

Tuning Machine Learning to Address Process Mining Requirements

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Paper Title:	Tuning Machine Learning to Address Process Mining Requirements
Keywords Specific to the Paper:	Process mining (PM) Machine learning, Non-parametric distribution, concurrency, Nonstationary Zero-shot learning Encoding Training Large Language Models (LLMs)
Summary of the main contributions	<p>This article examines the challenges and opportunities of integrating AI and ML techniques with Process Mining (PM) for better understanding and optimization of business processes. It highlights key issues such as data distribution mismatch, concurrency management, non-stationary behavior, and data encoding, and suggests solutions and future directions.</p> <p>The contributions of the paper are: Providing guidelines for carefully selecting data representation to maintain contextual information required for effective process analysis. Addressing non-Gaussian, non-stationary data distributions in process mining jobs and recommending testing multiple class balancing configurations for more accurate training. Proposing the use of zero-shot learning techniques, such as language models, to address the unpredictability of outcomes in process mining activities. Recommend early quality assurance with limitations to avoid major increases in model error during training. Emphasizing the significance of using domain knowledge to improve model performance and interpretability. Advocating for the evaluation of model interpretability and the adoption of algorithms that provide clear explanations of predictions. ML models must be continuously monitored and updated to ensure accuracy and relevance in dynamic process settings. Encourage knowledge sharing and collaboration among the project management community in order to spread successful case studies, research, and best practices.</p>

	<p>AI model used: A variety of machine learning models are proposed, including supervised learning models like decision trees and unsupervised learning approaches like PCA and clustering. Furthermore, Active Learning and Generative Adversarial Networks (GANs) are advised for addressing unique issues in process mining jobs.</p> <p>Introduce the AI models: The paper examines the usage of several machine learning models and methodologies, highlighting the necessity of choosing the right model based on the process mining task's specific requirements and characteristics.</p> <p>The AI models and approaches mentioned in this work contribute to the concept of combining process mining with machine learning by addressing significant issues in process mining activities. They provide methods for data representation, data dissemination, concept drift management, model interpretability, and continuous monitoring and updating of ML models.</p>
<p>Supported by a software application? (If yes, provide more details)</p>	<p>Although this paper does not mention a specific software application but suggests that the proposed solutions and recommendations can be implemented in existing PM libraries and software tools. Integrating these techniques into the PM software would provide a more fluid and user-friendly experience for practitioners.</p>