


Chapter 6

Process Mining for Social and Economic Needs: An Introduction

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ABSTRACT

Process mining is a paradigm shift from traditional process understanding methodologies like interviews and surveys to a data-driven understanding of the actual digital processes. It analyzes business processes by applying algorithms to the event data generated by digital systems. The chapter provides insight into various uses of process mining in different social and economic processes, with examples from past works demonstrating how practical process mining is in detecting and mitigating bottlenecks in these sectors. Then the chapter further delves into the details of process mining algorithms, key features, and metrics that can help practitioners and researchers evaluate process mining for their work. It also highlights some data quality issues in the event log that can inhibit obtaining fair results from process models. Additionally, some current limitations and concerns are described for creating awareness and building over the body of knowledge in the process and sequential mining techniques.

INTRODUCTION

Connected Machines, digital transformation, and process automation have become ubiquitous. These terms are appearing more frequently than what it was a decade ago. The Covid 19 pandemic further made the world physically distant and virtually connected. Organizations were forced to evaluate their manual process and re-think digitalizing their business processes. This digital transformation of busi-

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ness processes led to multiple workflows generating a new train of rich data for almost every event in the workflows.

Additionally, digitalization leads to the generation of various logs in different digital systems (Law et al. 2021). Analyzing these logs with event data can provide rich information in governing or further digital process transformation. However, traditional data mining or machine learning algorithms are unsuitable for crunching these event logs and providing process-related insights. This is where the process mining algorithms excel. Process mining algorithms can process millions of event data points to tap into these datasets and generate the much-needed intelligence to help discover the process divergence and loopholes in the workflows. Digital transformation solutions are geared toward automating business processes, and process mining provides intelligence to drive these digital workflows to deliver the desired outcome. Every process is a chain of events made up of specific steps that do some activity and passes on to the next stage in the process. This continues until the goal of the process is met or achieved. So, a process has a definite start and end. Most of the time, standard processes are well known based on which the workflows are laid out. However, in real life, there are chances of deviations. For example, let's say an Organization implements an ERP system to streamline its Order to Cash process. The Organization is quite aware of the standard process it follows, from capturing an order to delivering the final product to its customers. Based on this knowledge, they lay out the workflows in the new ERP system. However, it being a new system, adopting these ERP systems might not be an easy job for their employees. So, they might think of ways to bypass the process, for example, continue using spreadsheets for order entry and upload the details at the end of the day. Process mining can help analyze the process and find the bottlenecks in these digital workflows. As stated, process mining is the "Analytics of Processes". The main goal of Process Mining is to analyze how the process emerges, how they deviate from the standard/ideal process, and where the bottlenecks are to optimize and improve the processes.

Process mining finds its application in various industries and domains. Jans et al. (2011) used process mining as a tool for mitigating internal transaction fraud. It is also helpful as a tool to analyze business processes post implementation of any process automation or enterprise business systems. Mahendrawathi, Zayin, and Pamungkas (2017) used process mining for a post-implementation review of an ERP system that was used to improve the procurement process and discovered bottlenecks related to cycle time for procurement activities. Dogan, Fernandez-Llatas, and Oztaysi (2019) used process mining to evaluate differences among the customer visits in a shopping mall. Process mining also aids in bringing a scientific approach to improving sales process and performance management (Bernard et al. 2016). It is also employed for management of the software development process and proves an effective tool for improving the maturity level of the software engineering process (Lemos et al. 2011). These are a few examples that cited the enormous contribution potential that process mining has in improving different digital workflows.

This chapter aims to provide an introduction and enable discussion on the current state of process mining and identify different opportunities in further research or application of process mining in their field of work. Moreover, the chapter provides information professionals and researchers with examples of how others apply process mining, especially in healthcare, education, and energy industries. These examples of process mining work are contextualized within social and economic sectors to provide another possible research methodology for exploring the digital workflows within these sectors.

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