

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, Lancaster, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Zurich, Switzerland

John C. Mitchell

Stanford University, Stanford, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology Madras, Chennai, India

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbrücken, Germany

More information about this series at <http://www.springer.com/series/7407>

Jaideep Vaidya · Jin Li (Eds.)

Algorithms and Architectures for Parallel Processing

18th International Conference, ICA3PP 2018
Guangzhou, China, November 15–17, 2018
Proceedings, Part III

Editors

Jaideep Vaidya
Rutgers University
Newark, NJ, USA

Jin Li
Guangzhou University
Guangzhou, China

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-030-05056-6 ISBN 978-3-030-05057-3 (eBook)
<https://doi.org/10.1007/978-3-030-05057-3>

Library of Congress Control Number: 2018962485

LNCS Sublibrary: SL1 – Theoretical Computer Science and General Issues

© Springer Nature Switzerland AG 2018

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Welcome to the proceedings of the 18th International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP 2018), which was organized by Guangzhou University and held in Guangzhou, China, during November 15–17, 2018.

ICA3PP 2018 was the 18th event in a series of conferences devoted to research on algorithms and architectures for parallel processing. Previous iterations of the conference include ICA3PP 2017 (Helsinki, Finland, November 2017), ICA3PP 2016 (Granada, Spain, December 2016), ICA3PP 2015 (Zhangjiajie, China, November 2015), ICA3PP 2014 (Dalian, China, August 2014), ICA3PP 2013 (Vietri sul Mare, Italy, December 2013), ICA3PP 2012 (Fukuoka, Japan, September 2012), ICA3PP 2011 (Melbourne, Australia, October 2011), ICA3PP 2010 (Busan, Korea, May 2010), ICA3PP 2009 (Taipei, Taiwan, June 2009), ICA3PP 2008 (Cyprus, June 2008), ICA3PP 2007 (Hangzhou, China, June 2007), ICA3PP 2005 (Melbourne, Australia, October 2005), ICA3PP 2002 (Beijing, China, October 2002), ICA3PP 2000 (Hong Kong, China, December 2000), ICA3PP 1997 (Melbourne, Australia, December 1997), ICA3PP 1996 (Singapore, June 1996), and ICA3PP 1995 (Brisbane, Australia, April 1995).

ICA3PP is now recognized as the main regular event in the area of parallel algorithms and architectures, which covers many dimensions including fundamental theoretical approaches, practical experimental projects, and commercial and industry applications. This conference provides a forum for academics and practitioners from countries and regions around the world to exchange ideas for improving the efficiency, performance, reliability, security, and interoperability of computing systems and applications.

ICA3PP 2018 attracted over 400 high-quality research papers highlighting the foundational work that strives to push beyond the limits of existing technologies, including experimental efforts, innovative systems, and investigations that identify weaknesses in existing parallel processing technology. Each submission was reviewed by at least two experts in the relevant areas, on the basis of their significance, novelty, technical quality, presentation, and practical impact. According to the review results, 141 full papers were selected to be presented at the conference, giving an acceptance rate of 35%. Besides, we also accepted 50 short papers and 24 workshop papers. In addition to the paper presentations, the program of the conference included four keynote speeches and two invited talks from esteemed scholars in the area, namely: Prof. Xuemin (Sherman) Shen, University of Waterloo, Canada; Prof. Wenjing Lou, Virginia Tech, USA; Prof. Witold Pedrycz, University of Alberta, Canada; Prof. Xiaohua Jia, City University of Hong Kong, Hong Kong; Prof. Xiaofeng Chen, Xidian University, China; Prof. Xinyi Huang, Fujian Normal University, China. We were extremely honored to have them as the conference keynote speakers and invited speakers.

ICA3PP 2018 was made possible by the behind-the-scene effort of selfless individuals and organizations who volunteered their time and energy to ensure the success

of this conference. We would like to express our special appreciation to Prof. Yang Xiang, Prof. Weijia Jia, Prof. Yi Pan, Prof. Laurence T. Yang, and Prof. Wanlei Zhou, the Steering Committee members, for giving us the opportunity to host this prestigious conference and for their guidance with the conference organization. We would like to emphasize our gratitude to the general chairs, Prof. Albert Zomaya and Prof. Minyi Guo, for their outstanding support in organizing the event. Thanks also to the publicity chairs, Prof. Zheli Liu and Dr Weizhi Meng, for the great job in publicizing this event. We would like to give our thanks to all the members of the Organizing Committee and Program Committee for their efforts and support.

The ICA3PP 2018 program included two workshops, namely, the ICA3PP 2018 Workshop on Intelligent Algorithms for Large-Scale Complex Optimization Problems and the ICA3PP 2018 Workshop on Security and Privacy in Data Processing. We would like to express our sincere appreciation to the workshop chairs: Prof. Ting Hu, Prof. Feng Wang, Prof. Hongwei Li and Prof. Qian Wang.

Last but not least, we would like to thank all the contributing authors and all conference attendees, as well as the great team at Springer that assisted in producing the conference proceedings, and the developers and maintainers of EasyChair.

November 2018

Jaideep Vaidya
Jin Li

Organization

General Chairs

Albert Zomaya University of Sydney, Australia
Minyi Guo Shanghai Jiao Tong University, China

Program Chairs

Jaideep Vaidya Rutgers University, USA
Jin Li Guangzhou University, China

Publication Chair

Yu Wang Guangzhou University, China

Publicity Chairs

Zheli Liu Nankai University, China
Weizhi Meng Technical University of Denmark, Denmark

Steering Committee

Yang Xiang (Chair) Swinburne University of Technology, Australia
Weijia Jia Shanghai Jiaotong University, China
Yi Pan Georgia State University, USA
Laurence T. Yang St. Francis Xavier University, Canada
Wanlei Zhou Deakin University, Australia

Program Committee

Pedro Alonso Universitat Politècnica de València, Spain
Daniel Andresen Kansas State University, USA
Cosimo Anglano Università del Piemonte Orientale, Italy
Danilo Ardagna Politecnico di Milano, Italy
Kapil Arya Northeastern University, USA
Marcos Assuncao Inria, France
Joonsang Baek University of Wollongong, Australia
Anirban Basu KDDI Research Inc., Japan
Ladjel Bellatreche LIAS/ENSMA, France
Jorge Bernal Bernabe University of Murcia, Spain
Thomas Boenisch High-Performance Computing Center Stuttgart,
Germany

George Bosilca	University of Tennessee, USA
Massimo Cafaro	University of Salento, Italy
Philip Carns	Argonne National Laboratory, USA
Alexandra Carpen-Amarie	Vienna University of Technology, Austria
Aparicio Carranza	City University of New York, USA
Aniello Castiglione	University of Salerno, Italy
Arcangelo Castiglione	University of Salerno, Italy
Pedro Castillo	University of Granada, Spain
Tzung-Shi Chen	National University of Tainan, Taiwan
Kim-Kwang Raymond Choo	The University of Texas at San Antonio, USA
Mauro Conti	University of Padua, Italy
Jose Alfredo Ferreira Costa	Federal University, UFRN, Brazil
Raphaël Couturier	University Bourgogne Franche-Comté, France
Miguel Cárdenas Montes	CIEMAT, Spain
Masoud Daneshtalab	Mälardalen University and Royal Institute of Technology, Sweden
Casimer Decusatis	Marist College, USA
Eugen Dedu	University of Bourgogne Franche-Comté, France
Juan-Carlos Díaz-Martín	University of Extremadura, Spain
Matthieu Dorier	Argonne National Laboratory, USA
Avgoustinos Filippopolitis	University of Greenwich, UK
Ugo Fiore	Federico II University, Italy
Franco Frattolillo	University of Sannio, Italy
Marc Frincu	West University of Timisoara, Romania
Jorge G. Barbosa	University of Porto, Portugal
Chongzhi Gao	Guangzhou University, China
Jose Daniel García	University Carlos III of Madrid, Spain
Luis Javier García Villalba	Universidad Complutense de Madrid, Spain
Paolo Gasti	New York Institute of Technology, USA
Vladimir Getov	University of Westminster, UK
Olivier Gluck	Université de Lyon, France
Jing Gong	KTH Royal Institute of Technology, Sweden
Amina Guermouche	Telecom Sud-Paris, France
Jeff Hammond	Intel, USA
Feng Hao	Newcastle University, UK
Houcine Hassan	Universitat Politècnica de València, Spain
Sun-Yuan Hsieh	National Cheng Kung University, Taiwan
Chengyu Hu	Shandong University, China
Xinyi Huang	Fujian Normal University, China
Mauro Iacono	University of Campania Luigi Vanvitelli, Italy
Shadi Ibrahim	Inria, France
Yasuaki Ito	Hiroshima University, Japan
Mathias Jacquelin	Lawrence Berkeley National Laboratory, USA
Nan Jiang	East China Jiaotong University, China
Lu Jiaxin	Jiangxi Normal University, China

Edward Jung	Kennesaw State University, USA
Georgios Kambourakis	University of the Aegean, Greece
Gabor Kecskemeti	Liverpool John Moores University, UK
Muhammad Khurram Khan	King Saud University, Saudi Arabia
Dieter Kranzlmüller	Ludwig Maximilian University of Munich, Germany
Michael Kuhn	University of Hamburg, Germany
Julian Kunkel	German Climate Computing Center, Germany
Algirdas Lančinskas	Vilnius University, Lithuania
Patrick P. C. Lee	The Chinese University of Hong Kong, SAR China
Laurent Lefevre	Inria, France
Hui Li	University of Electronic Science and Technology of China, China
Kenli Li	Hunan University, China
Dan Liao	University of Electronic Science and Technology of China, China
Jingyu Liu	Hebei University of Technology, China
Joseph Liu	Monash University, Australia
Yunan Liu	Jiangxi Normal University, China
Zheli Liu	Nankai University, China
Jay Lofstead	Sandia National Laboratories, USA
Paul Lu	University of Alberta, Canada
Amit Majumdar	University of California San Diego, USA
Tomas Margalef	Universitat Autònoma de Barcelona, Spain
Stefano Markidis	KTH Royal Institute of Technology, Sweden
Alejandro Masrur	Chemnitz University of Technology, Germany
Susumu Matsumae	Saga University, Japan
Raffaele Montella	University of Naples Parthenope, Italy
Francesco Moscato	University of Campania Luigi Vanvitelli, Italy
Bogdan Nicolae	Argonne National Laboratory, Germany
Francesco Palmieri	University of Salerno, Italy, Italy
Swann Perarnau	Argonne National Laboratory, USA
Dana Petcu	West University of Timisoara, Romania
Salvador Petít	Universitat Politècnica de València, Spain
Riccardo Petrolo	Rice University, USA
Florin Pop	University Politehnica of Bucharest, Romania
Radu Prodan	University of Klagenfurt, Austria
Zhang Qikun	Beijing Institute of Technology, China
Thomas Rauber	University Bayreuth, Germany
Khaled Riad	Zagazig University, Egypt
Suzanne Rivoire	Sonoma State University, USA
Ivan Roderó	Rutgers University, USA
Romain Rouvoy	University of Lille, France
Antonio Ruiz-Martínez	University of Murcia, Spain
Françoise Sailhan	CNAM, France
Sherif Sakr	The University of New South Wales, Australia
Giandomenico Spezzano	ICAR-CNR and University of Calabria, Italy

Patricia Stolf	IRIT, France
John Stone	University of Illinois at Urbana-Champaign, USA
Peter Strazdins	The Australian National University, Australia
Hari Subramoni	The Ohio State University, USA
Gang Sun	University of Science and Technology of China, China
Zhizhuo Sun	Beijing Institute of Technology, China
Frederic Suter	CNRS, France
Yu-An Tan	Beijing Institute of Technology, China
Ming Tao	Dongguan University of Technology, China
Andrei Tchernykh	CICESE Research Center, Mexico
Massimo Torquati	University of Pisa, Italy
Tomoaki Tsumura	Nagoya Institute of Technology, Japan
Didem Unat	Koç University, Turkey
Vladimir Voevodin	Moscow University, Russia
Feng Wang	Wuhan University, China
Hao Wang	Shandong Normal University, China
Yu Wei	Nankai University, China
Sheng Wen	Swinbourne University of Technology, China
Jigang Wu	Guangdong University of Technology, China
Roman Wyrzykowski	Czestochowa University of Technology, Poland
Yu Xiao	Shandong University of Technology, China
Ramin Yahyapour	University of Göttingen, Germany
Fang Yan	Beijing Wuzi University, China
Zheng Yan	Xidian University, China
Laurence T. Yang	St. Francis Xavier University, Canada
Wun-She Yap	Universiti Tunku Abdul Rahman, Malaysia

Contents – Part III

Big Data and Information Processing

TAMSA: Two-Stage Auction Mechanism for Spectrum Allocation in Cooperative Cognitive Radio Networks	3
<i>Xinxiang Zhang, Jigang Wu, and Long Chen</i>	
QoS-Driven Service Matching Algorithm Based on User Requirements	17
<i>Mengying Guo and Xudong Yang</i>	
Research on Overload Classification Method for Bus Images Based on Image Processing and SVM	28
<i>Tingting Li, Yongxiong Sun, Yanhua Liang, Yujia Zhai, and Xuan Ji</i>	
Accurate Acoustic Based Gesture Classification with Zero Start-Up Cost	44
<i>Haojun Ai, Liangliang Han, Yifeng Wang, and Liang Liao</i>	
An Approach of Collecting Performance Anomaly Dataset for NFV Infrastructure	59
<i>Qingfeng Du, Yu He, Tiandi Xie, Kanglin Yin, and Juan Qiu</i>	
An Axiomatization for BSP Algorithms	72
<i>Yoann Marquer and Frédéric Gava</i>	
Efficient and Secure Outsourced Linear Regression	89
<i>Haomiao Yang, Weichao He, Qixian Zhou, and Hongwei Li</i>	
New Multi-objectives Scheduling Strategies in Docker SwarmKit	103
<i>Tarek Menouer, Christophe Cérin, and Étienne Leclercq</i>	
Internet Performance Prediction Framework Based on PingER Dataset.	118
<i>Wei Zhang, Xiaofei Xing, Saqib Ali, and Guojun Wang</i>	
MS-RAID: An Energy-Saving Data Layout for CDP	132
<i>Jingyu Liu, Ziyao Zhang, Lu Liu, and Xin Chai</i>	
Incentivizing Multimedia Data Acquisition for Machine Learning System	142
<i>Yiren Gu, Hang Shen, Guangwei Bai, Tianjing Wang, Hai Tong, and Yujia Hu</i>	
Toward Performance Prediction for Multi-BSP Programs in ML	159
<i>Victor Allombert, Frédéric Gava, and Julien Tesson</i>	

Exploiting the Table of Energy and Power Leverages	175
<i>Issam Raïs, Laurent Lefèvre, Anne-Cécile Orgerie, and Anne Benoit</i>	
A Semantic Web Based Intelligent IoT Model	186
<i>Chao Qu, Ming Tao, Jie Zhang, Xiaoyu Hong, and Ruifen Yuan</i>	
Accelerating CNNs Using Optimized Scheduling Strategy	196
<i>Rui Xu, Sheng Ma, Wenwu Li, and Yang Guo</i>	
Data Analysis of Blended Learning in Python Programming	209
<i>Qian Chu, Xiaomei Yu, Yuli Jiang, and Hong Wang</i>	
APs Deployment Optimization for Indoor Fingerprint Positioning with Adaptive Particle Swarm Algorithm	218
<i>Jianhui Zhao, Jun Li, Haojun Ai, and Bo Cai</i>	
Deployment Optimization of Indoor Positioning Signal Sources with Fireworks Algorithm	229
<i>Jianhui Zhao, Shiqi Wen, Haojun Ai, and Bo Cai</i>	
A Study of Sleep Stages Threshold Based on Multiscale Fuzzy Entropy	239
<i>Xuexiao Shao, Bin Hu, Yalin Li, and Xiangwei Zheng</i>	
Blind Estimation Algorithm Over Fast-Fading Multipath OFDM Channels . . .	249
<i>Jing Liu, Kun Han, Wenhua Wu, Shu Wang, and Xiao Yu</i>	
Facial Shape and Expression Transfer via Non-rigid Image Deformation	257
<i>Huabing Zhou, Shiqiang Ren, Yong Zhou, Yuyu Kuang, Yanduo Zhang, Wei Zhang, Tao Lu, Hanwen Chen, and Deng Chen</i>	
P-Schedule: Erasure Coding Schedule Strategy in Big Data Storage System	270
<i>Chao Yin, Haitao Lv, Tongfang Li, Yan Liu, Xiaoping Qu, and Sihao Yuan</i>	
Answer Aggregation of Crowdsourcing Employing an Improved EM-Based Approach	280
<i>Ran Zhang, Lei Liu, Lizhen Cui, Wei He, and Hui Li</i>	
Internet of Things and Cloud Computing	
A Parallel Fast Fourier Transform Algorithm for Large-Scale Signal Data Using Apache Spark in Cloud	293
<i>Cheng Yang, Weidong Bao, Xiaomin Zhu, Ji Wang, and Wenhua Xiao</i>	

Task Offloading in Edge-Clouds with Budget Constraint 311
Lei He, Hongli Xu, Haibo Wang, Liusheng Huang, and Jingyi Ma

Motion Trajectory Sequence-Based Map Matching Assisted Indoor Autonomous Mobile Robot Positioning 327
Wenping Yu, Jianzhong Zhang, Jingdong Xu, and Yuwei Xu

Towards the Independent Spanning Trees in the Line Graphs of Interconnection Networks. 342
Baolei Cheng, Jianxi Fan, Xiaoyan Li, Guijuan Wang, Jingya Zhou, and Yuejuan Han

POEM: Pricing Longer for Edge Computing in the Device Cloud. 355
Qiankun Yu, Jigang Wu, and Long Chen

Mobility Analysis and Response for Software-Defined Internet of Things. . . . 370
Zhiyong Zhang, Rui Wang, Xiaojun Cai, and Zhiping Jia

DStore: A Distributed Cloud Storage System Based on Smart Contracts and Blockchain. 385
Jingting Xue, Chunxiang Xu, Yuan Zhang, and Lanhua Bai

Towards an Efficient and Real-Time Scheduling Platform for Mobile Charging Vehicles. 402
Qi Liu, Jinyang Li, Xiaoshan Sun, Junjie Wang, Yang Ning, Wei Zheng, Jian Li, and Hengchang Liu

SoProtector: Securing Native C/C++ Libraries for Mobile Applications 417
Ning Zhang, Guangquan Xu, Guozhu Meng, and Xi Zheng

CloudPT: Performance Testing for Identifying and Detecting Bottlenecks in IaaS. 432
Ameen Alkasem, Hongwei Liu, and Decheng Zuo

Smart Grid Power Trading Based on Consortium Blockchain in Internet of Things. 453
Dong Zheng, Kaixin Deng, Yinghui Zhang, Jiangfan Zhao, Xiaokun Zheng, and Xinwei Ma

Energy-Efficient Offloading in Mobile Edge Computing with Edge-Cloud Collaboration 460
Xin Long, Jigang Wu, and Long Chen

Quantitatively Investigating Multihop Localization Errors in Regular 2-D Sensor Networks. 476
Bing Jia, Baoqi Huang, Tao Zhou, and Wuyungerile Li

Optimizing WiFi AP Placement for Both Localization and Coverage 489
Yu Tian, Baoqi Huang, Bing Jia, and Long Zhao

PLZMA: A Parallel Data Compression Method for Cloud Computing 504
Xin Wang, Lin Gan, Jingheng Xu, Jinzhe Yang, Maocai Xia, Haohuan Fu, Xiaomeng Huang, and Guangwen Yang

A Caching-Based Parallel FP-Growth in Apache Spark 519
Zhicheng Cai, Xingyu Zhu, Yuehui Zheng, Duan Liu, and Lei Xu

Contextual-Field Supported Iterative Representation for Face Hallucination 534
Kangli Zeng, Tao Lu, Xiaolin Li, Yanduo Zhang, Li Peng, and Shenming Qu

A Cancelable Multi-Biometric Template Generation Algorithm Based on Bloom Filter. 547
Lin You and Xun Li

Streaming ETL in Polystore Era 560
Nabila Berkani and Ladjel Bellatreche

Communication-Aware Prediction-Based Online Scheduling in High-Performance Real-Time Embedded Systems 575
Baptiste Goupille-Lescar, Eric Lenormand, Nikos Parlavantzas, and Christine Morin

Predicting SDC Vulnerability of Instructions Based on Random Forests Algorithm 593
LiPing Liu, LinLin Ci, and Wei Liu

Hybrid Cloud Architecture for Cross-Platform Interoperability in Smart Homes 608
Ming Tao, Chao Qu, Wenhong Wei, Bin Zhou, and Shuqiang Huang

Conflict-Free Block-with-Stride Access of 2D Storage Structure 618
Rui Song, Guozhao Zeng, Sheng Liu, and Haiyan Chen

Graph-Based Indoor Localization with the Fusion of PDR and RFID Technologies 630
Jie Wu, Minghua Zhu, Bo Xiao, and Yunzhou Qiu

UAV 3D Mobility Model Oriented to Dynamic and Uncertain Environment 640
Na Wang, Nan Di, Fei Dai, and Fangxin Liu

Acquiring Hidden Space via Modifying Block Bitmap
for Android Devices 651
Wang Lianfang, Huang Hong, Li Yuanzhang, and Zhang Li

Interest Relevance-Based Caching Design in Content-Centric Networking . . . 661
Guozhi Zhang, Jiqiang Liu, Xiaolin Chang, and Yang Yang

Author Index 673