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EDITORIAL

Editorial

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1 Requirements engineering conference

The IEEE International Requirements Engineering (RE) Conference is the premier requirements engineering conference, where researchers, practitioners, students, and educators meet, present, and discuss the most recent innovations, trends, experiences, and issues in the field of RE. Requirements engineering has been identified as a crucial prerequisite for successful software projects. Even gifted developers cannot save a project if they create the wrong product. These lessons learned apply to both traditional and agile development approaches.

The 29th edition of the conference (RE'21) focused on five challenges. The first, "discovering stakeholders' needs", is still a fundamental task today. The second, "societal challenges", is ever more relevant as software has turned into an enabler and a driver of social and societal activities. The third, "smart and connected", is fundamental in a world becoming increasingly linked to other technical systems as well as to humans. The fourth, "agile, DevOps and hybrid", refers to development approaches that are mixed and adapted by most companies and that rely on direct communication more than on documentation, resulting in requirements that are not as visible and explicit in a specification as in traditional approaches. Finally, "AI+RE", reflects a recent challenge and opportunity for requirements engineering, both for applying new artificial intelligence techniques to RE and applying the insights from RE to artificial intelligence.

RE'21 was organized by Jane Cleland-Huang and Michael Vierhauser at the University of Notre Dame, USA. Due to the Covid pandemic, it had to be fully virtualized. More than 350 attendees from 36 countries participated. Three keynotes addressed crucial aspects: Amy J. Ko talked about "Requirements of Oppression", Lionel Briand targeted the technical topic "Signal-based requirements for Cyber-Physical Systems: Specification and Run-time", and Pedro Domingos covered the mathematical aspect of "Unifying Logical and Statistical AI with Markov Logic".

In the Research and Industry Tracks, 33 papers were presented. They were accepted in a double-blind review process by both program committees composed by distinguished members of the research community. The best seven papers were invited to submit extended versions to this Special Issue. Six of those papers completed the process successfully. Criteria for the selection were technical excellence, innovation, and significance to the research community. Papers with one or more negative review votes were not selected, and surveys and systematic literature reviews were not considered. The journal versions in this Special Issue extend the invited papers with at least 40% of new contribution.

2 In this special issue

Testing Software's Changing Features with Environment-Driven Abstraction Identification by *Zedong Peng, Prachi Rathod, Nan Niu, Tanmay Bhowmik, Hui Liu, Lin Shi, Zhi Jin* presents a new approach to testing features based on important domain terms (abstractions). They are identified through natural-language processing. Abstractions are then fed into an automated step of metamorphic testing. Pairs of coupled test cases are derived, creating opposing key-value pairs for each abstraction. This paper extends the scope of abstractions in requirements engineering from early elicitation to testing.

Crowd-based Requirements Elicitation via Pull Feedback: Method and Case Studies by *Jelle Wouters, Abel Menkveld, Sjaak Brinkkemper, Fabiano Dalpiaz* presents CREUS, a crowd-based requirements elicitation method for users to

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express their ideas for current and future systems by writing user stories on an online platform. The method is evaluated with three case studies. The authors report on quantitative results (e.g. on the number of participants, ideas, votes) and on a qualitative analysis of the elicited user stories.

Explainable Software Systems: From Requirements Analysis to System Evaluation by *Larissa Chazette, Wasja Brunotte, Timo Speith* defines explainability distilled using a multi-method research strategy using a systematic literature review and workshops, offers a conceptual model showing the impact of explainability on other non-functional requirements, proposes a knowledge catalogue of explainability, and introduces a reference model. These artefacts support the understanding of explainability and its impact on other quality aspects.

How Do Requirements Evolve During Elicitation? An Empirical Study Combining Interviews and App Store Analysis by *Alessio Ferrari, Paola Spoletini, Sourav Debnath* is an exploratory study to understand how requirements are transformed from initial ideas to documented needs and how these evolve based on the analysis of similar products in app stores. The study is a controlled experiment involving 30 students interviewing a (proxy) customer. The results show that only a third of the documented requirements can be traced to initial ideas; the rest are new requirements. The authors also stress the essential role of the analyst, as well as the use of app stores for new roles and requirements.

Assessing user stories: the influence of template differences and gender-related problem-solving styles by *Catarina Gralha, Rita Pereira, Miguel Goulão, João Araujo* compares four different templates for user stories. The authors applied several metrics for speed, quality, and other aspects. They found several statistically significant differences between the templates. However, no single template was best in all categories. Therefore, authors recommend selecting a template based on the specific goal or priorities of a project (e.g. speed or quality).

Guidelines adopted by agile teams in privacy requirements elicitation after the Brazilian General Data Protection Law (LGPD) implementation by *Edna Dias Canedo, Angelica Toffano Seidel Calazans, Ian Nery Bandeira, Pedro Henrique Teixeira Costa, Eloisa Toffano Seidel Masson* was stimulated by the introduction of the Brazilian General Data Protection Law (LGPD). The authors conducted a systematic literature review, a survey, and 10 interviews to explore the state of the practice concerning LGPD. They found a higher awareness for data privacy issues in agile teams than before LGPD, but the teams are still facing challenges.

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