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Christophe Gaston · Nikolai Kosmatov ·
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Testing Software and Systems

31st IFIP WG 6.1 International Conference, ICTSS 2019
Paris, France, October 15–17, 2019
Proceedings

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Preface

This volume contains the proceedings of the 31st IFIP International Conference on Testing Software and Systems (ICTSS 2019). ICTSS has become a traditional event of the WG 6.1 of the International Federation for Information Processing (IFIP). This year the acronym of the conference evolved to IFIP-ICTSS 2019 to reinforce the connection with IFIP. The conference was held in Paris, France, during October 15–17, 2019.

ICTSS is a series of international conferences addressing conceptual, theoretical, and practical problems of testing software systems, including communication protocols, services, distributed platforms, middleware, embedded and cyber-physical systems, and security infrastructures. It is a forum for researchers, developers, testers, and users from industry to review, discuss, and learn about new approaches, concepts, theories, methodologies, tools, and experiences in the field of testing of software and systems.

This year, IFIP-ICTSS 2019 received 30 submissions. Each paper was reviewed in a single-blind process by three reviewers and discussed by the Program Committee. After a careful selection process, the Program Committee accepted 14 regular papers, 3 short papers, and 1 industrial paper. Papers cover a large range of subjects such as test-case generation, testing in relation with artificial intelligence, proof and verification techniques, security, performance, as well as empirical studies.

The program also featured two invited talks. The first keynote “Intelligence Testing of Autonomous Software Systems” was given by Arnaud Gotlieb (Simula Lab, Norway). The second keynote “Testing Human-Centric Cyber-Physical Systems” was given by Mauro Pezzè (USI – Università della Svizzera italiana, Switzerland). We thank them for accepting to give an invited presentation at IFIP-ICTSS 2019.

This year, IFIP-ICTSS 2019 was co-located with the MTV2 2019 workshop. This annual workshop gathers the French testing community participating in the MTV2 (Methods of Testing for Verification and Validation) working group of the French network on Software Engineering and Programming (GDR GPL) of CNRS. We hope that this co-location encourages interactions and exchanges between the international and the French community interested in testing.

We would like to thank the Steering Committee for their advice and support in the organization of the conference. Many thanks to the Program Committee members, as well as to the additional reviewers, for their careful reviews and participation in the discussions during the paper selection. The process of reviewing and selecting the papers was significantly simplified through the use of EasyChair. We would also like to thank IFIP for their continuous support of the conference series, as well as Springer for having published this volume.

We kindly thank the Organizing Committee for their help in local organization of the event, and in particular Natalia Kushik and Sylvie Vignes for their support in the preparation of the conference at Télécom ParisTech.

Finally, we are very grateful to the sponsors of the conference: the List institute of CEA Tech, CentraleSupélec, Télécom ParisTech, the French network on Software Engineering and Programming (GDR GPL) of CNRS, and University of Paris-Saclay. Their support strongly contributed to the success of this event.

On behalf of the ICTSS organizers, we hope that you find the proceedings useful, interesting, and challenging.

July 2019

Nikolai Kosmatov
Christophe Gaston
Pascale Le Gall

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Keynotes

Intelligence Testing of Autonomous Software Systems

Arnaud Gotlieb

Simula Research Laboratory, Fornebu, Norway

Abstract. Autonomous Software Systems (ASS) are systems able to plan and execute complex functions with limited human intervention, i.e., systems with self-decision capabilities. They usually complement humans capacity to deal with unexpected events such as faults or hazards and take decisions based on vast amounts of uncertain data. Testing ASS is highly challenging as their requirements in terms of safety, performance, robustness, and reliability evolve with their level of autonomy. My talk will address the challenges of testing ASS and will present some cases where Artificial Intelligence techniques have been successful in deploying automated testing methods.

Testing Human-Centric Cyber-Physical Systems

Mauro Pezzè

USI - Università della Svizzera Italiana, Lugano, Switzerland

Abstract. Human-centric cyber-physical systems are systems where software, devices, and people seamlessly and endlessly interact with evolving goals, requirements, and constraints. They are increasingly pervading our life, and span from simple mobile and Web applications, like recommendation systems and virtual shops, to complex evolving systems, like autonomous vehicles and smart cities. In this talk, I will give a broad and visionary view of the emerging issues and opportunities in the verification of human-centric cyber-physical systems. I will introduce the main features and survey the main open challenges of testing human-centric cyber-physical systems. I will discuss scope and limitation of the most recent research results in software testing; I will overview the ongoing partial but promising research activities in our USI-Star and UniMiB-LTA laboratories, and I will propose my vision of the most challenging open research issues.

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