Chair of IT Service Management, Development and Operations
TUM School of Computation, Information and Technology
Technical University of Munich

Master Thesis

Predictive Process Monitoring with Large Language Models

Predictive process monitoring (PPM) is a relatively young research field within the more established field of process mining. It concerns making predictions about business processes. Prediction encompasses both classification (categorical outcome, next event, ...) and regression (remaining time, cost, ...) problems. Machine learning techniques have been applied since the early days, with neural networks making their first entry in 2017. Since then, several papers using deep learning were published (overviews: [1], [2]).

Recently, large language models (LLM) were introduced into the field of process mining (e.g., [3]), but so far have not been used for PPM.

The objective of this thesis is to apply LLMs to PPM. The work will involve experiments involving prompt engineering and Retrieval Augmented Generation (RAG, vector databases). For benchmarking purposes, the PPM literature will have to be reviewed and/or neural networks deployed. Successful work could be submitted to a conference or journal.

Contact

Every thesis starts with an exposé, where you shape the topic towards your interest (in consultation with us). If you're interested, please contact us as outlined at https://www.cs.cit.tum.de/en/isdo/teaching/theses/.

[1]: Kratsch, W. et al. "Machine Learning in Business Process Monitoring: A Comparison of Deep Learning and Classical Approaches Used for Outcome Prediction". Business \& Information Systems Engineering, vol. 63, pp. 261-276 (2021)
[2]: Neu, D.A. et al. "A Systematic Literature Review on State-of-the-art Deep Learning Methods for Process Prediction". Artificial Intelligence Review, vol. 55, pp. 801-827 (2022)
[3]: Jessen, U. et al. "Chit-Chat or Deep Talk: Prompt Engineering for Process Mining". https://arxiv.org/pdf/2307.09909.pdf