

MISQ Archivist

Comprehensible Predictive Models for Business Processes

Dominic Breuker, Martin Matzner, Patrick Delfmann, and Jörg Becker

Abstract

Predictive modeling approaches in business process management provide a way to streamline operational business processes. For instance, they can warn decision makers about undesirable events that are likely to happen in the future, giving the decision maker an opportunity to intervene. The topic is gaining momentum in process mining, a field of research that has traditionally developed tools to discover business process models from data sets of past process behavior. Predictive modeling techniques are built on top of process-discovery algorithms. As these algorithms describe business process behavior using models of formal languages (e.g., Petri nets), strong language biases are necessary in order to generate models with the limited amounts of data included in the data set. Naturally, corresponding predictive modeling techniques reflect these biases. Based on theory from grammatical inference, a field of research that is concerned with inducing language models, we design a new predictive modeling technique based on weaker biases. Fitting a probabilistic model to a data set of past behavior makes it possible to predict how currently running process instances will behave in the future. To clarify how this technique works and to facilitate its adoption, we also design a way to visualize the probabilistic models. We assess the technique's effectiveness in an experimental evaluation with synthetic and real-world data.

Keywords: Process mining, process discovery, business process intelligence, grammatical inference, predictive modeling