



# AAAI-MAKE 2023: Challenges requiring the combination of machine learning and knowledge engineering

**Andreas Martin**

FHNW University of Applied Sciences  
and Arts Northwestern Switzerland,  
School of Business, Olten, Switzerland

## Correspondence

Andreas Martin, FHNW University of  
Applied Sciences and Arts Northwestern  
Switzerland, School of Business, Olten,  
Switzerland.

Email: [andreas.martin@fhnw.ch](mailto:andreas.martin@fhnw.ch)

## Abstract

The AAAI 2023 Spring Symposium on Challenges Requiring the Combination of Machine Learning and Knowledge Engineering was held at the Hyatt Regency, San Francisco Airport, California, USA, from March 27-29, 2023. The symposium gathered researchers and practitioners from machine learning and knowledge engineering to reflect on how combining the two fields can contribute to tackling future AI challenges. The symposium featured a joint keynote presentation by AI pioneers, over 25 presentations by contributors and authors who presented papers, datasets, ontologies, and research findings, and two novel challenges proposed to be solved by the community in a follow-up event.

The AAAI 2023 Spring Symposium on Challenges Requiring the Combination of Machine Learning and Knowledge Engineering brought together researchers and practitioners from machine learning and knowledge engineering. The focus was to reflect on how combining the two fields can contribute to tackling future societal, environmental, business, and fundamental AI challenges. AAAI-MAKE 2023 was the fifth edition of the symposium on combining machine learning and knowledge engineering with a changing focus as an emergent field.

A true highlight of AAAI-MAKE 2023 was the joint keynote presentation of the two AI pioneers and leading experts, Edward A. Feigenbaum and Douglas B. Lenat. Edward A. Feigenbaum is professor emeritus of computer science at Stanford University, winner of the ACM Turing Award, and is often called the father of expert systems. Douglas B. Lenat founded the Cyc project and Cycorp and is AAAI fellow. They provided a very inspiring joint keynote presentation where they shared their insights and perspectives on the history and future of AI, as well as

the challenges and opportunities of integrating machine learning and knowledge engineering.

The symposium featured over 25 presentations by contributors and authors who presented their papers, datasets, ontologies, and initial research findings. The presentations covered various topics, such as hybrid (human-artificial) intelligence and human-in-the-loop, commonsense and explainable AI, hybrid and neuro-symbolic AI, human-centered AI, dialogue systems and conversational AI, as well as application scenarios and requirements from the industry.

Besides, the symposium included two exciting challenges that were presented to be tackled by the community in a follow-up event. The first challenge was an independent evaluation of ChatGPT on mathematical word problems presented by Paulo Shakarian (Arizona State University). He proposed a benchmark dataset for evaluating chatbot systems for solving mathematical word problems in natural language. The second challenge was the dynamic ontology matching challenge presented by Maaike de Boer (TNO) and Roos Bakker (TNO). In their

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challenge, they suggested creating a novel ontology-based approach for matching ontologies related to the labor market that is currently heavily struggling with friction in demand and supply.

The participants perceived the AAI-MAKE symposium 2023 as a very successful, inspiring, and stimulating event that showcased the state-of-the-art and demonstrated the potential and value of combining machine learning and knowledge engineering for advancing AI research and practice. It also provided a platform for networking, fostering interaction and contribution among the participants from different backgrounds and domains. In the plenary session, Maaïke de Boer (TNO) delivered a short talk representing AAI-MAKE. The symposium ended with an engaged discussion on a follow-up event, which could root in a follow-up symposium on an assessment of approaches that combine knowledge engineering and machine learning, as well as challenge presentations. The participants expressed their interest and enthusiasm for continuing to collaborate and exchange ideas on this important topic.

The symposium was organized by the organizing committee of Andreas Martin (AAI-MAKE symposium

chair), Reinhard Stolle, Doug Lenat, Hans-Georg Fill, Aurona Gerber, Knut Hinkelmann, and Frank van Harmelen. The papers of the symposium shall be published as CEUR Workshop Proceedings.

#### CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest.

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#### AUTHOR BIOGRAPHY

**Andreas Martin**, PhD, is a lecturer and senior researcher in artificial intelligence and information systems at the FHNW University of Applied Sciences and Arts Northwestern Switzerland.