

Preface for the First International Workshop on Logical Foundations of Neuro-Symbolic AI (LNSAI 2024)

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Abstract

This is the preface of the Proceedings of the First International Workshop on Logical Foundations of Neuro-Symbolic AI (LNSAI 2024), which took place on 05 August 2024 in Jeju Island (South Korea). The workshop was co-located with the Thirty-Third International Joint Conference on Artificial Intelligence (IJCAI 2024).

Workshop Description: Deductive and Inductive Reasoning are the two pillars of Artificial Intelligence (AI) systems that deal with data. Deductive Reasoning techniques are based on symbolic manipulation of information and usually infer new knowledge using automated logic-based procedures. On the contrary, Inductive Reasoning techniques learn patterns often using sub-symbolic representations such as Artificial Neural Networks. Using these representations, the former can derive accurate and explainable knowledge but are susceptible to noisy data, whereas the latter are robust to data diversity but generate predictions that can be potentially imprecise and generally opaque. Due to these characteristics, deductive and inductive reasoning techniques excel at solving and struggle with completely different, and often complementary, families of problems.

As a result, we are currently experiencing a new era of AI where symbolic and neural techniques are being combined to leverage the best from both of them. It is therefore extremely important that such promising synergy is accurately formalized at its core, and more specifically grounded on formal methods, based on some form of logic. This workshop aims to strengthen the integration between neural and symbolic approaches, with the goal of discussing methods and approaches for formalizing it.

General Chairs:

- Gianluca Cima (Sapienza University of Rome)
- Marco Console (Sapienza University of Rome)
- Víctor Gutiérrez-Basulto (Cardiff University)
- Pascal Hitzler (Kansas State University)
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Technical Program: The workshop received 14 submissions for peer review and only one was rejected. In addition to the 13 presentations made as part of the workshop, we also had a presentation by Efi Tsamoura (Samsung AI) as an invited speaker.

Of the 13 papers accepted for presentation, the authors of the following six papers agreed to include their paper in the workshop proceedings:

- Abductive Symbolic Solver on Abstraction and Reasoning Corpus
- Investigating Symbolic Capabilities of Large Language Models
- Neuro-Symbolic AI in 2024: A Systematic Review
- Formal Verification of Parameterised Neural-symbolic Multi-agent Systems (Extended Abstract)
- On The Expressivity of Recurrent Neural Cascades (Extended Abstract)
- What makes Models Compositional A Neuro-Symbolic Theoretical View (Extended Abstract)

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