
Preface

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Biographical notes: Djallel Eddine Boubiche received his HDR degree from the University of Batna 2, Algeria, in 2015 and his PhD in Computer Science from UHLB University, Algeria, in 2013. He is currently an Associate Professor with the Sciences and Technologies Department, University of Batna 2. His research interests include wireless communication, emended system, intelligent multi-agent system, distributed computing, and sensor networks. His research has been published in various renowned international journals, such as the *International Journal of Sensor Networks*, *IEEE Communications*, *Wireless Personal Communications*, *Telecommunication Systems*, *Future Generation Computer Systems*, *Sensors*, *IEEE Communications Magazine* and so on.

Azeddine Bilami is the Director of the LaSTIC Laboratory. He is currently serving as a Full Professor from the Department of Computer Science at the University of Batna 2, Algeria. His research interests are wireless and mobile networks, TCP/IP, internet, system on chip architectures, high performance interconnects for parallel architectures and multi-processors.

Homero Toral-Cruz received his PhD and MS in Electrical Engineering, Telecommunication Option from the Center for Research and Advanced Studies of the National Polytechnic Institute (CINVESTAV), Jalisco, Mexico, in 2010 and 2006, respectively. He is currently an Assistant Professor from the Department of Sciences and Engineering at the University of Quintana Roo, Mexico. His research interest includes network measurement, IP technologies, network security and wireless sensor networks. He has been awarded a national recognition as a researcher (SNI Level 1) by CONACYT and has been elected as a member of the Mexican Academy of Sciences (AMC).

Kamaljit I. Lakhtaria is working as an Associate Professor from the Department of Computer Science, Gujarat University, India. He obtained his PhD in Computer Science. His research interests include next generation network, web services, mobile ad hoc networks, network security and cryptography. He is the author of eight reference books in the area of computer science and has published two chapters in international editorial volumes. He has presented 23 research papers in international conferences, 32 research papers in national conferences, published 23 research papers in refereed international journals, and six research papers in national journals. He is a life member of ISTE, IAENG, and many research groups. He holds the post of editor or associate editor in many international journals.

Recent research developments have brought forward high-performance information technologies which include high-performance computing (HPC) and high-performance interconnection networks (HPINs). Resolving complex problems requires HPC, which involves use of parallel processing required to run complex application programs.

HPC, or supercomputing, is a technology based on the use of supercomputers, which represent systems that perform at or near the current highest operational rate for computers. HPINs imply high-speed and large bandwidth data communication networks to optimise information exchange. Using HPINs, scientists can communicate, share experiments and results, and run simulations and programs on remote supercomputers at a high rate and capacity and with superior facilities.

This special issue on 'High-performance information technologies for engineering applications' aims to present new advances and research results in the field of high-performance technologies and related areas. The topics covered in this special issue include: architectures for ubiquitous and pervasive HPC, cloud, distributed and grid computing, component technologies for HPC, HPINs, HPC in scientific, engineering, medical and social applications, internet and web computing and parallel and distributed algorithms.

The special issue contains four papers. In the first paper, the authors Sundararaman and SubbuLakshmi address the job scheduling of scientific workflow applications in IaaS cloud and propose a job scheduling strategy called VMPROV to find the optimal number of virtual machines required to execute the jobs. Also, the authors introduce a priority-based round robin (PBRR) algorithm for resource mapping with minimal makespan and cost. The proposed algorithm considers the IaaS features such as pay per use, heterogeneous virtual environment and dynamic generation of virtual machines. Simulation experiments have been conducted with four real world scientific workflow applications to demonstrate the performances of VMPROV and PBRR algorithms compared with the classic algorithms in the schedule generation.

The second paper, presented by Kortas and Arbia, points out how the cloud is less suitable for subcontracting components with real-time limitations and introduces a cloudlet architecture that offers a middleware framework to achieve minimal network latency. The authors evaluate the proposed cloudlet architecture based on the resource utilisation rate, the average execution time, the latency, the throughput and the lost packets within the local and distant connection. Additionally, a comparative performance study with similar services (MegaUpload and RapidShare) is presented.

In the third paper, Manikandan and Subha present a parallel data processing approach for effective intensive care units (ICUs) with the internet of things. The main purpose is to improve efficiency and accuracy in data processing by applying a parallel decision tree algorithm in ICU data to take faster and accurate decisions on data selection. Indeed, the uses of parallelised algorithms optimise the process of collecting large sets of patient information. In addition, a decision tree algorithm is used for examining and extracting knowledge-based data from large databases. The IoT concept has been adopted by the authors for communicating the processing result to remote medical experts.

The special issue is concluded with the paper by Bennour, Ettouil, Zarrouk and Abderrazak. In this paper, the authors point out the impact of the HPC and software parallelism in the optimisation meta-heuristics field. Also, the paper presents a study of the Java runtime performance on handling multi-thread PSO over general purpose multi-core machines and networked machines. In their analyses, the authors consider synchronous, asynchronous, single-swarm and multi-swarm PSO variants.

We would like to thank all the authors for having submitted their research results for publication in this special issue. We believe that the papers published here reveal progress in the topic of high-performance information technologies. Also, we are very grateful for the collaboration of the reviewers and their influence of their expertise on the final quality. We sincerely thank Prof. Kuan-Ching Li, Editor of the *International Journal of Computational Science and Engineering*, for giving us the opportunity to prepare this special issue and his advice throughout this project. The support of the publisher with technical issues was also very welcome and assured good progress.