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Tiziana Margaria · Bernhard Steffen (Eds.)


Leveraging Applications of Formal Methods, Verification and Validation

Adaptation and Learning

11th International Symposium, ISoLA 2022
Rhodes, Greece, October 22–30, 2022
Proceedings, Part III

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ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-031-19758-1 ISBN 978-3-031-19759-8 (eBook)
<https://doi.org/10.1007/978-3-031-19759-8>

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Introduction

As General and Program Chairs we would like to welcome you to the proceedings of ISoLA 2022, the 11th International Symposium on Leveraging Applications of Formal Methods, Verification and Validation held in Rhodes (Greece) during October 22–30, 2022, and endorsed by EASST, the European Association of Software Science and Technology.

Returning to the traditional in-person event, ISoLA 2022 provided a forum for developers, users, and researchers to discuss issues related to the adoption and use of rigorous tools and methods for the specification, analysis, verification, certification, construction, testing, and maintenance of systems from the point of view of their different application domains. Thus, since 2004 the ISoLA series of events has served the purpose of bridging the gap between designers and developers of rigorous tools on one side, and users in engineering and in other disciplines on the other side. It fosters and exploits synergetic relationships among scientists, engineers, software developers, decision makers, and other critical thinkers in companies and organizations. By providing a specific, dialogue-oriented venue for the discussion of common problems, requirements, algorithms, methodologies, and practices, ISoLA aims in particular at supporting researchers in their quest to improve the practicality, reliability, flexibility, and efficiency of tools for building systems, and users in their search for adequate solutions to their problems.

The program of ISoLA 2022 consisted of a collection of special tracks devoted to the following hot and emerging topics:

1. Rigorous Engineering of Collective Adaptive Systems
(Organizers: Rocco De Nicola, Stefan Jähnichen, Martin Wirsing)
2. Programming: What is Next?
(Organizers: Klaus Havelund, Bernhard Steffen)
3. X-by-Construction meets Runtime Verification
(Organizers: Maurice H. ter Beek, Loek Cleophas, Martin Leucker, Ina Schaefer)
4. Automated Software Re-Engineering
(Organizers: Serge Demeyer, Reiner Hähnle, Heiko Mantel)
5. Digital Twin Engineering
(Organizers: John Fitzgerald, Peter Gorm Larsen, Tiziana Margaria, Jim Woodcock, Claudio Gomes)
6. SpecifyThis - Bridging gaps between program specification paradigms
(Organizers: Wolfgang Ahrendt, Marieke Huisman, Mattias Ulbrich, Paula Herber)
7. Verification and Validation of Concurrent and Distributed Heterogeneous Systems
(Organizers: Marieke Huisman, Cristina Seceleanu)
8. Formal Methods Meet Machine Learning
(Organizers: Kim Larsen, Axel Legay, Bernhard Steffen, Marielle Stoelinga)
9. Formal methods for DIStributed COmputing in future RAILway systems
(Organizers: Alessandro Fantechi, Stefania Gnesi, Anne Haxthausen)

10. Automated Verification of Embedded Control Software
(Organizers: Dilian Gurov, Paula Herber, Ina Schaefer)
11. Digital Thread in Smart Manufacturing
(Organizers: Tiziana Margaria, Dirk Pesch, Alan McGibney)

It also included the following the embedded or co-located events:

- Doctoral Symposium and Poster Session (Sven Jörges, Salim Saay, Steven Smyth)
- Industrial Day (Axel Hessenkämper, Falk Howar, Hardi Hungar, Andreas Rausch)
- DIME Days 2022 (Tiziana Margaria, Bernhard Steffen)

Altogether, the proceedings of ISoLA 2022 comprises contributions collected in four volumes:

- Part 1: Verification Principles
- Part 2: Software Engineering
- Part 3: Adaptation and Learning
- Part 4: Practice

We thank the track organizers, the members of the program committee, and their reviewers for their effort in selecting the papers to be presented, the local Organization Chair, Petros Stratis, and the EasyConferences team for their continuous precious support during the entire period preceding the events, and the Springer for being, as usual, a very reliable partner for the proceedings production. Finally, we are grateful to Christos Therapontos for his continuous support for the Web site and the program, and to Steve Bosselmann for his help with the editorial system EquinOCS.

Special thanks are due to the following organizations for their endorsement: EASST (European Association of Software Science and Technology) and Lero - The Irish Software Research Centre, along with our own institutions - TU Dortmund and the University of Limerick.

We wish you, as an ISoLA participant, lively scientific discussions at this edition, and also later, when reading the proceedings, valuable new insights that contribute to your research and its uptake.

October 2022

Bernhard Steffen
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Contents – Part III

Rigorous Engineering of Collective Adaptive Systems

Rigorous Engineering of Collective Adaptive Systems Introduction to the 4 th Track Edition	3
<i>Martin Wirsing, Rocco De Nicola, and Stefan Jähnichen</i>	
Correct by Design Coordination of Autonomous Driving Systems	13
<i>Marius Bozga and Joseph Sifakis</i>	
Neural Predictive Monitoring for Collective Adaptive Systems	30
<i>Francesca Cairoli, Nicola Paoletti, and Luca Bortolussi</i>	
An Extension of HybridSynchAADL and Its Application to Collaborating Autonomous UAVs	47
<i>Jaehun Lee, Kyungmin Bae, and Peter Csaba Ölveczky</i>	
Discrete Models of Continuous Behavior of Collective Adaptive Systems	65
<i>Peter Fettke and Wolfgang Reisig</i>	
Modelling Flocks of Birds from the Bottom Up	82
<i>Rocco De Nicola, Luca Di Stefano, Omar Inverso, and Serenella Valiani</i>	
Towards Drone Flocking Using Relative Distance Measurements	97
<i>Andreas Brandstätter, Scott A. Smolka, Scott D. Stoller, Ashish Tiwari, and Radu Grosu</i>	
Epistemic Ensembles	110
<i>Rolf Hennicker, Alexander Knapp, and Martin Wirsing</i>	
A Modal Approach to Consciousness of Agents	127
<i>Chen Yifeng and J. W. Sanders</i>	
An Experimental Toolchain for Strategy Synthesis with Spatial Properties	142
<i>Davide Basile, Maurice H. ter Beek, and Vincenzo Ciancia</i>	
Toward a Kinetic Framework to Model the Collective Dynamics of Multi-agent Systems	165
<i>Stefania Monica, Federico Bergenti, and Franco Zambonelli</i>	

Understanding Social Feedback in Biological Collectives with Smoothed Model Checking	181
<i>Julia Klein and Tatjana Petrov</i>	
Efficient Estimation of Agent Networks	199
<i>Alexander Leguizamon-Robayo and Max Tschaikowski</i>	
Attuning Adaptation Rules via a Rule-Specific Neural Network	215
<i>Tomáš Bureš, Petr Hnětynka, Martin Kruliš, František Plášil, Danylo Khalyeyev, Sebastian Hahner, Stephan Seifermann, Maximilian Walter, and Robert Heinrich</i>	
Measuring Convergence Inertia: Online Learning in Self-adaptive Systems with Context Shifts	231
<i>Elvin Albers and Ilias Gerostathopoulos</i>	
Capturing Dependencies Within Machine Learning via a Formal Process Model	249
<i>Fabian Ritz, Thomy Phan, Andreas Sedlmeier, Philipp Altmann, Jan Wieghardt, Reiner Schmid, Horst Sauer, Cornel Klein, Claudia Linnhoff-Popien, and Thomas Gabor</i>	
On Model-Based Performance Analysis of Collective Adaptive Systems	266
<i>Maurizio Murgia, Riccardo Pinciroli, Catia Trubiani, and Emilio Tuosto</i>	
Programming Multi-robot Systems with X-KLAIM	283
<i>Lorenzo Bettini, Khalid Bourr, Rosario Pugliese, and Francesco Tiezzi</i>	
Bringing Aggregate Programming Towards the Cloud	301
<i>Giorgio Audrito, Ferruccio Damiani, and Gianluca Torta</i>	
Ensemble-Based Modeling Abstractions for Modern Self-optimizing Systems	318
<i>Michal Töpfer, Milad Abdullah, Tomas Bureš, Petr Hnětynka, and Martin Kruliš</i>	
Formal Analysis of Lending Pools in Decentralized Finance	335
<i>Massimo Bartoletti, James Chiang, Tommi Junttila, Alberto Lluch Lafuente, Massimiliano Mirelli, and Andrea Vandin</i>	
A Rewriting Framework for Interacting Cyber-Physical Agents	356
<i>Benjamin Lion, Farhad Arbab, and Carolyn Talcott</i>	
Model Checking Reconfigurable Interacting Systems	373
<i>Yehia Abd Alrahman, Shaun Azzopardi, and Nir Piterman</i>	

Formal Methods Meet Machine Learning

Formal Methods Meet Machine Learning (F3ML)	393
<i>Kim Larsen, Axel Legay, Gerrit Nolte, Maximilian Schlüter, Marielle Stoelinga, and Bernhard Steffen</i>	
The Modest State of Learning, Sampling, and Verifying Strategies	406
<i>Arnd Hartmanns and Michaela Klauk</i>	
Importance Splitting in Uppaal	433
<i>Kim Guldstrand Larsen, Axel Legay, Marius Mikučionis, and Danny Bøgsted Poulsen</i>	
Verification of Variability-Intensive Stochastic Systems with Statistical Model Checking	448
<i>Sami Lazreg, Maxime Cordy, and Axel Legay</i>	
Author Index	473