Master Project: Sampling in Process Mining

Process mining aims to enable analysts to obtain insights about business processes running in organisations. Using these insights, the organisation can improve and optimise its processes. Stochastic process mining is a sub-field of process mining that takes the likelihood of behaviour into account. Given an event log, process discovery aims to find a process model that represents the event log well. Given an event log and a process model, conformance checking aims to measure to what extent the log and the model agree with one another.

Several process mining techniques are not directly applicable to process models (for instance EMSC), which may have infinite behaviour, for instance if the models contain loops. In such cases, a good sample may be all that it takes to apply the technique.

In this project, we aim to:

- Investigate existing sampling techniques for event logs;
- Evaluate their benefits and downsides. Examples of desirable properties of sampling methods are biasedness, complexity, and the models the method can handle, such as resistance to livelocks, unbounded models and unsound models;
- Design a new sampling technique that improves over existing sampling techniques;
- Implement the new sampling technique in Rust.

About the BPM group

The Business Process Management: Foundations and Engineering group is a new group in the Informatik faculty RWTH. The focus of the BPM group, led by Prof. Sander Leemans, is on the combination of data-based process analysis and the optimisation of processes in organisations.

Pre-requisites

To apply for this project, you must demonstrably have experience with process mining. For instance, you have followed Fundamentals of Business Process Management, Introduction to Data Science, Business Process Intelligence or Advanced Process Mining. Preferably, you have done your seminar in the BPM or PADS groups.

How to apply

In an at-most 1-page A4 application, motivate what triggers you to pursue this opportunity, and indicate your prior experience with process mining, including relevant courses and your marks. Please send your application to applications@bpm.rwth-aachen.de. Applications close by 1 February 2025, or when a suitable candidate has been found.