



Master Project: Stochastic Conformance Checking with Partial Trace Matching

Process mining aims to enable analysts to obtain insights about business processes running in organisations. In an event log, some traces are observed more often than others. Correspondingly, a stochastic process model is annotated with the relative likelihoods on its routing decisions, and thus expresses a probability distribution over traces as well.

A core field of process mining, conformance checking, quantifies how well the model ("how it should be") represents the event log ("what actually happened"). In comparing distributions of traces, several techniques are available, such as Earth Movers' Stochastic Conformance, Entropy, Jensen-Shannon and Bhattacharyya.

Most of these techniques however consider traces as a whole: that is, if two traces of 100 events, one of these events differs between the traces, the measures consider the traces as being "different". Intuitively, we would rather have these traces being classified as "almost equivalent" and apply a smaller penalty. In this project, we aim to change this, by developing stochastic conformance checking techniques that consider partial trace matching. The technique is ideally computationally efficient and incorporate frequency information from both the model and the event log.

In this project, we will:

- Improve existing stochastic conformance checking techniques by considering partial trace matches;
- Implement partial-match-aware stochastic conformance tech-

niques in Rust;

- Evaluate the implementation on real-life event logs and stochastic process models;

Pre-requisites

To apply for this project, you must have some experience with process mining and/or machine learning. For instance, you have followed Fundamentals of Business Process Management, Business Process Intelligence, Advanced Process Mining, or have taken your seminar in the BPM or the PADS group.

About the BPM group

The Business Process Management: Foundations and Engineering group is a new group in the Informatik faculty. 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.

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. The starting date is flexible, and applications close 31 March or once a suitable candidate has been found.