

Special issue

Citation for published version (APA):

Fahland, D., Ghidini, C., Dumas, M., & Reichert, M. (2022). Special issue: BPM 2020 Selected Papers in Foundations and Engineering. *Information Systems*, 109, Article 102093.
<https://doi.org/10.1016/j.is.2022.102093>

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DOI:

[10.1016/j.is.2022.102093](https://doi.org/10.1016/j.is.2022.102093)

Document status and date:

Published: 01/11/2022

Document Version:

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
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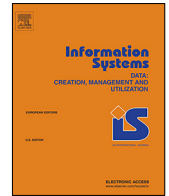
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Contents lists available at ScienceDirect

Information Systems

journal homepage: www.elsevier.com/locate/is

Editorial

Special issue: BPM 2020 Selected Papers in Foundations and Engineering



From the guest editors

This special issue contains extended versions of a selection of papers presented at the foundations and engineering tracks of the 18th International Conference on Business Process Management (BPM), which was organized by the University of Seville, Spain, September 13–18, 2020, but was held online due to the COVID-19 pandemic.

The annual BPM conference is the flagship venue for researchers and practitioners in the field of BPM. As in previous editions, the BPM 2020 conference was structured into three tracks, corresponding to the three traditional communities of the conference series: the foundations track (computer science), the engineering track (information systems engineering), and the management track (information systems management). In this special issue, we are pleased to present the revised and extended versions of four papers out of the 17 accepted papers in the foundations and engineering tracks. The chosen four papers stood out for their significance, novelty, and potential impact. The extended versions went through an additional dedicated review process for this special issue.

Today, BPM thinking lies at the heart of most successful business organizations. It is an interdisciplinary field at the intersection of information technology, organizational management, and industrial engineering. In recent years, it has been expanding its scope and span to embrace other issues raised by behavioral science, big data, operations management, social computing, cloud computing, theory of processes, etc. Accordingly, researchers are trying to foster true innovation rather than only incremental change in this field by developing new approaches for design of flexible, loosely structured and ad-hoc processes that go beyond just the control flow modeling of a process. Rather, there is a need to also capture the various other dimensions that relate to the successful realization of efficient processes, such as the data flows, the social and human aspects, and temporality, location and non-human resource issues.

The four chosen papers all fall into this category dealing with *uncertainty* in processes and event data, the *integration of control-flow and data* in modeling and verification, and the challenges of getting insights into *loosely structured ad-hoc processes*. We briefly overview their main contributions next.

- The article *Probabilistic Declarative Process Mining* by Alman et al. engage with the phenomenon that some dynamics

of processes are inherently uncertain and cannot be described in precise, crisp terms. The authors show how to extend standard temporal constraints with a probabilistic interpretation to describe uncertainty. By loosely coupling temporal and probabilistic reasoning, the article redefines, and provides solutions, process discovery, monitoring partial executions, and conformance checking under uncertainty. The techniques are implemented and evaluated on real-life event logs.

- In *Petri Net-Based Object-Centric Processes with Read-Only Data*, Ghilardi et al. fundamentally engage with one of the most challenging problems in process modeling and analysis: the integration of behavioral process models with data, specifically multiple objects that are handled and updated in the same process execution. The paper studies a variant of coloured Petri nets, called *catalog and object-aware nets (COA-nets)* that carefully balances the expressive power to cover many, advanced modeling scenarios over multiple objects on one hand, while proving under which conditions such models can still formally analyze through parameterized verification techniques.
- The article *From Action to Response to Effect: Mining Statistical Relations in Work Processes* by Koorn et al. tackles the problem of identifying *action-response-effect* patterns that encompass the traditional control-flow perspective of process discovery. The authors take advantage of well-established statistical tests to analyze event logs and uncover potential dependency relations in these patterns. The technique is implemented in the new ARE miner, whose graphical representations are evaluated to be easy to understand, and highlight informative on artificial and real-world data sets.
- In *Towards Interactive Event Log Forensics: Detecting and Quantifying Timestamp Imperfections*, Fischer et al. engage with a key challenge of data preprocessing in Process Mining: quality assessment of event logs. It does it by presenting a user-guided and semi-automated approach for detecting and quantifying timestamp-related issues in event logs which is based on 15 proposed metrics related to timestamp quality. The approach is implemented and evaluated in artificial and naturalistic settings by including experts from research and practice.

A novelty of the BPM 2020 conference was the encouragement to provide and review openly accessible artifacts, such as data sets and implementations, to further the reproducibility of

scientific research. We are pleased that all four papers meet this challenge.

We close this introduction by thanking all the reviewers involved in the special issue for their commitment and valuable feedback, which has been instrumental to keep the high quality standards of BPM special issues. Furthermore, we want to thank the authors for their dedication in providing their extended contributions, carefully taking into account the comments contained in all reviews. We also want to express our gratitude to the editorial team of Information Systems for hosting this special issue. Finally, we thank the technical team of the journal for their assistance in managing the review process.

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