Angelo Montanari
AndreA Orlandini
Nicola Saccomanno
Stefano Tonetta
(eds.)

7th International Workshop on Artificial Intelligence and Formal Verification, Logics, Automata and Synthesis

Bologna (Italy), October 26, 2025

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7th International Workshop on
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https://overlay.uniud.it/workshop/2025

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Contents

LLMs and Neurosymbolic AI for knowledge acquisition

Leveraging LLMs for Formal Software Requirements: Challenges and Prospects
Arshad Beg, Diarmuid O'Donoghue, Rosemary Monahan

A Proposal For Handling Query Ambiguity For Process Mining Tasks
Lucas Fortunato Das Neves, Chrysoula Zerva, Alessandro Gianola

Games and reasoning

Learning to Coordinate without Communication under Incomplete Information
Shenghui Chen, Shufang Zhu, Giuseppe De Giacomo, Ufuk Topcu

Strategic Reasoning over Golog Programs in the Nondeterministic Situation Calculus – Extended Abstract
Giuseppe De Giacomo, Yves Lespérance, Matteo Mancanelli

Spotlight presentations of Work in Progress

Circuit Complexity Meets Discrete Ordinary Differential Equations: An Overview
Melissa Antonelli, Arnaud Durand, Juha Kontinen

From Applicative Programming to Verification-based Knowledge: A Curry-Howard-Lambek Reading
Cosimo Perini Brogi

Attack logics, not outputs: Towards efficient robustification of deep neural networks by falsifying concept-based properties
Raik Dankworth, Gesina Schwalbe

RLRom: Monitoring and Training Reinforcement Learning Agents using Signal Temporal Logic
Ana María Gómez-Ruiz, Alexandre Donzé, Thao Dang

A Proof System with Causal Labels (Part I): checking Individual Fairness and Intersectionality
Leonardo Ceragioli, Giuseppe Primiero

A Proof System with Causal Labels (Part II): checking Counterfactual Fairness
Leonardo Ceragioli, Giuseppe Primiero

False Positives in Robustness Checking of Neural Networks
Mohammad Afzal, Ashutosh Gupta, R. Venkatesh, S. Akshay

Compliance Checking for Public Administration Processes using Retrieval-Augmented Generation in LLMs: Novel Directions and Challenges
Alessandro Gianola, Chrysoula Zerva

Reasoning on Privacy Policies
Yilian Huang, Cosimo Perini Brogi, Rocco De Nicola

Extracting Weighted Finite Automata from RNNs via iterative partitioning and spectral learning
Sandamali Yashodhara Wickramasinghe, Jacob M. Howe, Laure Daviaud

Preface

The use of *Artificial Intelligence* (AI) within the context of safety-critical systems has been experiencing continuous growth for a number of years now. On top of that, the research community is currently aiming to integrate sub-symbolic approaches with symbolic ones to foster their usage in critical scenarios such as, for example, safety-critical systems. These applications call for the adoption of *Formal Methods* (FM) techniques for the design, verification and synthesis of reliable and robust systems. The intersection between the AI and the FM communities is therefore more and more important.

OVERLAY 2025 was the 7th edition of the *International Workshop on Artificial Intelligence and fOrmal VERification, Logic, Automata, and sYnthesis*. Supported by the OVERLAY group (`https://overlay.uniud.it`), its primary objective is to establish and sustain a long lasting scientific platform dedicated to topics in the intersection of AI and FM.

This year's edition (`https://overlay.uniud.it/workshop/2025/`) took place on October 26, 2025 at the Engineering School of the University of Bologna, Italy, and was part of the 28th edition of the *European Conference on Artificial Intelligence* held in Bologna from the 25th to the 30th of October 2025.

The review process involved 25 PC members (plus 5 additional sub-reviewers) whose affiliations came from 10 different countries: Australia (1), Austria (1), Denmark (1), France (2), Germany (2), Italy (17), Netherlands (1), Portugal (2), Spain (1), United Kingdom (1). Eventually, 19 papers and 10 work-in-progress papers were accepted for presentation out of a total of 34 submissions that involved 90 authors whose affiliations came from 14 different countries: Canada, Denmark, Finland, France, Germany, India, Ireland, Italy (42), Netherlands, Norway, Portugal, Switzerland, United Kingdom, and USA. Of the accepted papers, 5 were not included in these proceedings by request of the authors.

Six sessions organized the presentations of the accepted papers:

- Session 1: Verification of learning-based and multi-agent systems, chaired by Stefano Tonetta (Fondazione Bruno Kessler, Italy);
- Session 2: Automata, formal languages and logic, chaired by Angelo Montanari (University of Udine, Italy);
- Session 3: Applications of formal verification and AI, chaired by Nicola Saccomanno (University of Udine, Italy);
- Session 4: LLMs and Neurosymbolic AI for knowledge acquisition, chaired by Andrea Orlandin (CNR, Italy);
- Session 5: Games and reasoning, chaired by Andrea Orlandini (CNR, Italy);
- Session 6: Spotlight presentations of Work in Progress, chaired by Nicola Saccomanno (University of Udine, Italy).

In addition a Poster session was organized with 10 extended abstracts, accepted as work in progress. In general, the accepted contributions exemplify seamless integration between artificial intelligence and formal methods.

OVERLAY 2025 witnessed a vibrant participation of around 80 attendees, fostering discussions among researchers bridging the realms of AI and FM. The contributions collected in these proceedings also prove the outstanding quality of the submissions received.

A huge thank you goes to Nicola Gigante at the Free University of Bolzano who kept the OVERLAY website always up to date and contributed in the formatting of these proceedings.

Finally, we extend our sincere gratitude to all authors and participants, and wish to reiterate once more that OVERLAY represents far more than a traditional workshop.

The chairs,

Angelo Montanari, University of Udine, Italy
AndreA Orlandini, CNR, Italy
Nicola Saccomanno, University of Udine, Italy
Stefano Tonetta, Fondazione Bruno Kessler, Italy.