Preface to BPM 2015

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This special issue contains extended versions of the outstanding papers presented at the 13th International Conference on Business Process Management (BPM) that took place in Innsbruck, Austria on August 31 - September 3, 2015.

BPM as a research field and as an industry practice has significantly matured and increased its span, but is also facing new and unprecedented challenges such as a need to foster true innovation rather than improvement, to make use of big data opportunities and to account for processes that are increasingly adaptive, flexible and generative rather than structured, formalized and stable. These new topics add to existing areas of interest and relevance to BPM research and industry, and also attest to an increasingly interdisciplinary nature of BPM research. In line with the emergent opportunities and challenges, BPM 2015 explicitly encouraged papers that report on research in emerging BPM areas and novel applications of BPM concepts, as well as interdisciplinary BPM research that connects to related fields. In this special issue, we are delighted to present extended versions of four outstanding papers spanning a range of topics in the BPM area.

The paper *A Framework for Visually Monitoring Business Process Compliance* by David Knuplesch, Manfred Reichert, and Akhil Kumar presents a language for compliance checking, referred to as *extended Compliance Rule Graph (eCRG)*. The eCRG language enables users to capture compliance requirements along various dimensions in a visual manner, including control flow, data, time, resources, and interactions. The authors show how compliance requirements formalised as an eCRG model are monitored while a business process is executed: Temporary and permanent violations of compliance requirements are visualised directly in the respective eCRG models. The paper also presents a proof-of-concept implementation for compliance monitoring. Experimental results on the run-time performance of the reasoning procedures and the understandability of eCRG models further highlight the potential of the framework to be adopted for comprehensive compliance monitoring.

Akhil Kumar and Russell Barton present their work on *Controlled violation of temporal process constraints models, algorithms and results*, which develops an approach to temporal workflow consistency. Motivated by deadlines for task durations or delays between task executions in the medical domain, the authors present a formalisation of both temporal workflows and constraints, which gives rise to a constraint satisfaction problem. They argue that some violations of temporal constraints, however, may be inevitable and therefore present the notion of a controlled violation. Based on this notion, they address the question of how to minimise the impact of a violation when scheduling the execution of subsequent tasks. Finally, the paper also outlines an architecture for the implementation of the presented approach.

The paper *Resolving inconsistencies and redundancies in Declarative Process Models*, by Di Ciccio, et al. introduces an automata-based formal method for checking conflicts and redundancies in declarative process models. Declarative process models are defined as a set of constraints on the tasks of a process. During the discovery of constraints of a process in a declarative process model, due to lack of global oversights on the constraints, the resulting constraint sets could be conflicting and redundant. Given that the problem of finding inconsistencies and redundancies optimally is intractable, the authors present a semi-optimal method, based on automata multiplication, to find and remove inconsistent and redundant constraints. The paper extends DECLARE, which is a declarative process modelling language, and the presented method builds on the notion of constraint templates over tasks. The paper proposes multiple constraints sorting mechanism for identifying the set of redundant constraints. It also presents the result of the complexity analysis of the algorithm, and the experiments on two process logs, which show that the method has reasonable accuracy, and execution time.

In their paper *Comparing Textual Descriptions to Process Models – The Automatic Detection of Inconsistencies*, Han van der Aa, Henrik Leopold and Hajo A. Reijers investigate the problem of keeping process descriptions and process models in synchronization, and finding inconsistencies among them as they change. The authors present a method to detect types of inconsistencies including missing activities and conflicting orders of activities. The paper introduces a number of predictors that report inconsistencies at the process-level and the activity-level. These methods leverage linguistic analysis (bag of word, anaphora resolution, and entity resolution) to extract information of interest that are used for similarity matching between the description text and the activity text in the process model. The predictors are a number of specifically defined probabilistic functions for identifying the likelihood of an inconsistency type via computing the differences between the activities and their orders in the process description and the process model. The presented methods have been evaluated over 53 pairs of process-descriptions. The initial results show that the proposed methods are promising in highlighting inconsistencies.

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