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Jie Gao · Alon Efrat
Sándor P. Fekete · Yanyong Zhang (Eds.)

Algorithms for Sensor Systems

10th International Symposium on Algorithms
and Experiments for Sensor Systems,
Wireless Networks and Distributed Robotics,
ALGOSENSORS 2014
Wroclaw, Poland, September 12, 2014
Revised Selected Papers

Editors

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Tucson, AZ
USA

Sándor P. Fekete
TU Braunschweig
Braunschweig, Niedersachsen
Germany

Yanyong Zhang
Rutgers University
New Brunswick, NJ
USA

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Preface

ALGOSENSORS, the International Symposium on Algorithms and Experiments for Sensor Systems, Wireless Networks, and Distributed Robotics, is an international forum dedicated to the algorithmic aspects of wireless networks, static or mobile. The 10th edition of ALGOSENSORS was held on September 12 in Wroclaw, Poland, within the ALGO annual event.

Originally focused solely on sensor networks, ALGOSENSORS now covers more broadly algorithmic issues arising in all wireless networks of computational entities, including sensor networks, sensor-actuator networks, and systems of autonomous mobile robots. In particular, it focuses on the design and analysis of discrete and distributed algorithms, on models of computation and complexity, on experimental analysis, in the context of wireless networks, sensor networks, and robotic networks and on all foundational and algorithmic aspects of the research in these areas.

This year papers were solicited into three tracks: Sensor Network Algorithms (Track A), Wireless Networks and Distributed Robotics (Track B), and Experimental Algorithms (Track C).

In response to the call for papers, 20 submissions were received overall, out of which 10 papers were accepted after a rigorous reviewing process by the (joint) Program Committee, which involved at least three reviewers per paper. The committee had an online discussion and the final accepted list was agreed by all members of the committee. In addition to the technical papers, the program included an invited keynote talk by Dr. Phillip Gibbons (Intel Labs Pittsburgh). This volume contains the technical papers as well as a summary of the keynote talk. We would like to thank the Program Committee members, as well as the external reviewers, for their fundamental contribution in selecting the best papers resulting in a strong program. We would also like to warmly thank the ALGO/ESA 2014 organizers for kindly accepting the proposal of the Steering Committee to co-locate ALGOSENSORS with some of the leading events on algorithms in Europe.

October 2014

Jie Gao
Alon Efrat
Sándor P. Fekete
Yanyong Zhang

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Algorithmic Challenges in M2M (Invited Talk)

Phillip B. Gibbons

Intel Science and Technology Center for Cloud Computing,
Carnegie Mellon University,
Pittsburgh, PA, USA

phillip.b.gibbons@intel.com

Abstract. The Internet of Things promises a world of billions to trillions of smart objects/devices, communicating machine-to-machine (M2M) and providing us valuable information and services. This talk highlights our recent work addressing several key algorithmic challenges that arise in this setting. Specifically, we focus on problems arising in aggregation, similarity search, and machine learning on M2M's massively distributed network. After surveying these results, we present in greater detail upper and lower bounds demonstrating the cost of fault tolerance in such networks. These bounds show that across a communication-time trade-off curve, aggregation algorithms that tolerate crash failures incur an exponential cost in communication relative to non-fault-tolerant algorithms.

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