Call for Papers
Special issue of the
Journal of Parallel and Distributed Computing:
Metaheuristics on GPU

Background and Scope

Computationally hard discrete and continuous optimization problems are found virtually everywhere in society. In the discrete case, real-life problem instances are typically beyond resolution by exact methods under realistic response requirements. Often, one needs to resort to some form of approximative method. Metaheuristics denote a general type of approximative methods based on heuristics. They are based on strategies for diversifying search effort and for escaping local optima. Over the past few decades, they have shown remarkable performance in discrete optimization. In real life continuous optimization problems, one rarely finds an analytical expression for the objective. There are problems of noise, non-linearities, and correlations between variables. There is a need for direct and global methods. With only few exceptions, metaheuristics were originally designed for discrete optimization. In recent years, many have been adapted for solving continuous problems, with very good results. Given the computational hardness of the targeted problems, it is not surprising that parallel computing has been investigated to further improve the performance of metaheuristics, both in the discrete and the continuous case.

Lately we have seen a drastic change in the development of commodity computers. The steady increase of CPU frequency has stopped. Performance is now improved through a growing number of cores for task parallel computing. Moreover, improvement of the performance and programmability of graphics processing units (GPUs) adds impressive stream processing capabilities to ordinary computers. To take advantage of the new computing capabilities offered by the GPU, algorithms need to be re-implemented and even rethought.

Since 2006, the conference series International Conference on Metaheuristics and Nature Inspired Computing (META) have become one of the main gathering points of top researchers from academia and industry. META'2010, which was held in Djerba Island, Tunisia from October 27 to 31, 2010, continued this tradition of excellence and friendly scientific exchange. A special session on metaheuristics on graphics hardware was an important and novel part of this year's META conference.

Starting from the activities of the special session, we are very happy to announce a special issue of Journal of Parallel and Distributed Computing. The special issue is devoted to publications on the use of GPUs in metaheuristics, both in discrete and continuous optimization. The issue is open to the entire international research community. Papers covering all topics of GPU computing in metaheuristics are welcome. The topics include, but are not limited to:

- Parallel single-solution metaheuristics on GPU (local search, tabu search, simulated annealing, …)
- Parallel population-based metaheuristics on GPU (evolutionary algorithms, swarm intelligence, AIS, PSO, bee colony, EDA, scatter search, …)
- Parallel hybrid metaheuristics on GPU
- Surveys of GPU computing and prospects for the future
- Case studies focused on large scale academic or real-life problems
- Theoretical aspects
- Frameworks

All contributions will be peer reviewed according to the usual standards of the journal.

Submission guidelines

Authors are invited to submit papers to this special issue. The submitted papers must be written in English and describe original research which is neither published, nor currently under review by other journals or conferences. The author guidelines for preparation of manuscript can be found at: http://www.elsevier.com/wps/find/journaldescription.cws_home/622895/authorinstructions

Each manuscript should be accompanied by a cover letter outlining the basic findings of the paper and their significance. Manuscripts should be no longer than 20 double-spaced pages, not including the title page, abstract, or references. All manuscripts and any supplementary material should be submitted through the Elsevier Editorial System (EES) at http://ees.elsevier.com/jpdc/ . The authors must select "Special Series: Metaheuristics on GPU" from the Article Type drop-down menu so the paper is properly routed. You will need to create a user account if you do not already have one prior to submission.

Important dates

Full paper submission: May 31, 2011

Author notification: November 1, 2011

Final paper: January 15, 2012

Expected publication date: June 1, 2012

Submissions

Elsevier Editorial System: http://ees.elsevier.com/jpdc

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