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Genetic Algorithms for Hyperparameter Optimization in Predictive Business Process Monitoring

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Abstract

Predictive business process monitoring aims at predicting the outcome of ongoing cases of a business process based on past execution traces. A wide range of techniques for this predictive task have been proposed in the literature. It turns out that no single technique, under a default configuration, consistently achieves the best predictive accuracy across all datasets. Thus, the selection and configuration of a technique needs to be done for each dataset. This paper presents a framework for predictive process monitoring that brings together a range of techniques, each with an associated set of hyperparameters. The framework incorporates two automatic hyperparameter optimization algorithms, which given a dataset, select suitable techniques for each step in the framework and configure these techniques with minimal user input. The proposed framework and hyperparameter optimization algorithms have been evaluated on two real-life datasets and compared with state-of-the-art approaches for predictive business process monitoring. The results demonstrate the scalability of the approach and its ability to identify accurate and reliable framework configurations.

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