Impact-Driven Process Model Repair

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Abstract

The abundance of event data in today's information systems makes it possible to "confront" process models with the actual observed behavior. Process mining techniques use event logs to discover process models that describe the observed behavior, and to check conformance of process models by diagnosing deviations between models and reality. In many situations, it is desirable to mediate between a preexisting model and observed behavior. Hence, we would like to repair the model while improving the correspondence between model and log as much as possible. The approach presented in this article assigns predefined costs to repair actions (allowing inserting or skipping of activities). Given a maximum degree of change, we search for models that are optimal in terms of fitness—that is, the fraction of behavior in the log not possible according to the model is minimized. To compute fitness, we need to align the model and log, which can be time consuming. Hence, finding an optimal repair may be intractable. We propose different alternative approaches to speed up repair. The number of alignment computations can be reduced dramatically while still returning near-optimal repairs. The different approaches have been implemented using the process mining framewor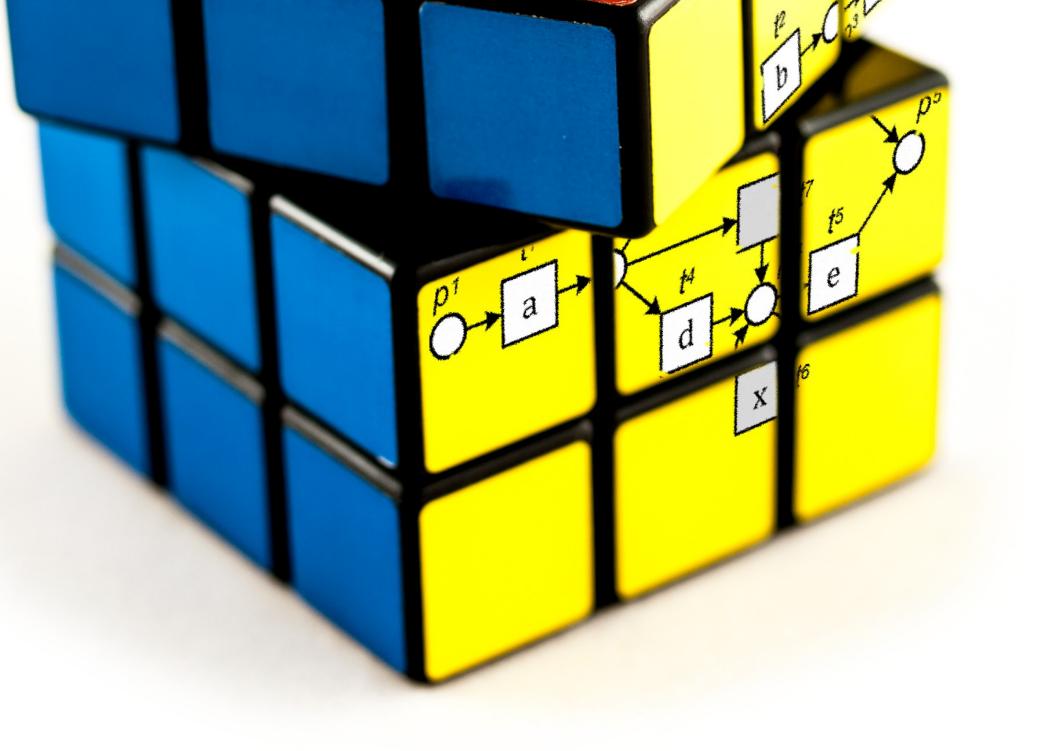k ProM and evaluated using real-life logs.