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Preface: Semantic Industrial Information Modelling

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Information Modelling (IM) has been under the spotlight of both academia and industry for decades. Important aspects of IM include methods and practices of representing concepts, relationships, constraints, rules and operations to specify data semantics for a chosen domain of interest. As a response to the IM challenge a number of modelling paradigms and languages arose, and they range from ERM, UML, ORM to OWL and Knowledge Graphs and come with a wide range of systems to support the life cycle of information models.

Despite the past success, existing approaches and systems for IM fail to cope with new challenges of overwhelming global industrial digitalization that requires advanced information models and aims at fully computerized, software-driven, automation of production processes and enterprise-wide integration of software components. Such trend and the technological and industrial developments that come with it are an important part of Industry 4.0 and industrial Internet of Things. It requires IM that, for example, allows capturing the functionality of and information flow between different assets in a plant, such as equipment and production processes. Moreover, it requires IM and models that are based on ISA and IEC standards and have a number of desirable properties, e.g., reusable, explainable, scalable, simulatable etc. Such IM should allow for seamless data sharing and integration e.g., via data marketplaces and across value chains.

These new challenges require new theory, methodology, best practice, systems and this should be developed, shared, and discussed by a wide range of stakeholders. In this workshop we aim at gathering researchers and practitioners who work on addressing these challenges with the help of semantic technologies. We in particular invite IM experts who are excited and committed to push the frontiers of IM further and support modern industry in its current technological transformation. In our workshop we welcome novel methods, systems, solutions, experience, and practice for semantic industrial information modelling.

In two sessions, the participants discuss semantic information modelling, based on 4 presentation based on the articles in this volume and the invited talk “*Leveraging Simple Semantic Models and Large Language Models for Event Analysis and Enterprise Data Management*” by Oktie Hassanzadeh, IBM Research. The workshop received 5 submissions, which were all reviewed by two or three members of the program committee. Four submissions were ultimately accepted.

We thank the program committee and reviewers for their work, and are grateful to the workshop chairs and reviewers of ISWC’24, who helped with setting up and shaping the event.

SemIIM’24: International Workshop on Semantic Industrial Information Modelling, November 12, 2024, Baltimore, US

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Preface: Software Lifecycle Management for Knowledge Graphs

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Knowledge graphs are digital artifacts with a complex construction process utilizing numerous tools and data sources. They are generated in elaborate pipelines utilizing a wide variety of semantic technologies, for example mapping languages, such as RML or OTTR, or validation languages, such as SHACL. Further semantic technologies are used to describes the used ontology, such as OWL, and the adjacent queries, such as SPARQL. Far from a linear process, multiple data sources must be mapped into the target knowledge graph.

All the involved artifacts, ontologies, mapping scripts, graph shapes, etc., are interdependent and changes in one of them require the adjustment in others. The building and maintenance of a knowledge graph needs to apply the artifacts and tools in the correct order in the right context, e.g., staging and production contexts, as well as manage the intermediate artifacts generated in substeps. In current practice, managing the dependencies is a manual process and general management of artifacts and changes is done using ad hoc approaches. Despite the numerous work on knowledge graph construction, there is a focus on the technical aspects of the single steps and little attention has been paid to the practical aspects of (a) organizing and managing knowledge graphs projects in terms of change management, dependencies between semantic artifacts, as well as DevOps for knowledge graphs, and (b) automating building and deploying of the resulting knowledge graph and adjacent artifacts. Similarly, connections to project management in software engineering, where a rich body of experience in DevOps, building, maintaining and deploying of digital artifacts exists are not systematically explored.

The Software Lifecycle Management for KG workshop (SofLiM4KG) was started to collect experiences in successful and abandoned knowledge graph projects from this perspective to (a) carve out the specifics in knowledge graph engineering that pose challenges beyond software engineering practices, (b) to establish best practices and anti-patterns for the community, and (c) build the foundations for the systematic investigation of the connection to software engineering, as well as qualitative and quantitative studies in project management of knowledge graphs.

In two sessions, the participants discusse software for knowledge graphs, based on 3 presentation and articles in this volume and an invited talk by Thomas Smoke, whyhow.ai. The

SofLiM4KG'24: Software Lifecycle Management for Knowledge Graphs Workshop, November 12, 2024, Baltimore, US

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We thank the program committee and reviewers for their work, and are grateful to the workshop chairs and reviewers of ISWC'24, who helped with setting up and shaping the event. We also acknowledge the organizers of the Dagstuhl seminar 24061, where the idea for this workshop arose.

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