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Preface

We are proud to present the proceedings of the 38th International Conference on Conceptual Modeling (ER 2019), held in Salvador, Brazil, during November 4–7, 2019. The ER conference series is an annual premier forum featuring the latest research breakthroughs in theories, models, methods, and tools for developing, communicating, and applying conceptual models.

This year, we are very delighted to celebrate 40 years of ER and to bring the conference back to Brazil after 10 years. We have put together a strong scientific program consisting of keynote talks by four distinguished speakers, oral presentations of accepted main conference papers, a doctoral consortium, seven workshops, and four tutorials. For the keynote talks, we were extremely honored to have Veda C. Storey, the winner of Peter Chen Award 2018 and Full Professor of Computer Information Systems and Professor of Computer Science at the Georgia State University (USA), Marco A. Casanova, Professor of Computer Science at the Pontifical Catholic University of Rio de Janeiro (Brazil), Barbara Weber, Professor for Software Systems Programming and Development at the University of St. Gallen (Switzerland), and Paul D. Nielsen, Director and CEO of the Software Engineering Institute (USA), sharing their research and practice insights. The industrial keynote talk was delivered by C. Mohan, an outstanding researcher from IBM Research, an IBM fellow, and a database community leader bestowed with many awards and honors.

For the main conference, we received 142 paper submissions of which 22 were accepted as full papers and another 22 were accepted as short papers. The overall acceptance rate was about 31%. In our review process, each paper was reviewed by three PC members and one senior PC member to ensure that all accepted papers were carefully selected. All the accepted papers were given presentation timeslots distributed into 12 paper sessions. In addition, ER 2019 hosted a Doctoral Consortium for PhD students and academics to share their research ideas, to seek advice, and to explore collaboration in conceptual modeling research. The conference also included an ER Forum to cover emerging and early stage research, as well as poster and demo sessions to increase opportunities for interaction.

Finally, we would like to thank all participants, authors, reviewers, and organizers of the conference for their contribution to making ER 2019 a successful event. We thank Springer for their proceedings support and EasyChair for its wonderful conference management system. Special thanks to our many sponsors and to the ER Steering Committee for their support and advice.

November 2019

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Invited Talks

Next Generation Modeling Environments

Barbara Weber[1,2]

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Abstract. Conceptual models play an important role in many organizations. They serve as tools for communication and documentation, are often a central part in process improvement initiatives, and are key to the development and evolution of information systems. Existing modeling tools typically support end users in a rather generic and non-personalized manner. However, users not only differ in their modeling expertise and the challenges they encounter while modeling, but also in their preferences. Therefore, they would benefit from a new generation of modeling environments that are highly personalized and adapt themselves to users' needs. This keynote presents a vision of such modeling environments with a focus on process modeling. Next generation process modeling environments are not limited to graphical user interfaces, but allow end users to interact with them in their preferred modality (e.g., natural language user interfaces like chatbots and conversational agents). For example, recent research by [4] shows how a process model can be transformed into a conversational agent to guide process actors through the process steps. Another key characteristic of next generation process modeling environments is the continuous collection of multi-modal data. Amongst others data collection may include behavioral data (e.g., user interactions), data on how the model and its properties change over time, and (neuro-)physiological data of the modeler collected with biosensors. Next generation modeling environments analyze the collected data while the system is being used to obtain insights and continuously adapt themselves in response to the obtained insights. For example, data about the model and how it has evolved over time can be used to predict the expertise level of a modeler [3]. Behavioral data can be exploited not only to derive behavioral patterns or modeling styles [1, 5], but also to automatically detect the modeling activity a user is currently engaged in [2]. Neuro-physiological data, in turn, can be used in a learning setting to assess the cognitive state of a user (e.g., identify states of high cognitive load) and to adapt the difficulty of the materials provided accordingly [7]. With inherent data collection and analysis capabilities, the boundaries between development and evaluation will increasingly blur and continuous experimentation will become an integral part of system development. Our work on Cheetah Experimental Platform is a first step towards this direction [6]. The keynote highlights this potential with several examples from our research and touches upon challenges that come with the development of next generation modeling environments.

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State of Permissionless and Permissioned Blockchains: Myths and Reality

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Abstract. It has been a decade since the concept of blockchain was invented as the underlying core data structure of the permissionless or public Bitcoin cryptocurrency network. Since then, several cryptocurrencies, and associated concepts like tokens and ICOs have emerged. After much speculation and hype, significant number of them have become problematic or worthless, even though some countries have embraced them! The permissionless blockchain system Ethereum emerged by generalizing the use of blockchains to manage any kind of asset, be it physical or purely digital, with the introduction of the concept of Smart Contracts. Over the years, numerous myths have developed with respect to the purported utility and the need for permissionless blockchains. The adoption and further adaptation of blockchains and smart contracts for use in the permissioned or private environments is what I consider to be useful and of practical consequence. Hence, the technical aspects of only private blockchain systems will be the focus of my ER 2019 keynote. Along the way, I will bust many myths associated with permissionless blockchains. I will also compare traditional database technologies with blockchain systems' features and identify desirable future research topics.

Keywords: Bitcoin · Smart contracts · Private blockchains · Hyperledger fabric · Enterprise ethereum alliance · Quorum · R3 corda · Sawtooth · Cryptocurrencies · Byzantine faults · Consensus

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