
Editorial

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Biographical notes: Joanna Kolodziej graduated in Theoretical Mathematics from the Jagiellonian University in Cracow (Poland) in 1992, where she also obtained the PhD in Theoretical Computer Science in 2004. She is a Professor at Cracow University of Technology at the Department Computer Science. The main topics of her research are evolutionary computation, mathematical modelling of stochastic processes, grid and cloud computing, intelligent networking, scalable computation, multi-agent systems and global optimisation metaheuristics. She has published in international journals, books and conference proceedings of the research area. She is serving as the editorial board member of several major ICT journals.

Bernabé Dorronsoro received the degree in Engineering (2002) and the PhD in Computer Science (2007) from the University of Malaga (Spain). He received best PhD thesis award of his Engineering School. He is a research associate at the University of Lille 1. His main research interests include grid computing, energy efficiency, ad hoc networks, and metaheuristics in solving complex real-world problems. He published in major computer science journals and is a co-author of two monographs. He has been a member of the organising committees of several conferences and workshops, and he usually serves as reviewer for leading impact journals and conferences.

Wei Xue received the degree in electrical engineering (1998) and the PhD in Electrical Engineering (2003) from Tsinghua University (China). Currently, he is an Associate Professor in Department of Computer Science and Technology, Tsinghua University as well as the joint faculty in Center for Earth System Science, Tsinghua University. He got the First Class Award for Science and Technology Progress of Ministry of Education of China. His main research interests include scientific computing, scalable IO systems and uncertainty analysis of climate modelling. He is a full professional member of ACM, IEEE and serves as the Member of Information Storage Technical Committee of China Computer Federation.

Modelling and simulation are widely considered essential tools in many areas of science and engineering for the prediction and analysis of complex systems and natural phenomena. They often require a significant amount of computational resources with large datasets typically

scattered across different geographical locations. Recent approaches in high performance computing show the need of the intelligent combination of complex computing systems with pervasive computing paradigm, which generates a huge amount of data that must be handled by

such systems. The goal of researchers working in today's high performance and pervasive computing is to create smart products that communicate transparently, are connected to the internet, public web services or cloud infrastructure, and guarantee an easily access to the system services and data. The development of such complex modelling and simulation environments usually requires collaborative efforts from researchers with different domain knowledge and expertise.

This special issue encompasses models, simulators, and practical approaches that advance research in all aspects of handling large amounts of data, processing data intensive applications and smart human-computer communication in future generation grids, clouds, clusters, smartly-networked computational nodes, ad hoc and wireless networks and modern mobile systems. Its successful contributions range from advanced technologies, models, algorithms, applications, and innovative solutions for today's data complex distributed systems.

In the paper by Szykiewicz, with title 'Action planning for multi-robot-based reconfigurable fixture', the author proposes a planning system for a self-reconfigurable set of mobile robots through a feasible plan for the mobility and positioning of the robots. The problem is translated into a constraint satisfaction problem, which is to find an assignment to the problem variables that satisfies all defined constraints.

The paper 'A framework for comparative performance study on virtualised machines' presents a novel framework that provides a set of performance tools to help application developers study different performance issues on virtualised multi-core machines. Virtualisation techniques are widely used in various widely spread computing platforms, as cloud and grid computing. The framework is tested on a number of benchmark applications.

In 'Design and evaluation of a quorum-based synchronisation protocol of multimedia replicas', authors discuss on the efficient and consistent manipulation of

replicas of a multimedia object, focusing not only on data structure but also on quality of service. A novel extended multimedia quorum-based protocol is presented to reduce the processing overheads of replicas, compared with two quorum-based protocols.

The paper by Chen et al., 'Parallelisation of a watershed distributed ecohydrological model with dynamic task scheduling', presents a new scheme of dynamic task scheduling based parallelism for watershed ecohydrological model. The idea is based on decoupling the grid based tasks into independent tasks and rank computation sequence of them. The new method could improve the efficiency of the Walnut Gulch watershed (in Arizona, USA) with nearly six times speedup.

Marks et al. present in 'High performance wireless sensor network localisation system' a software framework for wireless sensor networks localisation, using the received signal strength. It can be used either to calculate the position of devices in the deployment area or to verify and adjust different localisation schemes through simulation.

The paper 'High throughput wavelet coherence analysis of neural series' focuses on the study of the coherence of multiple neural signals in real-time to understand brain functions. The authors propose a parallel version of the MC-WTC state-of-the-art algorithm for GPGPU architectures. Unlike the original algorithm, its proposed parallel version can be used in real time, since it is near 200 times faster than the sequential algorithm.

Finally, the paper by Iturriaga et al., with title 'AEDB protocol tuning with a fast efficient parallel multi-objective local search', presents a novel parallel local search metaheuristic for the multi-objective problem of optimising AEDB broadcasting protocol for MANETs, accounting for energy and network use, coverage, and time. The algorithm was designed after a careful sensibility analysis study of the influence of the variables of the problem on the performance of the protocol.