Lecture Notes in Computer Science

13297

Founding Editors

Gerhard Goos

Karlsruhe Institute of Technology, Karlsruhe, Germany

Juris Hartmanis

Cornell University, Ithaca, NY, USA

Editorial Board Members

Elisa Bertino

Purdue University, West Lafayette, IN, USA

Wen Gao

Peking University, Beijing, China

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Moti Yung

Columbia University, New York, NY, USA

More information about this series at https://link.springer.com/bookseries/558

Gilles Perrouin · Naouel Moha · Abdelhak-Djamel Seriai (Eds.)

Reuse and Software Quality

20th International Conference on Software and Systems Reuse, ICSR 2022 Montpellier, France, June 15–17, 2022 Proceedings



Editors
Gilles Perrouin
University of Namur
Namur, Belgium

Abdelhak-Djamel Seriai D University of Montpellier Montpellier, France Naouel Moha (D) École de Technologie Supérieure Montreal, OC, Canada

ISSN 0302-9743 ISSN 1611-3349 (electronic) Lecture Notes in Computer Science ISBN 978-3-031-08128-6 ISBN 978-3-031-08129-3 (eBook) https://doi.org/10.1007/978-3-031-08129-3

© Springer Nature Switzerland AG 2022

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, expressed 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

This volume contains the proceedings of the 20th edition of the International Conference on Software and Systems Reuse (ICSR 2022). This volume was prepared jointly by the program chairs (Gilles Perrouin, Naouel Moha) and the general chair (Abdelhak-Djamel Seriai). The conference was initially planned to be held in Montpellier, France, during June 15–17, 2022. Though the world was hoping to see the end of this COVID-19 pandemic many uncertainties remained that could prevent attendees from travelling to the conference. The organization team therefore opted for a virtual format once again. This format has the advantage of making the conference accessible to everyone.

ICSR is the premier international event in the software reuse community. The main goal of ICSR is to present the most recent advances in the area of software and systems reuse and to promote an exchange of ideas and best practices among researchers and practitioners.

The chosen theme for this anniversary edition was "reuse and software quality". Indeed, the reuse of robust, validated components and libraries is a blessing for the software community who can quickly build high-quality applications. But this is also a curse if one of the links in the software supply chain is not up to standard, endangering the whole ecosystem depending on it. We also welcomed papers on every aspect of software reuse, be it technical or managerial (e.g., handling open-source licenses).

We adopted a two-phase submission process requiring abstracts one week prior to the full paper submission deadline. Following the current practices in reviewing, we also kept the double-blind process. We received 28 full and one short complete submissions, out of which six were accepted as full papers, one was accepted as full paper after shepherding, and two were retained for publication as short papers. The full paper acceptance rate was 25% (7/28) and the overall acceptance rate was 31% (9/29).

This anniversary edition both looked at the past and to the future of the conference. We were delighted to have Bill Frakes, one of the founding members of the conference, who delivered the following keynote: "Software Reuse and Domain Engineering – Industry Impact and Future". The second keynote speaker, Ying (Jenny) Zou, offered us a keynote entitled "Intelligent Management of Code Clones". This edition also featured panels on the future, security, and sustainable software reuse.

We would like to thank the ICSR steering committee (notably Rafael Capilla and Hafedh Mili) and the local organization team for the virtualization of the conference.

May 2022

Gilles Perrouin Naouel Moha Abdelhak-Djamel Seriai

Organization

General Chair

Abdelhak-Djamel Seriai University of Montpellier, France

Program Committee Chairs

Gilles Perrouin University of Namur, Belgium

Naouel Moha Ecole de technologie supérieure - Université du

Québec, Canada

Workshop and Tutorial Co-chairs

Christophe Dony University of Montpellier, France
Mohamed Wiem Mkaouer Rochester Institute of Technology, USA

Doctoral Symposium Co-chairs

Bedir Tekinerdogan Wageningen University, The Netherlands

Christelle Urtado EuroMov-DHM, University of Montpellier and

IMT Mines Alès, France

Industry Panel Chair

Tewfik Ziadi Sorbonne University, France

Demonstration and Tools Chair

Chouki Tibermacine University of Montpellier, France

Publicity Chair

Marianne Huchard University of Montpellier, France

Local Organization Co-chairs

Hinde Bouziane University of Montpellier, France

Sylvain Vauttier EuroMov DHM, University of Montpellier and

IMT Mines Alès, France

Web and Media Co-chairs

David Delahaye University of Montpellier, France

Sylvain Vauttier EuroMov DHM, University of Montpellier and

IMT Mines Alès, France

Green Conference Co-chairs

Clémentine Nebut University of Montpellier, France Marianne Huchard University of Montpellier, France

Steering Committee

Rafael Capilla Sevilla Universidad Rey Juan Carlos, Spain
Hafedh Mili Université du Québec à Montréal, Canada
Claudia M. L. Werner Federal University of Rio de Janeiro, Brazil

Martin L. Griss Carnegie Mellon University, USA

William B. Frakes IEEE TCSE Committee on Software Reuse, USA

John Favaro Trust-IT, Italy

Eduardo Almeida Federal University of Bahia, Brazil
Goetz Botterweck University of Limerick, Ireland
George Angelos Papadopoulos
Nan Niu University of Cyprus, Cyprus
University of Cincinnati, USA

Oliver Hummel University of Applied Sciences Mannheim,

Germany

Hanen Hattab Université du Québec à Montréal, Canada

Program Committee

Manel Abdellatif University of Ottawa, Canada
Eduardo Almeida Federal University of Bahia, Brazil
Apostolos Ampatzoglou University of Macedonia, Greece
Francesca Arcelli Fontana University of Milano-Bicocca, Italy

Claudia P. Ayala Universitat Politècnica de Catalunya, Spain Olivier Barais IRISA, Inria, University of Rennes 1, France

Sihem Ben Sassi University of Manouba, Tunisia

Djamal Benslimane Université Claude Bernard Lyon 1, France Mireille Blay-Fornarino Université Côte d'Azur, CNRS, France Jan Bosch Chalmers University of Technology, Sweden

Rafael Capilla Universidad Rey Juan Carlos, Spain

Stephanie Challita Inria, France

Alexander Chatzigeorgiou University of Macedonia, Greece
Coen De Roover Vrije Universiteit Brussel, Belgium
Serge Demeyer Universiteit Antwerpen, Belgium

Stéphane Ducasse Inria, France

Laurence Duchien University of Lille, France

Ghizlane El Boussaidi École de technologie supérieure, Canada

John Favaro Intecs, USA

Lidia Fuentes University of Málaga, Spain
Jessie Galasso University of Montréal, Canada
Barbara Gallina Mälardalen University, Sweden

Iris Groher Johannes Kepler University Linz, Austria
Andre Hora Universidade Federal de Minas Gerais, Brazil

José Miguel Horcas Aguilera University of Málaga, Spain Marouane Kessentini Oakland University, USA

Raula Gaikovina Kula Nara Institute of Science and Technology, Japan

Lamia Labed Jilani ISG Tunis, Tunisia

Tommi Mikkonen University of Helsinki, Finland

Hafedh Mili Université du Québec à Montréal, Canada

Raffaela Mirandola Politecnico di Milano, Italy

Naouel Moha École de technologie supérieure – Université du

Québec, Canada

Nan Niu University of Cincinnati, USA Mourad Oussalah LINA, University of Nantes, France

Quentin Perez EuroMov DHM, University of Montpellier and

IMT Mines Alès, France

Gilles Perrouin

Gordana Rakic

University of Novi Sad, Serbia

University of Haifa, Israel

University of Montreal, Canada

University of Hildesheim, Germany

Bedir Tekinerdogan

University, The Netherlands

Paul Temple University of Namur, Belgium
Xhevahire Ternava Université de Rennes 1, France
Chouki Tibermacine Université de Montpellier, France

Christelle Urtado IMT Mines Alès, France

Christina von Flach Federal University of Bahia, Brazil
Uwe Zdun University of Vienna, Austria
Wei Zhang Peking University, China
Tewfik Ziadi Sorbonne University, France

Additional Reviewers

Acher, Mathieu Ait Oubelli, Lynda Della Vedova, Gianluca Fortz, Sophie Gasmallah, Noureddine Hernández López, José Antonio Islam, Syful Saadi, Abdelfetah Weyssow, Martin Zaitsev, Oleksander

Contents

Code Recommendation and Reuse	
Fine-Grained Analysis of Similar Code Snippets Jessie Galasso, Michalis Famelis, and Houari Sahraoui	3
DepMiner: Automatic Recommendation of Transformation Rules for Method Deprecation	22
Learning and Reuse	
Scratching the Surface of ./configure: Learning the Effects of Compile-Time Options on Binary Size and Gadgets	41
Nemo: A Tool to Transform Feature Models with Numerical Features and Arithmetic Constraints	59
Evolution and Reuse	
Evolution Support for Custom Variability Artifacts Using Feature Models: A Study in the Cyber-Physical Production Systems Domain	79
Prevalence and Evolution of License Violations in npm and RubyGems Dependency Networks Ilyas Saïd Makari, Ahmed Zerouali, and Coen De Roover	85
Quality, Longevity and Reuse	
Differential Testing of Simulation-Based Virtual Machine Generators: Automatic Detection of VM Generator Semantic Gaps Between Simulation and Generated VMs Pierre Misse-chanabier, Guillermo Polito, Noury Bouraqadi, Stéphane Ducasse, Luc Fabresse, and Pablo Tesone	103

xii Contents

SEED: Semantic Graph Based Deep Detection for Type-4 Clone Zhipeng Xue, Zhijie Jiang, Chenlin Huang, Rulin Xu, Xiangbing Huang, and Liumin Hu	120
Barriers to Device Longevity and Reuse: An Analysis of Application Download, Installation and Functionality on a Vintage Device	138
Author Index	147