real world are multi-objective in nature, and non-dominated sorting genetic algorithm (NSGA II) is commonly used as a problem solving tool. However, multi-objective problems with non-convex and discrete Pareto front can take enormous computation time to converge to the true Pareto front. Hence, the classical NSGA II (i.e., non-parallel NSGA II) may fail to solve in ε -tolerable amount of time. In this context, we can argue that parallel processing techniques can be a suitable tool of choice to overcome this difficulty. In this paper, we study three different models i.e., Trigger, Island, and Cone Separation to parallelize NSGA-II to solve multi-objective 0/1 knapsack problem. Further, we emphasize on two factors that can scale the parallelism i.e., convergence and time. The experimental results confirm that Cone Separation model is showing a clear edge over Trigger and Island models in terms of processing time and approximation to the true Pareto front.

Biography

Bhabani Shankar Prasad Mishra is working as an Associate Professor in School of Computer Engineering at KIIT University, Bhubaneswar, Odisha since 2006. He has received the BTech in Computer Science in 2003 with Honours and distinction, and completed MTech in 2005. In MTech, he has received Gold and Silver Medals from the University. He has received his PhD degree in Computer Science from F M University, Balasore, Odisha in 2011. He completed his Post-doctoral research in Soft Computing Laboratory, Yonsei University, Seoul, South Korea under the Technology Research Program for Brain Science through the National Research Foundation, Ministry of Education, Science and Technology, South Korea. His research interest includes evolutionary computation, neural networks, pattern recognition, data warehousing and data mining, and big data. He has already published about 30 research papers in referred journals and conferences, has published one book and edited two books in his credit. He is also acting as an editorial member of various journals.

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