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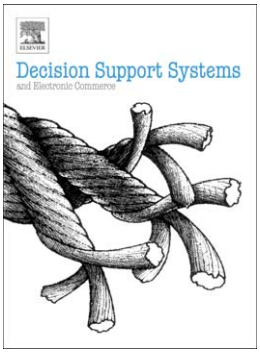

Event Interval Analysis: Why Do Processes Take Time?

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Event Interval Analysis: Why Do Processes Take Time?

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Abstract

Through the application of process mining, valuable evidence-based insights can be obtained about business processes in organisations. As a result, the field has seen an increased uptake in recent years as evidenced by success stories and increased tool support. However, despite this impact, current performance analysis capabilities remain somewhat limited in the context of information-poor event logs. For example, natural daily and weekly patterns are not considered but they are vital for understanding the performance of processes and resources. In this paper, a new framework for analysing event logs is defined. Our framework is based on the concept of *event interval*. The framework allows for a systematic approach to sophisticated performance-related analysis beyond the capabilities of existing log-based analysis techniques, even with information-poor event logs. The paper formalises a range of event interval types and then presents an implementation as well as an evaluation of the proposed approach.

Keywords: process mining, ProM, data mining, business process management

1. Introduction

Process mining [21] aims to exploit the massive amount of event data recorded by today's information systems to gain valuable insights into business processes by unearthing, among others, actual process behaviour, model deviations, performance characteristics, and bottlenecks. The use of process mining in practice is becoming more and more widespread as confirmed by the growing number of success stories of its application [17, 9, 14, 25] and the increasing number of tools offering process mining capabilities [8] (e.g. ProM [26], ARIS[1], Fluxicon[2], Bizclarity[3]).

The practical application of process mining is often hampered by the limited information available in events logs, especially in those logs which are not generated by process-aware information systems. A typical problem is that not both start and complete times are recorded for activities. This information is expected by current process mining software, such as the *performance analysis with Petri nets* and *alignment-based performance analysis* plug-ins of the ProM environment [7, 20, 18, 2] and the performance analysis component of Disco (a commercial tool), in order to derive metrics such as waiting times and case utilisation. The reliance on the existence of a *clean and simple* process models to derive more detailed performance information is also not very realistic as they are often not realizable in practice. Furthermore, existing approaches, such as the fuzzy-mining-based performance analysis approaches [23, 1, 5, 6, 16], and the temporal trace language approach [13], analyse process performance

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[1] www.softwareag.com/corporate/products/aris_platform/aris_controlling/aris_process_performance/overview/

[2] www.fluxicon.com/disco

[3] www.bizclarity.com.au

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