

# Lecture Notes in Business Information Processing

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# Data-Driven Process Discovery and Analysis

7th IFIP WG 2.6 International Symposium, SIMPDA 2017  
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Revised Selected Papers

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# Preface

The rapid growth of organizational and business processes data, managed via information systems, has made available a big variety of information that consequently created a high demand for making data analytics more effective and valuable. The seventh edition of the International Symposium on Data-Driven Process Discovery and Analysis (SIMPDA 2017) was conceived to offer a forum where researchers from different communities can share their insights in this hot new field. As a symposium, SIMPDA fosters exchanges among academic research, industry, and a wider audience interested in process discovery and analysis. The event is organized by the IFIP WG 2.6. This year the symposium was held in Neuchatel, Switzerland.

Submissions cover theoretical issues related to process representation, discovery, and analysis or provide practical and operational examples of their application. To improve the quality of the contributions, the symposium is structured for fostering discussion and stimulating improvements. Papers are pre-circulated to the authors, who are expected to read them and make ready comments and suggestions. After the event, authors have the opportunity to improve their work extending the presented results. For this reason, authors of accepted papers were invited to submit extended articles to this post-symposium volume. We received 19 submissions and six papers were accepted for publication in this volume.

The current selection of papers underlines the most relevant challenges that were identified and proposes novel solutions for facing these challenges.

In the first paper, “Online Detection of Operator Errors in Cloud Computing Using Anti-Patterns,” Arthur Vetter studies the role of anti-patterns to support monotonic inference in real-time event processing. In particular his work addresses monitoring on a specific model, namely, the topology and orchestration specification for cloud applications, which explicitly models the maintenance operations of IT service applications.

The second paper, by Sebastian Steinau et al., is titled “Executing Lifecycle Processes in Object-Aware Process Management” and presents an advanced methodology for coping with object-aware process management, where the operational semantics is not obtained by specifying a workflow but by constraining the data flow characterizing business objects.

The third paper by Leonardi et al., “Towards Semantic Process Mining Through Knowledge-Based Trace Abstraction” proposes an approach to lift the semantics of event logs. The proposed framework is able to convert actions found in the event log into higher-level concepts, on the basis of a domain knowledge. According to the authors, the semantics lift process is proven to be a means to significantly increase the quality of the mined models, when measured in terms of fitness.

The fourth paper by Gega et al., “Mining Local Process Models and Their Correlations” aims at simplifying the integration of local process model (LPM) mining, episode mining, and the mining of frequent subtraces. For instance, the output of a

subtrace mining approach can be used to mine LPMs more efficiently. Also, instances of LPMs can be correlated together to obtain larger LPMs, thus providing a more comprehensive overview of the overall process. The authors discuss the benefit of this integration on a collection of real-life event logs.

The fifth paper by Couvreur and Ezpeleta, “A Linear Temporal Logic Model-Checking Method over Finite Words with Correlated Transition Attributes” presents an adaption of the classic timed propositional temporal logic to the case of finite words and considers relations among different attributes corresponding to different events. The introduced approach allows for the use of general relations between event attributes by means of freeze quantifiers as well as future and past temporal operators. The paper also presents a decision procedure, as well as a study of its computational complexity.

The sixth paper by Azzini et al., “A Report-Driven Approach to Design Multidimensional Models” presents an approach that can generate a multidimensional model from the structure of expected reports as data warehouse output. The approach is able to generate the multidimensional model and populate the data warehouse by defining a knowledge base specific to the domain. Although the use of semantic information in data storage is not new, the novel contribution of this approach is represented by the idea of simplifying the design phase of the data warehouse, making it more efficient, by using an industry-specific knowledge base and a report-based approach.

We gratefully acknowledge the research community that gathered around the problems related to process data analysis. We would also like to express our deep appreciation of the referees’ hard work and dedication. Above all, thanks are due to the authors for submitting the best results of their work to the Symposium on Data-Driven Process Discovery and Analysis.

We are very grateful to the Università degli Studi di Milano and to IFIP for their financial support, and to the University of Neuchatel for hosting the event.

November 2018

Paolo Ceravolo  
Maurice Van Keulen  
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