

**5th International Workshop on Artificial
Intelligence for Business Process
Management (AI4BPM 2021)**

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As the field of artificial intelligence (AI) continues to grow, novel methodologies and techniques continue to emerge and are being applied across numerous areas. In the past few years, there has been a strong interest from both industry and academia in applying AI techniques in the area of business process management (BPM). Indeed, the application of AI is impacting additional areas where process management perspectives become relevant, including industrial engineering, IoT, and healthcare. The use of AI in BPM has been discussed as the next disruptive technology that will touch almost all business process activities performed by humans. In some cases, AI will dramatically simplify human interaction with processes, while in other cases it will enable full automation of tasks that have traditionally required manual contributions. We believe that over time, AI may lead to entirely new paradigms for business process management in all of its aspects: modeling, analysis, automation, and monitoring. For example, instead of BPM models centered either on process or on case management, we anticipate models that are based fundamentally on goal achievement. Moreover, these models will fully enable continuous improvement and adaptation based on experiential learning with little to no human intervention after the learning phase has been completed.

The goal of this workshop is to establish a forum for researchers and professionals interested in understanding, envisioning, and discussing the challenges and opportunities of moving from current, largely programmatic approaches for BPM to emerging forms of AI-enabled BPM. Given the recent adoption in the BPM context of explainable AI techniques, this year, a keynote speech by Fettke and Mehdiyev on “Explainable AI for Predictive Process Monitoring” enriched the program of the workshop. In addition, the workshop attracted eight international submissions on different topics including recommendations for business process modeling, predictive process monitoring, and process monitoring through generative adversarial networks (GANs). All submissions were reviewed by at least three Program Committee members or their sub-reviewers and eventually four papers were accepted. We believe that the accepted papers provide a novel mix of conceptual and technical contributions that are of interest for the AI4BPM community.

Sola et al. propose an approach for the provision of activity recommendations on the way models under development can be expanded by leveraging knowledge graphs. In their work, they investigate different approaches to apply embedding-based and rule-based knowledge graph completion methods to support this task and evaluate these methods in an experimental study. Weytjens and De Weerdts identify and demonstrate the importance of several issues affecting the pre-processing of event logs to be used for predictive process monitoring. They propose a number of standard pre-processing steps to derive unbiased benchmark datasets in a principled way, thus creating representative test sets without data leakage. In his work, Weinzerl investigates the usage of

graph neural networks (GNNs) - and in particular of gated graph sequence neural networks - for the next activity prediction task. GNNs can directly compute graph-oriented data inputs, generally structured into nodes and edges, thus allowing for the explicit modeling of event relationships. Lastly, Hoffman et al. present the ProGAN framework for implementing three (Monitor, Analyze and Plan) of the four phases of the MAPE-K control loop. ProGAN leverages a deep learning architecture that builds upon generative adversarial networks. The discriminator is used for monitoring the process in its environment by using sensor data and for detecting deviations with respect to the desired process state, while the generator is used afterwards for analyzing the detected deviations and its symptoms. These contributions demonstrate the latest advances in the AI4BPM research area.

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