

## **Preface**

RuleML+RR 2024 is the leading international joint conference in the field of rule-based reasoning. It focuses on theoretical advances, novel technologies, and innovative applications concerning knowledge representation, reasoning, and learning with rules. The conference is an annual event that builds bridges between academia and industry. These proceedings present the papers from the satellite events of RuleML+RR 2024, namely the 18<sup>th</sup> Rule Challenge, 8<sup>th</sup> Doctoral Consortium, Industry Track, and Networking Session.

The Rule Challenge is one of the highlights of the conference and seeks to provide competition among innovative rule-oriented applications, aimed at both the research and industrial side. Submissions typically present demos related to the RuleML+RR topics, supply benchmarks and comparison results for rule engines and rule-based machine learning techniques, illustrate rule- and model-driven engineering, report on industrial experiences, present real case studies and practical experiences. The Rule Challenge is a competition, and a prize is awarded for the best Rule Challenge paper. This year's programme had 10 accepted papers. In addition, Matteo Palmonari, Associate Professor at University of Milan-Bicocca (Italy), delivered an invited talk titled "Designing AI Systems that Surpass Human Reliability: a Personal Take on the Role of Rules".

The Doctoral Consortium is an initiative of the RuleML+RR community to attract and promote student research in the topics of the conference. It offers students close contact with leading experts in the field, as well as an opportunity to present and discuss their ideas in a dynamic and friendly setting. The topics range from theoretical aspects of rules and reasoning, such as knowledge elicitation within the knowledge graphs, ontology-enriched data management, data anonymization, and description logics, to relevant practical applications of machine learning. Students presented their work through brief oral presentations during a dedicated session of the RuleML+RR conference and had the chance to discuss their research in detail with experts in the field. This year's programme had 2 accepted papers from doctoral students.

The RuleML+RR Industry Track targets work from all areas of Rules and Reasoning based technologies specifically for solving real industry problems. It welcomes experiences from practitioners when applying rules to industries such as engineering, manufacturing, agriculture, energy, media, financials, telecommunications, healthcare, life sciences, government, smart cities, tourism and cultural heritage. This year's programme had 4 accepted papers. In addition, Qi Gao, Senior Data Scientist at Philips Innovation & Strategy, delivered an invited talk titled "Big data and AI for service innovation of medical imaging systems".

The project Networking Session of RuleML+RR aims to bring together relevant projects working in the area of data and AI with particular focus on, but not limited to, the event topics: rules, reasoning, decisions, and explanations. The session provides an opportunity to: share knowledge between research and innovation projects operating in the area of data and AI; identify potential synergies between the projects, e.g., transfer data and AI technology between projects, joint publications, joint dissemination activities, etc.; discuss funding opportunities such as Horizon Europe, Digital Europe, ERC, etc. This year's proceedings had 14 accepted contributions.

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