

Proceedings

IJCAI-ECAI Workshop

“Interactions between Analogical Reasoning and Machine Learning”

IARML 2022

July 23, 2022

Vienna, Austria

Editors

Miguel Couceiro (University of Lorraine, CNRS, Loria)

Pierre-Alexandre Murena (Aalto University)

<https://iarml2022-ijcai-ecai.loria.fr/>

Preface

Analogical reasoning is a remarkable capability of human reasoning, used to solve hard reasoning tasks. It consists in transferring knowledge from a source domain to a different, but somewhat similar, target domain by relying simultaneously on similarities and dissimilarities. In particular, analogical proportions, i.e., statements of the form “A is to B as C is to D”, are the basis of analogical inference. Analogical reasoning is pertaining to case-based reasoning and it has contributed to multiple machine learning tasks such as classification, decision making, and automatic translation with competitive results. Moreover, analogical extrapolation can support dataset augmentation (analogical extension) for model learning, especially in environments with few labeled examples. Conversely, advanced neural techniques, such as representation learning, enabled efficient approaches to detecting and solving analogies in domains where symbolic approaches had shown their limits. However, recent approaches using deep learning architectures remain task and domain specific, and strongly rely on ad-hoc representations of objects, i.e., tailor made embeddings.

The first workshop *Interactions between Analogical Reasoning and Machine Learning* (IARML) is being hosted by the 31st International Joint Conference on Artificial Intelligence and the 25th European Conference on Artificial Intelligence (IJCAI-ECAI 2022). It brings together AI researchers at the cross roads of machine learning, cognitive sciences and knowledge representation and reasoning, who are interested by the various applications of analogical reasoning in machine learning or, conversely, of machine learning techniques to improve analogical reasoning. The IARML workshop aims to bridge gaps between different AI communities, including case-based reasoning, deep learning and neuro-symbolic machine learning. The workshop welcomed submissions of research papers on all topics at the intersection of analogical reasoning and machine learning. The submissions were subjected to a strict double-blind reviewing process that resulted in the selection of six original contributions and two invited talks, in addition to the two plenary keynote talks.

Invited talks:

Towards a Model of Visual Reasoning (Ekaterina Y. Shurkova*, Leonidas Doumas)

Analogical Proportions (Christian Antic)

Plenary talks:

Analogy as a Technology for Machine Learning (Kenneth Forbus)

Analogy on Text Data (Yves Lepage)

IARML@IJCAI-ECAI'22 took place on July 23, 2022 in Vienna (Austria), and we are truly thankful to the IJCAI-ECAI workshop chairs for their help in the organization of this event. We are greatly indebted to the scientific committee for their reviews and suggestions for improving the accepted contributions.

Miguel Couceiro
Pierre-Alexandre Murena

Organising Committee

Miguel Couceiro (University of Lorraine, CNRS, Loria, FR)

Pierre-Alexandre Murena (Aalto University, FI)

Scientific Committee

Stergos Afantenos (CNRS, Université Paul Sabatier, IRIT, FR)

Fadi Badra (Université Sorbonne Paris Nord, LIMICS, FR)

Nelly Barbot (Université de Rennes 1, IRISA, FR)

Tarek R. Besold (DEKRA DIGITAL, Eindhoven University of Technology, NL)

Myriam Bounhas (LARODEC-ISGT, TU, UAE)

Adrien Coulet (Inria Paris, FR)

Sebastien Destercke (CNRS, Université de Technologie de Compiègne, Heudiasyc, FR)

Claire Gardent (University of Lorraine, CNRS, LORIA, FR)

Eyke Hullermeier (University of Munich, DE)

Mehdi Kaytoue (Infologic, FR)

Yves Lepage (Waseda University, JA)

Jean Lieber (University of Lorraine, CNRS, LORIA, FR)

Esteban Marquer (University of Lorraine, CNRS, LORIA, FR)

Laurent Miclet (Université de Rennes, FR)

Pierre Monnin (Orange, FR)

Amedeo Napoli (University of Lorraine, CNRS, LORIA, FR)

Henri Prade (CNRS, Université Paul Sabatier, IRIT, FR)

Irina Rabkina (OXY Occidental College, USA)

Steven Schockaert (Cardiff University, IR)