Call for Papers

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Important Dates

Intent to submit   15 January 2024
Paper submission 15 March 2024
Notification   15 May 2024

Software and Systems Modeling

Theme Section:
Foundations and Applications of AI and MDE

Model-driven engineering (MDE) and artificial intelligence (AI) represent distinct domains within the realm of computer science, yet their synergy offers promising prospects for mutual enrichment and collaboration. This amalgamation can materialize through at least two key avenues:

- **Artificial Intelligence for MDE**: MDE stands to gain substantial advantages by integrating AI principles and concepts. This synergy enhances MDE's capabilities, spanning areas such as flexibility, user experience, and overall software quality. For instance, the adoption of large language models presents a promising avenue for supporting various MDE tasks. These tasks may include domain modeling, model transformations, or the provision of recommendations for enhancing existing models in alignment with specific quality criteria.

- **MDE for Artificial Intelligence**: AI is software, and as such, it can benefit from integrating concepts and techniques from MDE that have been proven to improve software development. For example, using domain-specific languages allows domain experts to directly express and manipulate their problems while providing an auditable conversion pipeline. MDE can improve trust in, and safety of, AI technologies. Similarly, MDE technologies can contribute to the goal of fair and explainable AI.

The *Journal of Software and Systems Modeling* (SoSyM) invites original, high-quality submissions for its theme section on "Foundations and applications of AI and MDE". This dedicated issue aims to facilitate an in-depth exploration of the dynamic synergy between Artificial Intelligence (AI) and Model-Driven Engineering (MDE). We seek high-quality research papers, case studies, and empirical studies that shed light on the intricate interplay, challenges, and opportunities that arise at the nexus of AI and MDE. While we encourage submissions on a wide range of topics, some areas of interest include, but are not limited to:

AI for MDE
- Application of (meta-heuristic) search and machine learning to solve modeling problems;
- Machine learning of (meta-)models, concrete syntax, model transformations, etc.;
- AI planning applied to (meta-)modeling, and model management;
- AI-supported modeling (e.g., bots, recommenders, UI adaptation, etc.)
- Model inferencers and automatic, dataset-based model generators;
- Self-adapting code generators;

- Semantic reasoning, knowledge graphs, and domain-specific ontologies;
- AI-supported model-based digital twins;
- AI techniques for data, process, and model mining and categorisation;
- Natural language processing applied to modeling problems, including Large Language Models (LLM) and Generative AI;
- Data quality and privacy issues in AI for MDE.

MDE for AI
- Domain-specific modeling approaches for developing AI algorithms (e.g., AI planning, machine learning, agent-based modeling, etc.);
- Model-driven processes for AI systems development;
- MDE techniques for explainable and fair AI;
- Using models for data, information and knowledge representation;
- Code-generation for AI libraries and platforms;
- Architectural languages for AI-enhanced systems;
- MDE for federated learning;
- Model-based testing/analysis of AI components.

General
- AI in teaching MDE;
- Tools, frameworks, modeling standards;
- Experience reports, case studies, benchmarks, and empirical studies;

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General Author Information

- Papers must be written in a scientifically rigorous manner with adequate references to related work.
- Submitted papers must not be simultaneously submitted in an extended form or in a shortened form to other journals or conferences. It is however possible to submit extended versions of previously published work if less than 75% of the content already appeared in a non-journal publication, or less than 40% in a journal publication. Please see the SoSyM Policy Statement on Plagiarism for further conditions.
- Submitted papers do not need to adhere to a particular format or page limit. Please consult the SoSyM author information for submitting papers for more details.
- Each paper will be reviewed by at least three reviewers.

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Making a submission

- Communicate your intent to submit a paper by emailing the theme section editors the following information before the Intent to Submit deadline: Title, Authors, and an Abstract
- Possible submission formats are:
  o Word (.doc, without macros)
  o Rich Text Format (.rtf)
  o PostScript (.ps, special fonts must be embedded)
  o PDF (saved as readable in version 5.0 or earlier)
- Submit your work using the submission system manuscript central:
  o In step 1, select "Theme Section Paper" as the manuscript type.
  o In step 5, make sure the field "Cover Letter" includes the line: "Submission for Theme Section on Foundations and Applications of AI and MDE".

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Further information

If you have any questions or require additional information about this theme section, please contact the editors.