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Enterprise, Business-Process and Information Systems Modeling

20th International Conference, BPMDS 2019
24th International Conference, EMMSAD 2019
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Proceedings

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Preface

This book contains the proceedings of two long-running events held along with the Conference on Advanced Information Systems Engineering (CAiSE) relating to the areas of enterprise, business process, and information systems modeling: the 20th International Conference on Business Process Modeling, Development and Support (BPMDS 2019), and the 24th International Conference on Evaluation and Modeling Methods for Systems Analysis and Development (EMMSAD 2019). The two working conferences had a joint keynote entitled “Modeling and AI: Friends or Foes?,” given by Jordi Cabot, Research Professor at the Open University of Catalonia. The abstract of the keynote is included in these proceedings. More information on the individual events and their selection processes can be found below.

BPMDS 2019

The topics addressed by the Business Process Modeling, Development and Support (BPMDS) series are focused on business processes, their conceptualization with the help of modeling languages, and their realization with support of information technology. These topics are among the keystones of information systems theory beyond short-lived fashions. The continued interest in these topics on behalf of the information systems community is reflected by the success of the past BPMDS events, and their promotion from a workshop to a working conference.

The BPMDS series has produced 19 events from 1998 to 2018. From 2011, BPMDS became a two-day working conference attached to CAiSE. The basic principles of the BPMDS series are:

1. BPMDS serves as a meeting place for researchers and practitioners in the areas of business development and business applications (software) development.
2. The aim of the event is mainly discussions, rather than presentations.
3. Each event has a theme that is mandatory for idea papers.
4. Each event’s results are, usually, published in a special issue of an international journal.

The goals, format, and history of BPMDS can be found on the website: <http://www.bpmds.org/>.

BPMDS solicits papers related to business process modeling, development and support (BPMDS) using quality, relevance, originality and applicability as main selection criteria. As a working conference, BPMDS aims to attract *completed research papers* describing mature research, *experience reports* related to using BPMDS in practice, and visionary *idea papers*. To encourage new and emerging challenges and research directions in the area of business process modeling, development and support,

BPMDS has a unique focus theme every year. Papers submitted as idea papers are required to be of relevance to the focus theme, thus providing a mass of new ideas around a relatively narrow but emerging research area. The focus theme for BPMDS 2019 idea papers was “Transformative Business Process Modeling, Development and Support.” In line with this, two idea papers published in these proceedings address influential approaches and technologies in the areas of augmented reality, Internet of Things, and blockchain-based smart contracts.

For the 20th edition of the BPMDS conference, we invited interested authors to engage during the two days of BPMDS 2019 in Rome, and to take part in a deep discussion with all participants about the challenges of business transformation in the digitally connected world and the ways *business process modeling, development and support* may provide capabilities to deal with those challenges. The challenges result, among others, from the impacts of the ubiquity of the actors, social networks, new business models, the co-existence of flexibility, exception handling, context awareness and personalization requirements together with other compliance and quality requirements.

Practitioners are producing business process models, researchers are studying and producing business process models, and also are producing new modeling languages when they consider that existing ones are not sufficient. What is beyond? Which kind of analyses can we make using those process models? How can we complete and enhance those process models with annotations, with data coming from everywhere out of the immediate process environment? How can the understanding we gain by working on those models in a sandbox help or facilitate the undergoing business transformation?

BPMDS 2019 received 20 submissions from ten countries (Australia, Chile, Denmark, Estonia, France, Germany, Israel, Italy, Sweden, and Switzerland). Each paper received at least three reviews from the members of the international Program Committee. Eventually, seven full papers and two short papers were accepted, among them six completed research papers, two idea papers addressing the focus theme “Transformative BPMDS,” and one experience report. The accepted papers cover a wide spectrum of issues related to business process development, modeling, and support. They are organized under the following section headings:

- Large and Complex Business Process Modeling and Development
- Novel Approaches in Enterprise Modeling
- Execution and Understandability of Declarative Process Models
- Transformative Business Process Modeling, Development, and Support

We wish to thank all the people who submitted papers to BPMDS 2019 for having shared their work with us, as well as the members of the BPMDS 2019 Program Committee, who made a remarkable effort in reviewing the submissions. We also thank the organizers of CAiSE 2019 for their help with the organization of the event, and IFIP WG8.1 for the support.

April 2019

Jens Gulden
Rainer Schmidt

EMMSAD 2019

The field of information systems and software development has resulted in a rich heritage of modeling paradigms, including software modeling, business process modeling, enterprise modeling, capability modeling, ontology modeling, and domain-specific modeling. These important paradigms, and the specific methods following them, continue to be enriched with extensions, refinements, and even new languages, to deal with new challenges. Even with some attempts toward standardization (e.g., UML for object-oriented software design, ArchiMate for enterprise architecture modeling, and BPMN for business process modeling), new modeling methods are constantly being introduced, especially in order to deal with emerging trends such as compliance and regulations, cloud computing, big data, business analytics, Internet of Things, cyber-physical systems, etc. These topics introduce challenges to modeling as well: scalability, privacy, security, and performance – to list a few, and they may require extending existing modeling methods or developing new ones. Ongoing changes significantly impact the way systems are being analyzed and designed in practice. Moreover, they challenge the evaluation of the modeling methods, which aims to contribute to the knowledge and understanding of their strengths and weaknesses. This knowledge may guide researchers toward the development of the next generation of modeling methods and help practitioners select the modeling methods most appropriate to their needs. A variety of empirical and non-empirical evaluation approaches can be found in the literature: feature comparison, meta-modeling, metrics, paradigmatic analysis, contingency identification, ontological evaluation, surveys, laboratory and field experiments, case studies, action research, and more. Yet, there is a paucity of such research in the literature.

The objective of the EMMSAD conference series is to provide a forum for researchers and practitioners interested in modeling methods for Systems Analysis and Development (SA&D) to meet and exchange research ideas and results. This year, we introduced five tracks that emphasized the variety of EMMSAD topics. Each track involved two chairs whose aim was to encourage submissions in the relevant topics and help during the decision-making phase of the review process. The authors could select multiple tracks for categorizing their papers. The tracks were:

1. Foundations of modeling and method engineering – chaired by Oscar Pastor and Jolita Ralyté
2. Enterprise, business process and capability modeling – chaired by Paul Grefen and Dimitris Karagiannis
3. Information systems and requirements modeling – chaired by Monique Snoeck and Arnon Sturm
4. Domain-specific and ontology modeling – chaired by Tony Clark and Heinrich C. Mayr
5. Evaluation of modeling approaches – chaired by Renata Guizzardi and Jennifer Horkoff

More details can be found at <http://www.emmsad.org/>.

EMMSAD 2019 received 38 submissions from 21 countries (Argentina, Austria, Bosnia and Herzegovina, Canada, China, France, Germany, India, Israel, Italy, Japan, Latvia, The Netherlands, Norway, South Africa, Spain, Sweden, Switzerland, Turkey, UK, and USA). The division of submissions among tracks was as follows: 11 submission related to foundations of modeling and method engineering, eight to enterprise, business process and capability modeling, 12 to information systems and requirements modeling, 11 to domain-specific and ontology modeling, and eight to evaluation of modeling approaches. Each submitted paper received between three and four reviews. After completing the review process, which involved the track chairs, the following 15 high-quality papers were selected:

1. Foundations of modeling and method engineering:

- Simon Hacks, Andreas Steffens, Peter Hansen, and Nikhitha Rajashekar. A Continuous Delivery Pipeline for EA Model Evolution
- Marlies Van Steenberg, Jeroen van Grondelle, and Lars Rieser. A Situational Approach to Data-Driven Service Innovation
- Salvador Martinez, Sébastien Gerard, and Jordi Cabot. On the Need for Intellectual Property Protection in Model-Driven Co-Engineering Processes

2. Enterprise, business process, and capability modeling:

- Georgios Koutsopoulos, Martin Henkel, and Janis Stirna. Dynamic Adaptation of Capabilities: Exploring Meta-model Diversity
- Mart van Zwienen, Marcela Ruiz, Marlies van Steenberg, and Veronica Burriel. A Process for Tailoring Domain-Specific Enterprise Architecture Maturity Models
- Benedikt Reitemeyer and Hans-Georg Fill. Ontology-Driven Enterprise Modeling: A Plugin for the Protégé Platform

3. Information systems and requirements modeling:

- Xin Dong, Tong Li and Zhiming Ding. Review-Based User Profiling: A Systematic Mapping Study
- Sunet Eybers, Aurlon Gerber, Dominik Bork, and Dimitris Karagiannis. Matching Technology with Enterprise Architecture and Enterprise Architecture Management Tasks Using Task Technology Fit
- Noa Roy-Hubara, Peretz Shoval, and Arnon Sturm. A Method for Database Selection.

4. Domain-specific and ontology modeling:

- Andreas L. Opdahl and Bjørnar Tessem. Toward Ontological Support for Journalistic Angles
- Asha Rajbhoj, Shailesh Deshpande, Jayavardhana Gubbi, Vinay Kulkarni, and Balamuralidhar P. A System for Semi-automatic Construction of Image Processing Pipeline for Complex Problems
- Ulrich Frank. Specification and Management of Methods — A Case for Multi-Level Modeling

5. Evaluation of modeling approaches:

- Azzam Maraee and Arnon Sturm. The Usage of Constraint Specification Languages: A Controlled Experiment
- Drazen Brdjanin and Stefan Ilic. Dealing with Structural Differences in Serialized BPMN Models
- Ilia Bider and Arian Chalak. Evaluating Usefulness of a Fractal Enterprise Model. Experience Report

The EMMSAD 2019 program further included a session of presentations and a panel on EMMSAD-related topics.

We wish to thank the EMMSAD 2019 authors for having shared their work with us, as well as the members of EMMSAD 2019 Program Committee for their valuable reviews. Special thanks go to the track chairs for their help in EMMSAD advertising and decision-making. Finally, we thank the organizers of CAiSE 2019 for their help with the organization of the event and IFIP WG8.1 for its support.

April 2019

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Modeling and AI: Friends or Foes?

(Keynote)

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Extended Abstract

AI is infiltrating all industries and the software industry is no exception. In fact, as of today, there are already several initiatives claiming the (prospective) applications of AI in the different phases of the software development lifecycle [1, 4, 5], from the requirement analysis and design to the development, testing, deployment and maintenance. But, is this a fad or really the future of software development? And, if so, what role could modeling play in this future?

In this talk, we will review promising applications of AI techniques in conceptual modeling, business process modeling, systems modeling and, in general, any branch of model-driven engineering; and discuss the many challenges that remain to be solved before we see the first real and usable AI-enhanced modeling technique or IDE.

Among other examples, we will discuss how neural networks can kill model transformation languages, how virtual modelers could become our ideal “pair designer” or the use of graph kernels to cluster modeling artefacts [2]. The recently created Modelia¹ initiative aims to support research activities around these topics.

But make no mistake, AI may need us more than we need AI. The future of AI is model-based. During the talk, we will also cover how modeling can help to bring AI to the masses and simplify the fragmented landscape of AI libraries, platforms and tools. As an example, we will see how DSLs (Domain-Specific Languages) can facilitate the definition and generation of AI pipelines and components, such as chatbots [3], by enabling their specification at a higher abstraction level.

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¹ <https://modelia.eu/>.

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