Lecture Notes in Computer Science

Lecture Notes in Artificial Intelligence 14281

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Logics in Artificial Intelligence

18th European Conference, JELIA 2023
Dresden, Germany, September 20–22, 2023
Proceedings

Springer

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ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Artificial Intelligence
ISBN 978-3-031-43618-5 ISBN 978-3-031-43619-2 (eBook)
https://doi.org/10.1007/978-3-031-43619-2

LNCS Sublibrary: SL7 – Artificial Intelligence

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Preface

This volume contains the proceedings of the 18th European Conference on Logics in Artificial Intelligence, which took place at TU Dresden, Germany, during September 20–22, 2023.

The European Conference on Logics in Artificial Intelligence (or Journées Européennes sur la Logique en Intelligence Artificielle–JELIA) began back in 1988, as a workshop, in response to the need for a European forum for the discussion of emerging work in this field. Since then, JELIA has been organized biennially, with proceedings published in the Springer series Lecture Notes in Artificial Intelligence. Previous meetings took place in Roscoff, France (1988), Amsterdam, The Netherlands (1990), Berlin, Germany (1992), York, UK (1994), Évora, Portugal (1996), Dagstuhl, Germany (1998), Málaga, Spain (2000), Cosenza, Italy (2002), Lisbon, Portugal (2004), Liverpool, UK (2006), Dresden, Germany (2008), Helsinki, Finland (2010), Toulouse, France (2012), Madeira, Portugal (2014), Larnaca, Cyprus (2016), and Rende, Italy (2019). Due to the COVID-19 pandemic, the 2021 edition was held online, instead of the University of Klagenfurt, Austria. But in 2023, the conference could return to its traditional in-person format, as an engaging and inspiring meeting in the beautiful city of Dresden.

The aim of JELIA is to bring together active researchers interested in all aspects concerning the use of logics in artificial intelligence to discuss current research, results, problems, and applications of either a theoretical and practical nature. JELIA strives to foster links and facilitate cross-fertilization of ideas among researchers from various disciplines, among researchers from academia and industry, and between theoreticians and practitioners. The scientific community has been increasingly showing interest in JELIA, which during the years featured the growing participation of researchers from outside Europe and a very high overall technical quality of contributions; hence, the conference turned into a major biennial forum and a reference for the discussion of logic-based approaches to artificial intelligence.

JELIA 2023 received 112 submissions in two different formats: long and short papers. Each submission was reviewed by three Program Committee members. Out of the 112 submissions, 41 were accepted as long papers and 11 as short papers. Of the 55 submissions which were declared to have a student as a leading author, 26 were included in the program. All of the accepted submissions were given a slot for oral presentation at the conference.

This year's conference included a Special Track on *Logics for Explainable and Trustworthy* AI, focusing on logic-based approaches to making AI more transparent, safer, and more trustable. Of the 112 submissions, 14 were submitted to this special track. They went through the same reviewing process, and 7 papers were accepted and presented in a dedicated session at the conference.

The conference program also featured four wonderful invited talks by Mario Alviano, Katie Atkinson, Franz Baader, and Vaishak Belle. The abstracts of these talks—and in most cases also an accompanying paper—can be found in these proceedings.

JELIA 2023 recognized and awarded two prizes to contributions that the Program Committee deemed to be of exceptional quality. The *Best Paper Award* was given to Stéphane Demri and Karin Quaas for their work entitled *First Steps Towards Taming Description Logics with Strings*, while the *Best Student Paper Award* was given to Bartosz Bednarczyk for his paper *Beyond* $\mathcal{ALC}_{reg}$: *Exploring Non-Regular Extensions of Propositional Dynamic Logic with Description-Logics Features*. Each award was accompanied by a prize of 500 €, kindly offered by Springer.

We would like to thank the members of the Program Committee and the additional reviewers for their efforts to produce fair and thorough evaluations of the submitted papers, which is essential for a successful scientific conference. Thank you also to the authors of the scientific papers, including those not accepted for publication. The number of high-quality submissions on relevant and exciting topics was substantial, and unfortunately, not all could be included in the program. We want to extend our gratitude to the local organization committee for their hard work in making JELIA 2023 a wonderful event.

We are very grateful to all the sponsors for their generous support of JELIA 2023: School of Embedded Composite Artificial Intelligence (SECAI), Center for Perspicuous Computing (CPEC), Center for Scalable Data Analytics and Artificial Intelligence (ScaDS.AI), compl3te, Springer, and Potassco Solutions. Last, but not least, we thank the people behind EasyChair for the useful conference management system.

August 2023

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Combining Symbolic and Machine Learning Approaches for Automating Legal Reasoning (Abstract of Invited Talk)

Katie Atkinson

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Abstract. The need for AI applications to be explainable and trustworthy is eminently clear in domains where AI-supported decisions can have significant real-world consequences. The field of law is one such characteristic domain. In this talk I will present an overview of recent research investigating how different AI techniques can be combined to provide support for automating reasoning about legal cases in an efficient and explainable manner. Symbolic, logic-based techniques are used to represent the legal knowledge of a domain in a structured manner and machine learning techniques are used to identify the inputs to the symbolic model. The hybrid approach enables the different techniques to be targeted towards the particular tasks where they are most effective, within the overall automation pipeline. I will provide an overview of the hybrid system along with the first sets of results of experiments evaluating the performance of the hybrid system where the domain used is legal cases from the European Court of Human Rights.

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