Analysing Event Data through Process Mining

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Extended Abstract

Most organizations create business processes, which are sometimes difficult to control and comprehend. Understanding these processes is however an absolute prerequisite prior to taking on any improvement initiative. *Process mining* provides a new perspective that makes easier and faster to get a complete and objective picture of business processes to better control and continuously improve them, by reducing their costs, production time and risks. This is made possible by analysing vast quantities of event data available in today's information systems. Mainly, which activities are performed, when, and by whom.

In that sense, process mining sits between computational intelligence and data mining on the one hand, and business process management on the other hand. The reference framework for process mining focuses on: *(i)* conceptual models describing processes, organizational structures, and the corresponding relevant data; and *(ii)* the real execution of processes, as reflected by the footprint of reality logged and stored by the information systems in use within an enterprise. For process mining to be applicable, such information has to be structured in the form of explicit *event logs*. In fact, all process mining techniques assume that it is possible to record the sequencing of relevant events occurred within an enterprise, such that each event refers to an activity (i.e., a well-defined step in some process) and is related to a particular case

Through process mining, decision makers can discover process models from event logs (*process discovery*), compare expected and actual behaviors (*conformance checking*), and enrich models with key information about their actual execution (*process enhancement*). This, in turn, provides the basis to understand, maintain, and enhance processes based on reality.

In this tutorial, we introduce the process mining framework, the main process mining techniques and tools, and the different phases of event data analysis through process mining, discussing the various ways data and process analysts can make use of the mined models. Finally, we discuss common pitfalls and critical issues, and give suggestions on how to mitigate them.