
Introduction to the ICWE 2020 Special Issue

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Abstract

The International Conference on Web Engineering (ICWE) promotes research and scientific exchange related to web engineering, and brings together researchers and practitioners from various disciplines in academia and industry. Year 2020 ICWE, originally scheduled for Helsinki, Finland, took place online in June 2020. This special issue collects an assortment of its best articles, and presents them in expanded form.

Keywords: International Conference on Web Engineering, ICWE 2020, web engineering, invited papers.

1 Introduction

Starting from humble origins 1989 as a system for sharing research results between scientists in universities and institutes around the world, the World Wide Web has become the most powerful medium for information sharing and distribution in the history of humankind. During this evolution, several phases can be identified. These phases, sometimes characterised by connectivity, networked business, collaboration, and networked everything, have introduced numerous new technological innovations that have expanded the sharing capabilities towards a full-fledged software platform, which the Web is today.

At the same time, the Web is far from being complete, both in terms of technology and in terms of its accessibility. Hence, there is a constant need for new research and innovation that will transform the Web into an even more comprehensive and pervasive platform. This transformation needs systematic, disciplined and quantifiable approaches to development, operation, and maintenance of Web-based applications that continue to have a full validity like never before. Web Engineering is a discipline that deals with the process of developing, deploying and maintaining Web applications, which in the end can be built with new technology to realize the innovations. Furthermore, since the research results are often put directly to use in companies, there is an ongoing dialog between the researchers and the practitioners.

As one of the references in this research field, the International Conference on Web Engineering (ICWE) is the prime yearly international conference on the different aspects of designing, building, maintaining and using Web applications. With the ever-increasing importance of the Web in almost all walks of life, ICWE brings together practitioners and researchers to tackle the emerging challenges in the engineering of Web applications.

This special issue in the Journal of Web Engineering is oriented for discussing advanced techniques, new challenges, current state-of-the-art and experiences, based on a selection of the best papers of the 2020 edition of ICWE [1]. It covers the following four articles.

Geospatially Partitioning Public Transit Networks for Open Data Publishing by Harm Delva, Julián Andrés Rojas, Pieter Colpaert, and Ruben Verborgh provides an insight into why and how geospatial partitioning can improve query times for client-side route planning applications for various public transit networks, or other kinds of geospatial data in general. The authors evaluate the same method on three networks in Belgium: the national railways, the regional operator in Flanders, and the network of the city of Brussels, using both real and artificially generated query sets. Even though they came to a negative answer, i.e. they could not improve the performance on all networks significantly, they showed that the network's topography is the main determining factor. This finding can be applied for other use cases and other kinds of data.

An Empirical Study of Web Page Structural Properties by Xavier Chamberland-Thibeault, Sylvain Hallé analyzes a representative collection of Web sites to measure how the size and structure of their Web pages has evolved over time. The goal is to provide a reference dataset for quantitative studies sampling how Web engineers adopt different technologies and how the emergence of different HTML versions made an impact on the pages

written using this language. For example, indeed the DIV tag is still the most frequently used one. Also, over the years, the Document Object Model (DOM) tree have shown a tendency to grow wider but not deeper. As part of their work, the authors have also built a structural visualization tool for Web pages and a special crawler dedicated to harvesting DOM trees. We are glad to report that the authors have shared a replication package so that other Web engineering researchers can build upon their work.

Creating and Capturing Artificial Emotions in Autonomous Robots and Software Agents by Claus Hoffmann presents ARTEMIS, a control system for autonomous robots or software agents, which can present human-like artificial emotions during interactions with their environment. Under the hood, the system uses a knowledge graph that can store past emotions, based on which decision making and planning processes can be adapted. The paper also shows that using ARTEMIS, it is possible to realize an autonomous user assistant with plausible artificial emotions, and record these artificial emotions for future use. In general, the work combines theory and practice from several fields, demonstrating the versatility of web engineering as a research field.

Generation of Realistic Navigation Paths for Web Site Testing Using RNN and GAN by Silvio Pavanetto and Marco Brambilla presents a method based on recurrent neural networks and generative adversarial neural networks to generate realistic user access logs under constraints specified using IFML models. The goal is to enable testing of Web applications under realistic conditions before they are deployed in production. The comparative evaluation results show that GAN outperform RNN as well as the statistical baseline both in terms of the BLEU score as well as according to human judgement.

References

- [1] M. Bielikova, T. Mikkonen, and C. Pautasso. *Web Engineering: 20th International Conference, ICWE 2020, Helsinki, Finland, June 9-12, 2020, Proceedings*, volume 12128. Springer Nature, 2020.

Biographies



Maria Bielikova. She is co-founder and expert researcher at the Kempten Institute of Intelligent Technologies (KInIT), an independent non-profit institute focused on researching intelligent technologies and interconnecting industry and academia. She is active in research in modeling of human machine interactions and personalization. Before her work at KInIT, Maria was employed at the Slovak University of Technology as a full professor, lead of the PeWe research group (Personalized Web) and director of the User eXperience and Interaction research center. She is a steering committee or program committee member of several international conferences, including UMAP, ICWE, RecSys, IJCAI, The Web Conference and Hypertext. You can find more information on <https://kinit.sk/member/maria-bielikova/>.



Cesare Pautasso. He is a Full Professor at the Software Institute of the Faculty of Informatics, USI Lugano, Switzerland where he leads the Architecture, Design and Web Information Systems Engineering research group. He is currently supervising the research of a group of Ph.D. students building experimental systems to explore the intersection of software architecture, Web engineering, and business process management, with research projects exploring blockchain-based business choreographies, Web Service API Analytics, and liquid software. He is the coauthor of the book *SOA with REST* (2012) and has just published a new book titled *Beautiful APIs*

(2021) on LeanPub. He is coeditor of the IEEE Software Insight department and was general chair of the 16th International Conference on Web Engineering (ICWE2016) and program co-chair of the 20th International Conference on Web Engineering (ICWE2020). You can find more information on <http://www.pautasso.info> and follow him @pautasso@scholar.social.



Tommi Mikkonen. He is a Full Professor at the Department of Computer Science at University of Helsinki, Finland. He has a history of working at the interface of academia and industry, bringing new results closer to practice via close collaboration with industry, and identifying new, emerging challenges that are faced by practitioners. Previously, he has been working for industry projects at Aerospatiale, Nokia, Sun Microsystems, and Mozilla. He served as the general chair of the 20th International Conference on Web Engineering (ICWE2020). Contact him at tommi.mikkonen@helsinki.fi.

