Lecture Notes in Computer Science 12129

More information about this subseries at http://www.springer.com/series/7411

Chryssis Georgiou · Rupak Majumdar (Eds.)

Networked Systems

8th International Conference, NETYS 2020 Marrakech, Morocco, June 3–5, 2020 Proceedings

Springer

Editors
Chryssis Georgiou
University of Cyprus
Nicosia, Cyprus

Rupak Majumdar
Max Planck Institute for Software Systems
Kaiserslautern, Germany

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-030-67086-3 ISBN 978-3-030-67087-0 (eBook)
https://doi.org/10.1007/978-3-030-67087-0

LNCS Sublibrary: SL5 – Computer Communication Networks and Telecommunications

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

Preface

This volume contains the papers presented at the 8th edition of the International Conference on NETworked sYStems (NETYS 2020). The conference was originally scheduled to be held in Marrakech, Morocco, between June 3 and 5, 2020. However, it moved to a fully virtual mode due to the Covid-19 pandemic.

The aim of the NETYS series of conferences is to bring together researchers and engineers from both the theory and practice of distributed and networked systems. The scope of the conference covers all aspects related to the design and the development of these systems, including, but not restricted to, concurrent and distributed algorithms, parallel/concurrent/distributed programming, multi-core architectures, formal verification, distributed databases, cloud systems, networks, security, formal verification, etc.

The Program Committee of NETYS 2020 included 38 researchers working in 16 different countries. There were 46 papers submitted to the conference, 38 as full papers, and 8 as short papers. The Program Committee selected 18 contributions out of the 38 full paper submissions for regular presentations at the conference (which represents an acceptance rate of 47%) as well as 4 extended abstracts for short presentations. Every submitted paper was read and evaluated by at least three members of the Program Committee. The committee was assisted by 14 external reviewers.

The program also included invited lectures, again hosted virtually, by C. Aiswarya, Chennai Mathematical Institute (India), Antonio Fernández Anta, IMDEA Networks Institute (Spain), Constantin Enea, University of Paris (France), Maria Potop-Butucaru, Sorbonne University (France), and Nitin Vaidya, Georgetown University (USA). In addition, C. Aiswarya, Antonio Fernández Anta and Maria Potop-Butucaru contributed invited papers.

The videos of all invited and contributed presentations can be viewed at: https://www.youtube.com/channel/UC3Y0phGAVVV_MyFbntZa0Ug/videos.

The program committee also selected a Best Paper and a Best Student Paper. The Best Paper was awarded to Quentin Bramas, Stéphane Devismes, and Pascal Lafourcade for their paper *Infinite Grid Exploration by Disoriented Robots*. The Best Student Paper was awarded to Carole Delporte-Gallet, Hugues Fauconnier, and Mouna Safir for their paper *Byzantine k-Set Agreement*. The author Mouna Safir was a full-time student at the time of the submission.

We are grateful to all members of the Program and Organizing Committees, to all referees for their cooperation, and to Springer for their professional support during the production phase of the proceedings. Finally, we would like to thank the sponsoring institutions without whom NETYS 2020 could not have been a reality. We are also thankful to all authors of submitted papers and to all participants of the conference.

Their interest in this conference and contributions to the discipline are greatly appreciated.

August 2020

Chryssis Georgiou
Rupak Majumdar

Organization

General Chair

Mohammed Erradi	ENSIAS, Mohammed V University in Rabat, Morocco

General Vice-chairs

Ahmed Bouajjani	University of Paris, France
Rachid Guerraoui	EPFL, Switzerland

Program Chairs

Chryssis Georgiou	University of Cyprus, Cyprus
Rupak Majumdar	Max Planck Institute for Software Systems, Germany

Program Committee

M. Faouzi Atig	Uppsala University, Sweden
Slimane Bah	EMI, Mohammed V University, Morocco
Yahya Benkaouz	FS, Mohammed V University, Morocco
Ismail Berrada	SMBAU, Morocco
Annnette Bieniusa	TU Kaiserslautern, Germany
Ahmed Bouajjani	University of Paris, France
Costas Busch	LSU, USA
Ioannis Chatzigiannakis	Sapienza University of Rome, Italy
Yu-Fang Chen	Academia Sinica, Taiwan
Evgenia Christoforou	University of Cyprus, Cyprus
Loris D'Antoni	University of Wisconsin-Madison, USA
Carole Delporte	University of Paris, France
Ankush Desai	Amazon, USA
Amr El Abbadi	UCSB, USA
Pierre Ganty	IMDEA Software Institute, Spain
Seth Gilbert	NUS, Singapore
Vincent Gramoli	University of Sydney, Australia
Radu Grosu	Vienna University of Technology, Austria
Aarti Gupta	Princeton University, USA
Mohamed Jmaiel	University of Sfax, Tunisia
Mohammed-Amine Koulali	ENSA d'Oujda, Morocco
Jan Kretinsky	Technical University of Munich, Germany
S. Krishna	IIT Bombay, India
Fabian Kuhn	University of Freiburg, Germany
Miguel Matos	INESC-ID & IST, University of Lisbon, Portugal

Miguel Mosteiro	Pace University, USA
Calvin Newport	Georgetown University, USA
Nicolas Nicolaou	Algolysis Ltd., Cyprus
Guevara Noubir	Northeastern University, USA
Andreas Podelski	University of Freiburg, Germany
Maria Potop-Butucaru	Sorbonne University, France
Azalea Raad	Imperial College London, UK
Michel Raynal	IRISA, Université de Rennes 1, France
Indranil Saha	IIT Kanpur, India
Elad M. Schiller	Chalmers University of Technology, Sweden
Thomas Wies	NYU, USA

Organizing Committee

Khadija Bakkouch	IRFC, Rabat, Morocco
Yahya Benkaouz	FS, Mohammed V University, Rabat, Morocco
Abdellah Boulouz	FS, Ibn Zohr University, Agadir, Morocco
Rachid Guerdaoui	Mohammed VI Polytechnic University, Ben Guerir, Morocco
Mustaf Hedabou	ENSA Safi, Cadi Ayyad University, Marrakech, Morocco
Zahi Jarir	FS, Cadi Ayyad University, Marrakech, Morocco
Abdellatif Kobbane	ENSIAS, Mohammed V University, Rabat, Morocco
Mohammed Ouzzif	EST, Hassan II University, Casablanca, Morocco

Students Committee

Hind Boukhairate	University Mohammed VI Polytechnic, Benguerir
Mohammed Lechiakh	University Mohammed VI Polytechnic, Benguerir
Rachid Zennou	ENSIAS, Mohammed V University, Rabat

Additional Reviewers

Ishtiyaque Ahmad
Mohammad Javad Amiri
Miëtek Bak
Abtin Bateni
Ignacio Cascudo
Lotfi Chaari
Samuel Drews
Earlence Fernandes
Sujaya Maiyya
Sebgui Marouane
Stefanie Mühlberger
Kausik Subramanian
Josef Tkadlec
Mouna Torjmen

Sponsors

MOHAMMED VI Polytechnic University

OCP Group

Springer

King Abdullah
University of Science
and Technology

Auto Hall

Fondation Hassan II

thinline

Université Mohammed
V de Rabat

ENSIAS

Association
Alkhawarizmi de Génie
Informatique

Abstracts

Reasoning About Concurrent Data Types

Constantin Enea

IRIF, University of Paris

Abstract. Modern software is typically built with specialized concurrent objects, which encapsulate shared-memory accesses or message-passing protocols into higher-level abstract data types. These objects are designed to behave according to certain consistency criteria like linearizability, eventual or causal consistency. In this talk, I will give an overview of recent results concerning formal reasoning about concurrent objects, from efficient testing algorithms to algorithmic verification methods. These results give rise to alternative specification frameworks to characterize the intended behaviors of such objects, which complement the existing generic formalizations of linearizability and weak consistency.

Security and Privacy for Distributed Optimization and Learning

Nitin Vaidya

Georgetown University

Abstract. Consider a network of agents wherein each agent has a private cost function. In the context of distributed machine learning, the private cost function of an agent may represent the "loss function" corresponding to the agent's local data. The objective here is to identify parameters that minimize the total cost over all the agents. In machine learning for classification, the cost function is designed such that minimizing the cost function should result in model parameters that achieve higher accuracy of classification. Similar problems arise in the context of other applications as well, including swarm robotics.

Our work addresses privacy and security of distributed optimization with applications to machine learning. In privacy-preserving machine learning, the goal is to optimize the model parameters correctly while preserving the privacy of each agent's local data. In security, the goal is to identify the model parameters correctly while tolerating adversarial agents that may be supplying incorrect information. When a large number of agents participate in distributed optimization, security compromise of some of the agents becomes increasingly likely. The talk will provide intuition behind the design and correctness of the algorithms.

Contents

Invited Papers

On Network Topologies and the Decidability of Reachability Problem 3
C. Aiswarya

Hide Me: Enabling Location Privacy in Heterogeneous Vehicular Networks 11
Tobias Meuser, Oluwasegun Taiwo Ojo, Daniel Bischoff, Antonio Fernández Anta, Ioannis Stavrakakis, and Ralf Steinmetz

Blockchains and the Commons 28
Maria Potop-Butucaru

Regular Papers

On the State Reachability Problem for Concurrent Programs Under Power . . . 47
Parosh Aziz Abdulla, Mohamed Faouzi Atig, Ahmed Bouajjani, Egor Derevenetc, Carl Leonardsson, and Roland Meyer

On the Encoding and Solving of Partial Information Games 60
Yackolley Amoussou-Guenou, Souheib Baarir, Maria Potop-Butucaru, Nathalie Sznajder, Léo Tible, and Sébastien Tixeuil

Efficient Concurrent Execution of Smart Contracts in Blockchains Using Object-Based Transactional Memory 77
Parwat Singh Anjana, Hagit Attiya, Sweta Kumari, Sathya Peri, and Archit Somani

Exploring IoT Trickle-Based Dissemination Using Timed Model-Checking and Symbolic Execution 94
Boutheina Bannour, Arnault Lapitre, and Pascale Le Gall

Broadcasting Information in Multi-hop Networks Prone to Mobile Byzantine Faults 112
Silvia Bonomi, Giovanni Farina, and Sébastien Tixeuil

Infinite Grid Exploration by Disoriented Robots 129
Quentin Bramas, Stéphane Devismes, and Pascal Lafourcade

Wireless Broadcast with Short Labels 146
Gewu Bu, Maria Potop-Butucaru, and Mikaël Rabie

The Imitation Game: Algorithm Selection by Exploiting Black-Box Recommenders 170
Georgios Damaskinos, Rachid Guerraoui, Erwan Le Merrer, and Christoph Neumann

Byzantine *k*-Set Agreement 183
Carole Delporte-Gallet, Hugues Fauconnier, and Mouna Safir

Fissile Locks 192
Dave Dice and Alex Kogan

Verifying Safety of Parameterized Heard-Of Algorithms 209
Zeinab Ganjei, Ahmed Rezine, Petru Eles, and Zebo Peng

Staleness and Local Progress in Transactional Memory 227
Hagit Attiya, Panagiota Fatourou, Sandeep Hans, and Eleni Kanellou

Generic Framework for Optimization of Local Dissemination in Wireless Networks 244
Dariusz R. Kowalski, Miguel A. Mosteiro, and Krutika Wadhwa

Verifying Weakly Consistent Transactional Programs Using Symbolic Execution 261
Burcu Kulahcioglu Ozkan

NetSheriff: Sheltering Software-Defined Networks from Rogue Switches 279
Paolo Laffranchini, João Miranda, Nuno Machado, Luís Rodrigues, Etienne Rivière, and Ramin Sadre

Self-stabilizing Uniform Reliable Broadcast 296
Oskar Lundström, Michel Raynal, and Elad M. Schiller

Fully Anonymous Consensus and Set Agreement Algorithms 314
Michel Raynal and Gadi Taubenfeld

Cutoffs for Symmetric Point-to-Point Distributed Algorithms 329
Thanh-Hai Tran, Igor Konnov, and Josef Widder

Short Papers

Stateless Distributed Ledgers 349
François Bonnet, Quentin Bramas, and Xavier Défago

Stability Under Adversarial Injection of Dependent Tasks *(Extended Abstract)* 355
Vicent Cholvi, Juan Echagüe, Antonio Fernández Anta, and Christopher Thraves Caro

Collaborative Filtering: Comparative Study Between Matrix Factorization and Neural Network Method 361
Driss El Alaoui, Jamal Riffi, Badraddine Aghoutane, Abdelouahed Sabri, Ali Yahyaouy, and Hamid Tairi

Routing in Generalized Geometric Inhomogeneous Random Graphs *(Extended Abstract)* 368
Andrés Sevilla and Antonio Fernández Anta

Author Index 375