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Database and Expert Systems Applications

33rd International Conference, DEXA 2022
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Proceedings, Part I

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Preface

Welcome to the two-volume edition of the proceedings of the 33rd International Conference on Database and Expert Systems Applications (DEXA 2022). After a break of two years due to the COVID-19 pandemic situation, which forced us to use online formats, we were happy that we could finally meet in person in Vienna, Austria, during August 22–24, 2022. The wide variety of the topics, as well as the depth of the presented research, revealed, that sound research in the field of database and expert systems applications was not at all shut down by the pandemic. The papers accepted and presented at DEXA 2022, which are collated in these two volumes of proceedings, are an impressive collection of the research and development performed during the challenging recent times.

This year, the DEXA Program Committee accepted 43 full papers and 20 short papers, leading to an acceptance rate of 35%. The total number of submissions was comparable with recent DEXA editions, and we are proud to see again that the DEXA community is global as we received contributions from all around the world (Europe, America, Asia, Africa, Oceania). Our Program Committee performed more than 500 reviews, which not only serve the purpose of quality control for the conference but also contained valuable feedback and insights for the authors. We would like to sincerely thank our Program Committee members for their rigorous and critical, and at the same time motivating, reviews of DEXA 2022 submissions.

As is the tradition of DEXA conference series, all accepted papers were published in Lecture Notes in Computer Science (LNCS) and made available by Springer. Authors of selected papers presented at the conference will be invited to submit substantially extended versions of their conference papers for publication in special issues of two international journals: Knowledge and Information Systems (KAIS) and Transactions of Large Scale Data and Knowledge Centered Systems (TLDKS), both published by Springer. The submitted extended versions will undergo a further review process.

DEXA 2022 covered a wide range of relevant topics: (i) big data management and analytics, (ii) consistency, integrity, and quality of data, (iii) constraint modeling and processing, (iv) database federation and integration, interoperability, and multidatabases, (v) data and information semantics, (vi) data integration, metadata management, and interoperability, (vii) data structures and data management algorithms, (viii) graph databases, (ix) incomplete and uncertain data, (x) information retrieval, (xi) statistical and scientific databases, (xii) temporal, spatial, and high dimensional databases, (xiii) query processing and transaction management, (xiv) visual data analytics, data mining, and knowledge discovery, (xv) WWW and databases, as well as web services.

We would like to express our gratitude to the distinguished keynote speakers for their presented leading edge topics:

- Ricardo Baeza-Yates, Institute for Experiential AI, Northeastern University, USA
- Sabrina Kirrane, Institute for Information Systems and New Media, Vienna University of Economics and Business, Austria
- Philippe Cudré-Mauroux, University of Fribourg, Switzerland

DEXA 2022 also featured six international workshops that focused the attention on a variety of specific topics:

- The 2nd International Workshop on AI System Engineering: Math, Modelling and Software (AISys 2022);
- The 1st International Workshop on Applied Research, Technology Transfer and Knowledge Exchange in Software and Data Science (ARTE 2022);
- The 1st International Workshop on Distributed Ledgers and Related Technologies (DLRT 2022);
- The 6th International Workshop on Cyber-Security and Functional Safety in Cyber-Physical Systems (IWCFS 2022);
- The 4th International Workshop on Machine Learning and Knowledge Graphs (MLKgraphs 2022);
- The 2nd International Workshop on Time Ordered Data (ProTime 2022).

Like the success of every conference, DEXA's success is also built on the continuous and generous support of its participants and contributors and their perpetual and sustained efforts. Our sincere thanks go to the loyal and dedicated authors, distinguished Program Committee members, session chairs, organizing and steering committee members, and student volunteers who worked hard to ensure the continuity and the high quality of DEXA 2022.

We would also like to express our thanks to all institutions actively supporting this event, namely

- Software Competence Center Hagenberg (SCCH), Austria;
- Institute of Telecooperation, Johannes Kepler University Linz (JKU), Austria;
- Web Applications Society (@WAS);
- Austria Society for Artificial Intelligence (ASAI), Austria;
- Vienna University of Economics and Business (WU), Austria; and
- Austrian Blockchain Center (ABC Research), Austria.

We hope you enjoyed the DEXA 2022 conference: not only as an opportunity to present your own work to the DEXA community but also as an opportunity to meet new peers and foster and enlarge your network. We are looking forward to seeing you again next year!

August 2022

Christine Strauss
Alfredo Cuzzocrea

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Abstracts of Keynote Talks

Responsible AI

Ricardo Baeza-Yates

Institute for Experiential AI @ Northeastern University

Abstract. In the first part we cover five current specific problems that motivate the needs of responsible AI: (1) discrimination (e.g., facial recognition, justice, sharing economy, language models); (2) phrenology (e.g., biometric based predictions); (3) unfair digital commerce (e.g., exposure and popularity bias); (4) stupid models (e.g., minimal adversarial AI) and (5) indiscriminate use of computing resources (e.g., large language models). These examples do have a personal bias but set the context for the second part where we address four challenges: (1) too many principles (e.g., principles vs. techniques), (2) cultural differences; (3) regulation and (4) our cognitive biases. We finish discussing what we can do to address these challenges in the near future to be able to develop responsible AI.

Following the Rules: From Policies to Norms

Sabrina Kirrane

Institute for Information Systems and New Media @ Vienna University of Economics and Business

Abstract. Since its inception, the world wide web has evolved from a medium for information dissemination, to a general information and communication technology that supports economic and societal interaction and collaboration across the globe. Existing web-based applications range from e-commerce and e-government services, to various media and social networking platforms, many of whom incorporate software agents, such as bots and digital assistants. However, the original semantic web vision, whereby machine-readable web data could be automatically actioned upon by intelligent software web agents, has yet to be realized. In this talk, we will show how rules, in the form of policies and norms, can be used to specify a variety of data usage constraints (access policies, licenses, privacy preferences, regulatory constraints), in a manner that supports automated enforcement or compliance checking. Additionally, we discuss how, when taken together, policies, preferences, and norms can be used to afford humans more control and transparency with respect to individual and collaborating agents. Finally, we will highlight several open challenges and opportunities.

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