Preface

5th Workshop on Artificial Intelligence and Model-driven Engineering (MDE 2023)

Abstract.

Model-driven engineering (MDE) and Artificial Intelligence (AI) have gained momentum in recent years, and the fusion of techniques and tools in the two domains paves the way for several applications. Such integrations— which we call MDE Intelligence— are bidirectional, i.e., MDE activities can benefit from the integration of AI ideas and, in return, AI can benefit from the automation and subject-matter-expert integration offered by MDE.

The 5th edition of the Workshop on Artificial Intelligence and Model-driven Engineering (MDE Intelligence), held in conjunction with the IEEE/ACM 26th International Conference on Model-Driven Engineering Languages and Systems (MODELS 2023), follows up on the success of the previous four editions, and provides a forum to discuss, study, and explore the opportunities offered and the challenges raised by integrating AI and MDE.

Introduction

Artificial Intelligence (AI) has become part of everyone's life. It is used by companies to exploit the information they collect, to improve the products and/or services they offer, and, wanted or unwanted, it is present in almost every device we use. Lately, AI is also impacting all aspects of the system and software development lifecycle, from their upfront specification to their design, testing, deployment, and maintenance, with the main goal of helping engineers produce systems and software faster and with better quality while being able to handle ever more complex systems and software.

There is no doubt that MDE has been a means to tame this complexity. However, its adoption by industry still relies on their capacity to manage the underlying methodological changes, including, among other things, the adoption of new tools. To go one step further, we believe there is a clear need for AI-empowered MDE, which will push the limits of "classic" MDE and will provide the right techniques and tools to support engineers in the development of the next generation of highly complex software systems.

The MDE Intelligence workshop provides a forum to discuss how to choose, evaluate, and adapt AI techniques to MDE as a way to improve current modeling and generation processes while, at the same time, increasing the benefits and reducing the costs of adopting MDE and AI. Currently, we see emerging approaches exploiting AI techniques to empower MDE techniques and tools with new or improved features to deal with complex, large-scale, and data-driven systems. We also like to emphasize that AI artefacts are in fact software artefacts, thus AI-enhanced MDE techniques and tools will also be beneficial for developing AI artifacts themselves, just think about "trustable" AI software. Therefore, the workshop also aims to discuss AI software as a target domain for MDE.

Goal of the workshop

The fifth edition of MDE Intelligence continues with the tradition of the previous three successful workshops at MODELS. This workshop aims to bring together researchers from MDE and AI backgrounds as well as researchers and practitioners from other domains with problems that might be addressed by a combination of such approaches to explore opportunities for cross-pollination, collaboration and exciting

new research avenues. Specifically, we have three objectives: (i) Grow a community of researchers and practitioners interested in combining AI and MDE towards "MDE Intelligence"; (ii) Highlight recent results in combining AI and MDE techniques; and (iii) Collect and collate challenges and case studies to help the community to develop a common set of problems and a shared language.

Summary of the Workshop

We solicited two types of contributions: (1) Research papers (nine pages); and (2) Vision papers, Experience papers, or Demos (five pages). In total, we received 18 initial submissions. Four of them were desk-rejected. For the remaining submissions, each of them was sent to three members of the program committee for reviewing. Eventually, the following eight papers were accepted for publication in the proceedings and presentation during the workshop:

- Syed Juned Ali, Aleksandar Gavric, Henderik Proper and Dominik Bork. Encoding Conceptual Models for Machine Learning: A Systematic Review
- Lars van Arragon, Carlos Diego Nascimento Damasceno and Daniel Strüber. Model-Driven Optimization: Towards Performance-Enhancing Low-Level Encodings
- Sathurshan Arulmohan, Marie-Jean Meurs and Sebastien Mosser Extracting Domain Models from Textual Requirements in the Era of Large Language Models
- Boqi Chen, Fandi Yi and Dániel Varró. Prompting or Fine-tuning? A Comparative Study of Large Language Models for Taxonomy Construction
- Abbas Rahimi, Massimo Tisi, Shekoufeh Kolahdouz Rahimi and Luca Berardinelli, Towards Generating Structurally Realistic Models by Generative Adversarial Networks
- Aymeric Koenig, Benjamin Allaert and Emmanuel Renaux. NEURAL- UML: Intelligent Recognition System of Structural Elements in UML Class Diagram
- Felix Gemeinhardt, Martin Eisenberg, Stefan Klikovits and Manuel Wimmer. Model-Driven Optimization for Quantum Program Synthesis with MOMoT
- Mouna Dhaouadi, Bentley James Oakes and Michalis Famelis, Towards Understanding and Analyzing Rationale in Commit Messages using a Knowledge Graph Approach

Acknowledgement

We gratefully thank the MODELS 2023 organizing committee for giving us the chance to organize this workshop. We are especially thankful to the workshop chairs Davide Di Ruscio (University of L'Aquila, Italy) and Leen Lambers (BTU Cottbus Senftenberg, Germany), who provided us with continuous support during the organization of the workshop.

Our thanks also go to the authors who trusted the MDE Intelligence workshop and submitted their papers, regardless of whether they were accepted or not, and particularly to the presenters of the accepted papers. Moreover, we would like to express our gratitude to the keynote speakers for agreeing to deliver insightful speeches.

Last but not least, our thanks go to the reviewers and the members of the Program Committee and Steering Committee, for their timely and accurate reviews.

Steering Committee

- Marco Brambilla (Politecnico di Milano, Italy)
- Lola Burgueño (University of Malaga, Spain)
- Jordi Cabot (ICREA, Spain)
- Sébastien Gérard (CEA List, France)
- Marouane Kessentini (University of Michigan-Dearborn, USA)
- Manuel Wimmer (Johannes Kepler Universität Linz, Austria)
- Steffen Zschaler (King's College London, UK)

Workshop Program Committee

We would like to express our gratitude to the following colleagues who spent time and efforts to review the submissions:

- Shaukat Ali (Simula Research Laboratory, Norway)
- Robert Claris'o (Universitat Oberta de Catalunya, Spain)
- Istvan David (McMaster University, Canada)
- Davide Di Ruscio (University of L'Aquila, Italy)
- Mattia Fumagalli (University of Bozen-Bolzano, Italy)
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- Kamal Karlapalem (IIIT Hyderabad, India)
- Phuong T. Nguyen (University of L'Aquila, Italy)
- Bentley Oakes (Université de Montréal, Canada)
- Aurora Ram'ırez (University of Córdoba, Spain)
- Rijul Saini (McGill University, Canada)
- Daniel Strüber (Radboud University Nijmegen, Netherlands)
- Gabriele Taentzer (Philipps-Universität Marburg, Germany)
- Marina Tropmann-Frick (Hamburg University of Applied Sciences, Germany)
- Steffen Zschaler (King's College London, UK)

Lola Burgueño, Dominik Bork, Jessie Galasso and Manuel Wimmer *MDE Intelligence 2023 Workshop Co-Chairs*