

Proceedings of the 4th International Workshop on Process Management in the AI era 2025

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Abstract

These proceedings collect the accepted contributions from the Workshop PMAI 2025, which focused on the convergence of Process Management (PM) and Artificial Intelligence (AI), which has driven the emergence of AI-augmented BPM systems [1] (ABPMS)—intelligent, adaptive, and trustworthy systems capable of continuously reasoning and acting to optimize processes. The rise of Generative AI (GenAI) and ABPMSs has expanded the scope of business processes to extend beyond the conventional concept of business workflows, encompassing a variety of manifestations, such as agentic BPM, function calls, chains of thought, causal reasoning, broader forms of logical reasoning, and multi-agent collaborations.

In this workshop, we brought together researchers from AI and PM communities to address the challenges and opportunities in designing next-generation process-aware systems. Building on the momentum of previous PMAI events, the workshop featured contributions that advanced the vision of ABPMS through innovative methods, architectures, and applications.

Preface

The development of ABPMSs may be influenced by recent advancements in ad-hoc compositions of domain expertise and Artificial Expert Intelligence (AEI). These innovations, embodied in Agentic AI infrastructures, present both challenges and opportunities. Unlike GenAI, Agentic BPM goes further by creating intelligent agents capable of acting independently within a ‘framed autonomy’, collaborating with other agents, or interacting with humans through natural language processing, towards the attainment of organizational goals. These agents demonstrate varying levels of contextual understanding, learn from past experiences, reason within defined parameters, and make decisions in complex scenarios. By harnessing the potential of diverse AI technologies, organizations could achieve unprecedented insights and capabilities, resulting in measurable business impacts and new revenue streams. The composition will broaden the scope of AI-based applications and accelerate more data-driven business processes.

This workshop brings together researchers from different research disciplines and a strong interest in promoting the synergy between AI and PM to address the above frontier challenges. The AI community at ECAI, IJCAI, and AAAI, has hosted, as the birthplace of the early revolution of AI, some early events dedicated to business processes. And yet, the business process community has, over the years, drifted apart and found its separate home in the International Conference on Business Process Management (BPM) and, more recently, the International Process Mining Conference (ICPM). This landscape, however, is set to change as AI techniques mature and are deployed with increasing fidelity and robustness, which are required for enterprise applications. We can observe this evolving landscape in the early seeds of PMAI workshops, which aim to address the interdisciplinary gap with a significant emphasis on the vision of ABPMS. This vision has gained traction over the last three years, being showcased at IJCAI-ECAI 2022, IJCAI 2023, and, most recently, at ECAI 2024.

Workshop PMAI 2025, October 2025, Bologna, Italy



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Organization

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Keynote

Prof. Andrea Matta (Department of Mechanical Engineering, Politecnico di Milano, Italy)

Talk title: Generation of Graph-based Models for Digital Twins of Discrete Event Systems

Abstract: With the coming of the Industry 4.0 wave, digital representations of production systems have been promoted from marginal to central. Digital twins are not simply conceived as simulation models of their physical counterparts for offline what-if analysis, differently they are developed as self-adaptable and empowered decision-makers timely aligned with the dynamics of the real system. Enriched by these new features, digital twins are widely recognized as the key enablers for the implementation of optimal control of smart manufacturing systems. Graphs are well recognized as the mathematical structures representing the common denominator of engineering activities in manufacturing. They are the unifying language in industrial engineering, underpinning, for example, toolpaths,

process plans, workflows, and system topologies. This talk will present methods for automatically generating graphs from real process gathered data to represent physical entities in a digital twin scenario. Further, generative approaches based on discrete diffusion will be discussed in relation to model tuning, control, and optimization.

Declaration on Generative AI

During the preparation of this front-matter, the authors used GPT-4o to: Grammar and spelling check. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the publication's content.

References

- [1] M. Dumas, et al., Ai-augmented business process management systems: A research manifesto, ACM Trans. Manage. Inf. Syst. 14 (2023).