Report on the 3rd International Joint Conference on Rules and Reasoning (RuleML+RR 2019)

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The annual International Joint Conference on Rules and Reasoning (RuleML+RR) is an international conference on research, applications, languages and standards for rule technologies, rule-based programming and rule-based systems including production rules systems, logic programming rule engines, as well as business-rule engines and management systems; Semantic Web rule languages and rule standards, including RuleML (e.g., Datalog+ RuleML, Reaction RuleML and LegalRuleML), SWRL, RIF, Common Logic, PRR, decision rules and Decision Model and Notation (DMN), as well as Semantics of Business Vocabulary and Business Rules (SBVR); rule-based Event Processing Languages (EPLs) and technologies; and foundational research on inference rules, transformation rules, decision rules, production rules, and Event-Condition-Action (ECA) rules. In 2017, RuleML+RR joined the efforts of two well-established conference series: the International Web Rule Symposia (RuleML) and the Web Reasoning and Rule Systems (RR) conferences, and it is now the leading conference to build bridges between academia and industry in the field of Web rules and its applications, especially as part of the Semantic Technology stack. RuleML+RR is commonly listed together with and related to other major high-impact Artificial Intelligence conferences worldwide, starting with IJCAI in 2011 and 2016, ECAI in 2012, AAAI in 2013, ECAI in 2014, the AI Summit London in 2017, and GCAI in 2018 and 2019. The RuleML symposia and RR conferences have been held since 2002 and 2007, respectively. The RR conferences have been a forum for discussion and dissemination of new results on Web reasoning and rule systems, with an emphasis on rule-based approaches and languages. The RuleML symposia have been devoted to disseminating research, applications, languages, and standards for rule technologies, with attention to both theoretical and practical developments, to challenging new ideas, and to industrial applications. Building on the tradition of both, RuleML and RR, the joint conference series RuleML+RR aims at bridging academia and industry in the field of rules, and at fostering the cross-fertilization between the different communities focused on the research, development, and applications of rule-based systems. RuleML+RR aims at being the leading conference series for all subjects concerning theoretical advances, novel technologies, and innovative applications about knowledge representation and reasoning with rules.

To leverage these goals, RuleML+RR 2019 (https://rulemlrr19.inf.unibz.it) was organized as part of the Bolzano Rules and Artificial INtelligence Summit (BRAIN 2019). The summit was hosted by the Free University of Bozen-Bolzano at its main site in Bolzano, Italy. With its special focus theme on beneficial AI, a core objective of BRAIN 2019 was to present and discuss the latest advancements in AI and rules, and their adoption in IT systems, towards improving key fields such as environment, health, and societies. To this end, BRAIN 2019 brought together a range of events with related interests. In addition to RuleML+RR, the summit included the 5th Global Conference on Artificial Intelligence (GCAI 2019, http://gcai2019.inf.unibz.it), the DecisionCAMP 2019 (https://decisioncamp2019.wordpress.com), and the Reasoning Web Summer School (RW 2019, https://rulemlrr19.inf.unibz.it/rw2019/).

RuleML+RR 2019 hosted the following sub-events:

— The 13th International Rule Challenge, organized by Sotiris Moschoyiannis (University of Surrey, UK) and Ahmet Soylu (Norwegian University of Science and Technology, SINTEF, Norway). The aim of this initiative was to provide competition among work in progress and new visionary ideas concerning innovative rule-oriented applications, aimed at both research and industry.
— The RuleML+RR+GCAI Doctoral Consortium (DC) 2019 , organized by Mantas Simkus (TU Wien, Austria) and Guido Governatori (Data61, Australia). The doctoral consortium was an initiative to attract and promote student research in rules and reasoning, with the opportunity for students to present and discuss their ideas, and benefit from close contact with leading experts in the field. The DC was organized jointly with GCAI 2019, to favor interaction and exchange of ideas among students interested in rules and reasoning, and students interesting in various facets of artificial intelligence.
— Posters and Interaction, organized by Petros Stefaneas (National Technical University of Athens, Greece) and Alexander Steen (University of Luxembourg, Luxembourg). The goal of this initiative was to showcase promising, preliminary research results and implemented systems, in the form of a poster or interactive demos.
— A tutorial day.

The technical program of the main track of RuleML+RR 2019 included the presentation of ten full research papers and five short papers. These contributions were carefully selected by the Program Committee among 26 high-quality submissions to the event. Each paper was carefully reviewed and discussed by members of the PC. The technical program was then enriched with the additional contributions from the Doctoral Consortium and the Rule Challenge.

At RuleML+RR 2019 the following invited keynotes and tutorials were presented by experts in the field:

— Keynote by Marie-Laure Mugnier (University of Montpellier, France): Existential Rules: a Study Through Chase Termination, FO-Rewritability and Boundedness,
— Keynote by Mike Gualtieri (VP and Principal Analyst, Forrester Research, USA): The Future of Enterprise AI and Digital Decisions,
— Tutorial by Monica Palmirani (University of Bologna, Italy): LegalRuleML and RAWE.

The keynotes were shared with GCAI 2019, consequently giving the opportunity to the RuleML+RR 2019 audience to also attend the two GCAI keynotes by Giuseppe De Giacomo (Sapienza Universit di Roma, Italy) and Marlon Dumas (University of Tartu, Estonia). In addition, a shared session with DecisionCAMP 2019 provided insights on the most recent industrial trends in decision management.

RuleML+RR 2019 awarded the Best Paper Award to: Reasoning on DL-LiteR with Defeasibility in ASP, by Loris Bozzato, Thomas Eiter and Luciano Serafini. The Best Paper Runner Up was: Efficient TBox Reasoning with Value RestrictionsIntroducing the Flwer Reasoner, by Friedrich Michel, Anni-Yasmin Turhan and Benjamin Zarrie. The Best Rule Challenge Award went to: PyIDS - Python Implementation of Interpretable Decision Sets Algorithm, by Jiri Filip and Tomas Kliegr. The Best Rule Challenge Presentation Award went to: OO-logic: a Successor of F-logic, by Jrgen Angele and Kevin Angele. The Best Poster and Interactions Award went to: Combining Conflict-Driven Clause Learning and Chronological Backtracking for Propositional Model Counting, by Sibylle Mohle and Armin Biere.

The chairs sincerely thank the keynote and tutorial speakers for their contribution to the success of the event. The chairs also thank the Program Committee members and the additional reviewers for their hard work in the careful assessment of the submitted papers. Further thanks go to all authors of contributed papers, in particular, for their efforts in the preparation of their submissions and the camera-ready versions within the established schedule. Sincere thanks are due to the chairs of the additional tracks and subevents, namely the Doctoral Consortium, the Rule Challenge, and the Poster and Interaction Track, and to the chairs of all co-located BRAIN 2019 events. The chairs finally thank the entire organization team including the Publicity, Proceedings, Sponsorship, Speaker Support, and Social Program Chairs, who actively contributed to the organization and the success of the event.

A special thanks goes to all the sponsors of RuleML+RR 2019 and BRAIN 2019: the Free University of Bozen-Bolzano, the Transregional Collaborative Research Centre 248 Foundations of Perspicuous Software Systems, Robert Bosch GmbH, the Artificial Intelligence Journal, oXygen, Hotel Greif, Ontopic S.r.L., and Springer. A special thanks also goes to Springer, for their cooperation in editing and publishing of the main proceedings and CEUR for the affiliated programs proceedings.

The RuleML+RR community will organize the 2020 joint conference: RuleML+RR 2020: International Joint Conference on Rules and Reasoning (https://2020. declarativeai.net), in Oslo, Norway, under the leadership of Dumitru Roman (SINTEF AS / University of Oslo, Norway), Martin Giese (University of Oslo, Norway) and Ahmet Soylu (NTNU / SINTEF AS, Norway). See you all next year at RuleML+RR 2020 in Oslo, Norway.

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