Introduction to the Minitrack
on Business Process Technology

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Organizations have been striving to better understand, analyze, improve, and automate their business processes for decades. Yet, recent advancements in the area of Business Process Technology, such as *process mining* and *robotic process automation* (RPA), have equipped organizations with entirely new means to achieve this goal. Process mining allows organizations to exploit transactional data recorded by information systems to improve business processes with respect to performance dimensions such as efficiency, quality, and compliance. RPA provides the means to automate repetitive and routine-like work by employing so-called software robots. Furthermore, by combining developments from areas such as machine learning and predictive analytics, process weaknesses, such as bottlenecks, cannot only be automatically identified, but also remedied by taking preventative actions.

Given the large interest in this topic in both academia and practice, the goal of this minitrack is to promote scientific exchanges on Business Process Technology. As such, the minitrack enables researchers to present and discuss innovative approaches, techniques, methodologies, and models to design, adopt, implement, operate, evaluate, and govern technology in the context of business processes.

It is the third time we are organizing this minitrack. Compared to the second edition, we were able to attract additional attention, bringing us to a total of twelve submissions. After a careful review process, we accepted five high-quality papers.

Out of the five accepted papers, two deal with process mining, two deal process modeling, and one is concerned with leveraging NLP for better understanding decision processes. It is interesting to highlight that none of the accepted papers explicitly addresses the topic of process automation, which was the main theme of the track last year. This shows that business process technology is by no means limited to process automation, but rather involves a variety of facets. Below, we provide an overview of the accepted papers, their authors, and the corresponding abstracts.

Alignment-based conformance checking over probabilistic events

Authors: Jiawei Zheng, Petros Papapanagiotou, Jacques Fleuriot

Abstract: Conformance checking techniques allow us to evaluate how well some exhibited behaviour, represented by a trace of monitored events, conforms to a specified process model. Modern monitoring and activity recognition technologies, such as those relying on sensors, the IoT, statistics and AI, can produce a wealth of relevant event data. However, this data is typically characterised by noise and uncertainty, in contrast to the assumption of a deterministic event log required by conformance checking algorithms. In this paper, we extend alignment-based conformance checking to function under a probabilistic event log. We introduce a weighted trace model and weighted alignment cost function, and a custom threshold parameter that controls the level of confidence on the event data vs. the process model. The resulting algorithm considers activities of lower but sufficiently high probability that better align with the process model. We explain the algorithm and its motivation both from formal and intuitive perspectives, and demonstrate its functionality in comparison with deterministic alignment using real-life datasets.

From Text to Intelligent Services in Knowledge Intensive Decision Processes: Text2Chat

Authors: Jan Vanthienen, Alexandre Goossens.

Abstract: Knowledge-intensive processes intertwine processes and decisions. Such processes often end whenever the final decision outcome has been obtained and communicated to the stakeholder. However, stakeholders often desire additional clarification on decision outcomes which requires processing the decision and process information. The decision logic is often described in various internal and external textual documents but are often difficult to interpret. There exist various ways to generate and provide advice and ex-

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planation based on textual descriptions. We present an overview of existing research fragments and new research on integrating the pieces into a framework. This paper presents the Text2Chat framework for generating advice and explanation from the process description text, containing various tracks. Each track is explained together with its advantages and disadvantages. By introducing Text2Chat, this paper offers insights into processing textual knowledge-intensive process information for effective stakeholder advice provision.

Towards a Maturity Model of Process Mining as an Analytic Capability

Authors: Astria Hijriani, Marco Comuzzi

Abstract: Process mining applications offer a range of capabilities to analyze processes and improve organizational performance. Evaluating process mining capabilities is essential to demonstrate the business value created by process mining. Currently, there is a paucity of studies to evaluate the maturity of process mining analytic capability. This paper aims to close this gap. We created the first version of a maturity model of process mining as an analytical capability integrating the maturity models available for business process management, data analytics, and Artificial Intelligence (AI) organizational capabilities. Then, we evaluated the model with qualitative interviews with process mining experts. The interview feedback has been used to design an improved version of the proposed maturity model, which we aim to deploy in real-world case studies in the future.

Exploring Cognitive Effects of Inconsistency Characteristics on Understanding Inconsistencies in Declarative Process Models

Authors: Sabine Nagel, Patrick Delfmann

Abstract: Inconsistency handling in declarative process models (DPMs) has been of increased interest as even a single contradiction within a constraint set makes the entire DPM unsatisfiable. To develop interactive inconsistency resolution and prevention approaches, humans must be able to identify and understand the problem at hand. Therefore, we aim to gather first insights into the cognitive effects of inconsistency characteristics on understanding inconsistencies in DPMs by conducting an exploratory study. Our results show that participants had notable difficulties with understanding inconsistencies, which we could trace back to several inconsistency characteristics, such as combinations of interrelated constraints. Thus, we identified a strong need for the development of interactive and visual decision support technologies to improve inconsistency understand-ing in DPMs.

Advanced Temporal Control Structures for Business Process Modeling

Authors: Marco Franceschetti, Johann Eder

Abstract: Modeling time-constrained business processes is required in many domains but often challenging due to the difficulty of incorporating declarative temporal requirements in procedural process definitions. Here, we propose advanced temporal control structures based on highly expressive temporal conditions to give designers explicit control over the temporal behavior of a business process abstracting from low-level management of time aspects. These structures facilitate controlling executions to meet temporal requirements. We propose an approach for checking the temporal correctness of business processes featuring these structures in terms of dynamic controllability. The approach is based on the reduction to basic control structures and a further mapping to the CSTNUD, an expressive family of temporal constraint networks with established checking procedures.

We are happy to cover such a broad range of research methodologies and angles in the context of business process technology in our minitrack and look forward to discussing these papers during the conference. We wish to acknowledge the contributions of all authors and reviewers to the success of our minitrack and look forward to organizing another edition next year.