Raian Ali
Hermann Kaindl
Leszek A. Maciaszek (Eds.)

Communications in Computer and Information Science 1556

Evaluation of Novel Approaches to Software Engineering

16th International Conference, ENASE 2021
Virtual Event, April 26–27, 2021
Revised Selected Papers

Springer

Communications in Computer and Information Science 1556

Editorial Board Members

Joaquim Filipe
Polytechnic Institute of Setúbal, Setúbal, Portugal

Ashish Ghosh
Indian Statistical Institute, Kolkata, India

Raquel Oliveira Prates
Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil

Lizhu Zhou
Tsinghua University, Beijing, China

More information about this series at https://link.springer.com/bookseries/7899

Raian Ali · Hermann Kaindl ·
Leszek A. Maciaszek (Eds.)

Evaluation of Novel Approaches to Software Engineering

16th International Conference, ENASE 2021
Virtual Event, April 26–27, 2021
Revised Selected Papers

Springer

Editors
Raian Ali
Hamad bin Khalifa University
Doha, Qatar

Hermann Kaindl
TU Wien
Vienna, Austria

Leszek A. Maciaszek
Wrocław University of Economics
Wrocław, Poland

Macquarie University
Sydney, Australia

ISSN 1865-0929 ISSN 1865-0937 (electronic)
Communications in Computer and Information Science
ISBN 978-3-030-96647-8 ISBN 978-3-030-96648-5 (eBook)
https://doi.org/10.1007/978-3-030-96648-5

© 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

The present book includes extended and revised versions of a set of selected papers from the 16th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE 2021), held as an online event during April 26–27, 2021.

ENASE 2021 received 96 paper submissions from authors in 30 countries, of which 16% are finally included in this book as extended versions. These papers were selected by the event chairs and their selection is based on a number of criteria that include the classifications and comments provided by the Program Committee members, the session chairs' assessment, and also the program chairs' global view of all papers included in the technical program. The authors of selected papers were then invited to submit revised and extended versions of their papers having at least 30% innovative material.

The mission of ENASE is to be a prime international forum to discuss and publish research findings and IT industry experiences with relation to novel approaches to software engineering. The conference acknowledges evolution in systems and software thinking due to contemporary shifts of computing paradigm to e-services, cloud computing, mobile connectivity, business processes, and societal participation. By publishing the latest research on novel approaches to software engineering and by evaluating them against systems and software quality criteria, ENASE conferences advance knowledge and research in software engineering, including and emphasizing service-oriented, business-process driven, and ubiquitous mobile computing. ENASE aims at identifying most hopeful trends and proposing new directions for consideration by researchers and practitioners involved in large-scale systems and software development, integration, deployment, delivery, maintenance, and evolution.

The papers included in this book contribute to the understanding of relevant trends of current research on novel approaches to software engineering for the development and maintenance of systems and applications, specifically with relation to software for social media, (end-)user-centered design, user interfaces, software engineering education, enterprise information systems, business process engineering, requirements engineering, development process, software architecture, and code mining.

We would like to thank all the authors for their contributions and the reviewers for ensuring the quality of this publication.

April 2021

Raian Ali
Hermann Kaindl
Leszek Maciaszek

Organization

Conference Chair

Leszek Maciaszek	Wroclaw University of Economics and Business, Poland, and Macquarie University, Australia

Program Co-chairs

Raian Ali	Hamad Bin Khalifa University, Qatar
Hermann Kaindl	TU Wien, Austria

Program Committee

Wasif Afzal	MDH, Sweden
Issa Atoum	World Islamic Sciences and Education University, Jordan
Marco Autili	University of L'Aquila, Italy
Richard Banach	University of Manchester, UK
Ellen Barbosa	University of São Paulo, Brazil
Jan Blech	Aalto University, Finland
Iuliana Bocicor	Babes-Bolyai University, Romania
Ugo Buy	University of Illinois at Chicago, USA
Ahmet Cakir	ERGONOMIC Institut, Germany
Serban Camelia	Babes-Bolyai University, Romania
Glauco Carneiro	Universidade Salvador (UNIFACS), Brazil
Anis Charfi	Carnegie Mellon University, Qatar
Guglielmo De Angelis	IASI-CNR, Italy
Fatma Dhaou	University of Tunis El Manar, Tunisia
Mahmoud EL Hamlaoui	University of Mohammed V in Rabat, Morocco
Anna Fasolino	Università degli Studi di Napoli Federico II, Italy
Maria Ferreira	Universidade Portucalense, Portugal
Massimo Ficco	University of Campania Luigi Vanvitelli, Italy
Stéphane Galland	Université de Technologie de Belfort Montbéliard, France
José Garcia-Alonso	Universidad de Extremadura, Spain
Nicolas Gold	University College London, UK
John Grundy	Monash University, Australia

José-María Gutiérrez-Martínez	Universidad de Alcalá, Spain
Hatim Hafiddi	INPT, Morocco
Stefan Hanenberg	University of Duisburg-Essen, Germany
Ralph Hoch	TU Wien, Austria
Akos Horvath	IncQuery Labs, Hungary
Slinger Jansen	Utrecht University, The Netherlands
Georgia Kapitsaki	University of Cyprus, Cyprus
Osama Khaled	The American University in Cairo, Egypt
Siau-Cheng Khoo	National University of Singapore, Singapore
Dae-Kyoo Kim	Oakland University, USA
Diana Kirk	University of Auckland, New Zealand
Barbara Ann Kitchenham	Keele University, UK
Piotr Kosiuczenko	WAT, Poland
Horst Lichter	RWTH Aachen University, Germany
Jorge López	Airbus Defence and Space, France
Ivan Lukovic	University of Novi Sad, Serbia
Lech Madeyski	Wroclaw University of Science and Technology, Poland
Nazim Madhavji	University of Western Ontario, Canada
Tomi Männistö	University of Helsinki, Finland
Patricia Martin-Rodilla	University of A Coruña, Spain
Francesco Mercaldo	National Research Council of Italy (CNR), Italy
Arthur-Jozsef Molnar	Babes-Bolyai University, Romania
Leticia Montalvillo	IKERLAN, Spain
Ines Mouakher	University of Tunis El Manar, Tunisia
Malcolm Munro	Durham University, UK
Andrzej Niesler	Wroclaw University of Economics and Business, Poland
Frank Ortmeier	Otto-von-Guericke University of Magdeburg, Germany
Janis Osis	Riga Technical University, Latvia
Mourad Oussalah	University of Nantes, France
Siew Hock Ow	University of Malaya, Malaysia
Ricardo Pérez-Castillo	University of Castilla-La Mancha, Spain
Dana Petcu	West University of Timisoara, Romania
Kai Petersen	Flensburg University of Applied Sciences, Germany, and Blekinge Institute of Technology, Sweden
Deepika Prakash	NIIT University, India
Adam Przybylek	Gdansk University of Technology, Poland
Elke Pulvermueller	University of Osnabrueck, Germany
Ricardo Rabelo	Federal University of Santa Catarina, Brazil

Lukasz Radlinski	West Pomeranian University of Technology in Szczecin, Poland
Philippe Roose	IUT de Bayonne et du Pays Basque, France
Gunter Saake	Institute of Technical and Business Information Systems, Germany
Gwen Salaün	Grenoble INP and Inria, France
Richa Sharma	Lock Haven University, USA
Josep Silva	Universitat Politècnica de València, Spain
Riccardo Sisto	Polytechnic University of Turin, Italy
Michal Smialek	Warsaw University of Technology, Poland
Ioana Sora	Politehnica University of Timisoara, Romania
Andreas Speck	Christian-Albrechts-Universität zu Kiel, Germany
Maria Spichkova	RMIT University, Australia
Witold Staniszkis	Rodan Development, Poland
Chang-ai Sun	University of Science and Technology Beijing, China
Jakub Swacha	University of Szczecin, Poland
Stephanie Teufel	University of Fribourg, Switzerland
Francesco Tiezzi	University of Camerino, Italy
Porfirio Tramontana	University of Naples Federico II, Italy
Hanh Nhi Tran	University of Toulouse, France
Christos Troussas	University of West Attica, Greece
Andreea Vescan	Babes-Bolyai University, Romania
Bernhard Westfechtel	University of Bayreuth, Germany
Martin Wirsing	Ludwig-Maximilians-Universität München, Germany
Igor Wojnicki	AGH University of Science and Technology, Poland
Sebastian Wrede	Bielefeld University, Germany
Dinghao Wu	Pennsylvania State University, USA
Jifeng Xuan	Wuhan University, China
Nina Yevtushenko	Ivannikov Institute for System Programming of the Russian Academy of Sciences, Russia
Alfred Zimmermann	Reutlingen University, Germany

Additional Reviewers

Mohammad Aldabbas	University of Fribourg, Switzerland
Peter Alexander	RWTH Aachen University, Germany
Selin Aydin	RWTH Aachen University, Germany
Daniele Bringhenti	Politecnico di Torino, Italy
Maxime Labonne	Airbus Defence and Space, France
Erick Petersen	Institut Polytechnique de Paris, France

Christian Plewnia	RWTH Aachen University, Germany
Alex Sabau	RWTH Aachen University, Germany
Nils Wild	RWTH Aachen University, Germany

Invited Speakers

Stefan Kramer	Johannes Gutenberg-Universität Mainz, Germany
Panos Markopoulos	Eindhoven University of Technology, The Netherlands
John Grundy	Monash University, Australia

Contents

Theory and Practice of Systems and Applications Development

Validating *HyDe*: Intelligent Method for Inferring Software Architectures from Mobile Codebase 3
Dragoş Dobrean and Laura Dioşan

Considerations for Indigenous Cultural Aspects in Software Development: A Case Study 29
Philemon Yalamu, Abdullah Al Mahmud, and Caslon Chua

Modelling Age of End-Users Using Wire-Frames 44
Hourieh Khalajzadeh, Tanjila Kanij, Aria YukFan Jim, Hyun Shim, Jue Wang, Lionel Richie Wijaya, Rongbin Xu, and John Grundy

A Framework for Privacy and Security Requirements Analysis and Conflict Resolution for Supporting GDPR Compliance Through Privacy-by-Design 67
Duaa Alkubaisy, Luca Piras, Mohammed Ghazi Al-Obeidallah, Karl Cox, and Haralambos Mouratidis

The Relevance of Privacy Concerns, Trust, and Risk for Hybrid Social Media 88
Angela Borchert, Aidmar Wainakh, Nicole Krämer, Max Mühlhäuser, and Maritta Heisel

From Business Process Textual Description to BPEL Models 112
Wiem Khlif, Nadia Aloui, and Nourchène Elleuch Ben Ayed

XtraLibD: Detecting Irrelevant Third-Party Libraries in Java and Python Applications 132
Ritu Kapur, Poojith U. Rao, Agrim Dewam, and Balwinder Sodhi

Automation of the Software Development Process from ReLEL Using the Praxeme Approach 156
Rapatsalahy Miary Andrianjaka, Mahatody Thomas, Livaniaina Razanakolona, Ilie Mihaela, Razafimahatratra Hajarisena, Ilie Sorin, and Razafindrakoto Nicolas Raft

Stakeholder-Centric Clustering Methods for Conflict Resolution in the Requirements Engineering Process 183
Ishaya Gambo and Kuldar Taveter

Challenges and Novel Approaches to Systems and Software Engineering (SSE)

CitrusGenome: Applying User Centered Design for Evaluating the Usability of Genomic User Interfaces 213
Alberto García S., Carlos Iñiguez-Jarrín, Oscar Pastor Lopez, Daniel Gonzalez-Ibea, Estela Pérez-Román, Carles Borredà, Javier Terol, Victoria Ibanez, and Manuel Talón

Addressing the Influence of End User Human Aspects on Software Engineering 241
John Grundy, Ingo Mueller, Anuradha Madugalla, Hourieh Khalajzadeh, Humphrey O. Obie, Jennifer McIntosh, and Tanjila Kanij

Gender Classification Models and Feature Impact for Social Media Author Profiling 265
Paloma Piot-Perez-Abadin, Patricia Martin-Rodilla, and Javier Parapar

Agile Mindset Adoption in Student Team Projects 288
Simona Motogna, Dan Mircea Suciu, and Arthur-Jozsef Molnar

Systems and Software Quality

Ontology-Based Natural Language Processing for Process Compliance Management 309
Muhammad Atif Javed, Faiz Ul Muram, and Samina Kanwal

UI-Test: A Model-Based Framework for Visual UI Testing– Qualitative and Quantitative Evaluation 328
Bryan Alba, Maria Fernanda Granda, and Otto Parra

Author Index 357