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Algorithms and Architectures for Parallel Processing

13th International Conference, ICA3PP 2013
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Proceedings, Part II

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Message from the General Chairs

Welcome to the proceedings of 13th International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP 2013), organized by the Second University of Naples with the support of St. Francis Xavier University. It was our great pleasure to hold ICA3PP 2013 in Vietri sul Mare in Italy. In the past, the ICA3PP 2013 conference series was held in Asia and Australia. This was the second time the conference was held in Europe (the first time being in Cyprus in 2008).

Since its inception, ICA3PP 2013 has aimed to bring together people interested in the many dimensions of algorithms and architectures for parallel processing, encompassing fundamental theoretical approaches, practical experimental projects, and commercial components and systems. ICA3PP 2013 consisted of the main conference and four workshops/symposia. Around 80 paper presentations from 30 countries and keynote sessions by distinguished guest speakers were presented during the three days of the conference.

An international conference of this importance requires the support of many people and organizations as well as the general chairs, whose main responsibility is to coordinate the various tasks carried out with other willing and talented volunteers. First of all, we want to thank Professors Andrzej Gościński, Yi Pan, and Yang Xiang, the Steering Committee chairs, for giving us the opportunity to hold this conference and their guidance in organizing it. We would like to express our appreciation to Professors Laurence T. Yang, Jianhua Ma, and Sazzad Hussain for their great support in the organization.

We would like to also express our special thanks to the Program Chairs Professors Joanna Kołodziej, Kaiqi Xiong, and Domenico Talia, for their hard and excellent work in organizing a very strong Program Committee, an outstanding reviewing process to select high-quality papers from a large number of submissions, and making an excellent conference program. Our special thanks also go to the Workshop Chairs Professors Rocco Aversa and Jun Zhang for their outstanding work in managing the four workshops/symposia, and to the Publicity Chairs Professors Xiaojun Cao, Shui Yu, Al-Sakib Khan Pathan, Carlos Westphall, and Kuan-Ching Li for their valuable work in publicizing the call for papers and the event itself. We are grateful to the workshop/symposia organizers for their professionalism and excellence in organizing the attractive workshops/symposia, and the advisory members and Program Committee members for their great support. We are grateful to the local organizing team, for their extremely hard working, efficient services, and wonderful local arrangements.

Last but not least, we heartily thank all authors for submitting and presenting their high-quality papers to the ICA3PP 2013 main conference and workshops/symposia.

December 2013

Beniamino Di Martino
Albert Y. Zomaya
Christian Engelmann

Symposium and Workshop Chairs' Message

The editors are honored to introduce Vol. II of the refereed proceedings of the 13th International Conference on Algorithms and Architectures for Parallel Processing, ICA3PP 2013, held in Vietri sul Mare, Italy, during December 18-21, 2013. ICA3PP 2013 is the 13th in this series of conferences started in 1995 that, by now traditionally, provides an appreciated international forum to present and discuss a wide-range spectrum of theoretical and experimental issues covering the research activities connected with algorithms and architectures for parallel processing. This second volume consists of four sections including 35 papers from one symposium and three workshops held in conjunction with the ICA3PP 2013 main conference. These are 13 papers from the 2013 International Symposium on Advances of Distributed and Parallel Computing (ADPC 2013), which provides the title of this volume, five papers from the International Workshop on Big Data Computing (BDC 2013), ten papers from the International Workshop on Trusted Information in Big Data (TIBiDa 2013) as well as seven papers belonging to the Workshop on Cloud-Assisted Smart Cyber-Physical Systems (C-SmartCPS 2013).

The volume starts with a section reserved for the International Symposium on Advances of Distributed and Parallel Computing (ADPC 2013) that collects a selection of the papers submitted to ICA3PP 2013, so as to provide an additional forum for discussing the frontiers of conference topics. It is a fact that over the last few years parallel processing and distributed computing have occupied a well-defined place in computer science and information technology, thanks to the availability of commodity hardware components (e.g., multiprocessor chips inside a standard PC) and to the widespread use of parallel applications in research, industry, and social media. However, this success story continues demanding new ideas to improve the efficiency, performance, reliability, security, and interoperability of distributed computing systems and applications and to face the emerging challenges issued by GPU/CPU systems, high-throughput cloud/grid systems, and green computing.

In fact, this year's symposium selection covered crucial themes in cloud computing environments such as data placement, task scheduling, and trust evaluation in cloud federations. Different papers, addressed the programming and scheduling issues connected to the efficient use of multi-core architectures like GPU. Forefront topics such as software solutions for energy optimization in HPC systems, the definition of social influence model, and quality control in crowdsourcing-based applications were also discussed.

The symposium and workshops programs are the result of the difficult and meticulous work of selection that involved many people in the Organizing Committee and the Program Committee members. The editors, finally, wish to

cordially thank all the authors for preparing their contributions as well as the reviewers who supported this effort with their constructive recommendations.

December 2013

Rocco Aversa
Joanna Kołodziej
Jun Zhang
Flora Amato
Giancarlo Fortino

Organization

ICA3PP 2013 was organized by the Second University of Naples, Italy, Department of Industrial and Information Engineering, and St. Francis Xavier University, Canada, Department of Computer Science. It was hosted by the Second University of Naples in Vietri sul Mare (Italy) during December 18–20, 2013.

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Message from Workshop Organizers

Message of the Big Data Computing (BDC-2013) Workshop Organizers

Jun Zhang¹, Parimala Thaulasiraman², and Laurent Lefevre³

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“Big Data”, as a new ubiquitous term, is now invading in every aspect of our daily life and promise to revolutionize our life. We face the most challenging issue, i.e., safe and effective computing on a large amount of data. Many works have been carried out focusing on business, application and information processing level from big data. However, the issue of safe and effective computing has not been well addressed. This workshop offers a timely venue for researchers and industry partners to present and discuss their latest results in safe and effective big data computing, which is organized in 2013 for the first time. We have got a good number of submissions, only a very small set of the high quality papers have been selected. The main theme and topics are listed as follows.

- Computational Models for Big Data
- Parallel/Distributed Computing for Big Data
- Energy-efficient Computing for Big Data
- Software Techniques in Big Data Computing
- Big Social Data Management
- Big Data Computing for Mobile Applications
- Architecture, Storage, User Interfaces for Big Data Management
- Search and Mining in Big Data
- Semantic-based Big Data analysis
- Privacy Preserving of Big Data
- High Performance Cryptography
- Threat and Vulnerability Analysis in Big Data
- Secure Big Data Computing
- Big Data Analytics
- Experiences with Big Data Project Deployments
- Big Data Computing as a Service
- Case Study on Big Data Computing

Message of the Trusted Information in Big Data (TIBiDa) Workshop Organizer

Flora Amato

University of Naples “Federico II”, Dipartimento di Ingegneria Elettrica e Tecnologie dell'Informazione, via Claudio 21, 80125, Naples, Italy

The term “Big Data” refers to the continuing massive expansion in volume and diversity of data in nowadays applications. Volume and heterogeneity result in increasing attention to complexity of procedures that manage and use data, as well as to problems in trusted information management. Anyway, analysis of Big Data is crucial in several social and scientific fields.

Effective processing of big data requires both new algorithms for data analysis, able to face dramatic data growth, and new techniques able to enact proper and safe management procedures.

The Workshop on Trusted Information in Big Data brings together scientists, engineers and students with the aim of sharing experiences, ideas, and research results about Big Data Management and Trust Computing. The workshop intends to present innovative researches, technologies, methods and techniques related to the rising research activities about Big Data and Trusted Information.

The workshop has been organized in 2013 for the first time. We have got a good number of submissions, only a very small set of the high quality papers have been selected.

The main themes and topics are listed as follows:

- Trust Models and Algorithms for Big Data Processing
- Trust Management in Big Data
- System architectures for big data analysis
- Benchmarks, metrics, and workload characterization for big data
- Debugging and performance analysis tools for analytics and data-intensive computing
- Implications of data analytics to mobile and embedded systems
- Data management and analytics for vast amounts of unstructured data
- Artificial Intelligence, Evolutionary Agents
- Data Mining, Data Fusion
- Information Extraction, Retrieval, Indexing
- Enabling Technologies (Social Networking, Web 2.0, Geographical Information Systems, Sensors, Smart Spaces, Smart Cities, Context-Aware Computing, Web Services)

Message of the Cloud-Assisted Smart Cyber-Physical Systems (C-SmartCPS-2013) Workshop Organizers

Giancarlo Fortino¹, Giuseppe Di Fatta², Antonio Liotta³,
Jun Suzuki⁴, and Athanasios Vasilakos⁵

¹ University of Calabria, Italy

² University of Reading, UK

³ Technical University of Eindhoven, The Netherlands

⁴ University of Massachusetts, Boston, USA

⁵ University of Western Macedonia, Greece

The advances of body area networks, mobile computing, wireless networking, multi-agent systems, data mining, and cloud computing offer tremendous opportunities in providing newer, better and smarter distributed cyber-physical systems (CPS). The main objective of this workshop is to provide a medium for researchers and practitioners to present their research findings related to the synergy among Cloud computing and cutting-edge CPS-enabling technologies such as body area networks, wireless sensor and actuator networks, multi-agent systems, machine-to-machine (M2M) communication, data mining, with the aim of developing ubiquitous, cloud-assisted smart cyber-physical distributed systems.

This workshop offers a timely venue for researchers and industry partners to present and discuss their latest results in cyber-physical systems based on smart technology (such as software agents) and cloud computing. C-SmartCPS has been organized in 2013 for the first time. We have got a good number of submissions, only a very small set of the high quality papers have been selected. The main themes and topics are listed as follows:

- Basic technology supporting CPS (e.g. Wireless Sensor Networks, RFID, etc)
- Multi-Agent Systems
- Communication, information and software architectures
- Integration techniques between clouds and CPS
- A cloud of clouds for CPS
- Massively large-scale CPS
- Cloud-assisted data management, mining and processing for CPS
- Cloud-assisted decision support systems with CPS
- Cloud-CPS infrastructures for data acquisition
- Pervasive services for mobile cloud users
- Autonomic CPS
- Smart CPS
- Intelligence and optimization between clouds and CPS
- Data Mining for data collected/produced by CPS
- Heterogeneity of in/on-body and ambient sensors/actuators
- Nanoscale smart sensors and communication in/on/around human bodies
- Applications and practical experience in Smart Cities

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