

Application of business process intelligence methods in a

Degree programme : BSc in Medical Informatics
Thesis advisor : Prof. Dr. Murat Sariyar
Expert : Dr Mirjam Hofer

Exploring data-driven process optimization in a Swiss eye hospital's emergency department, this study leverages process mining to unveil the complexities of patient care flow, aiming to enhance healthcare delivery through strategic operational improvements

Introduction

Process mining, a subset of business intelligence, is particularly adept at deciphering complex healthcare processes, revealing the reality of patient flow and care delivery. By harnessing the capabilities of the statistical programming language R, this thesis seeks to map out the current state of emergency department operations and to identify opportunities for improvement.

Throughout the results different systems are looked at. These include the O system for patient admission; C for doctor consultations; M for medical care provided by doctors; E for examinations conducted by nurses; and T for nurse-led triage. With C and M, E and T representing identical steps in varying workflow sequences.

Objectives

The thesis focuses on two main objectives. Firstly, it aims to analyze emergency department workflows using R for process optimization. This involves a detailed examination of current processes. Secondly, it seeks to identify and recommend strategies for operational improvements based on data-derived insights.

Results

The line chart tracks the hourly summed average waiting times for different operational workflows, labeled by the sequence of steps involved. The chart illustrates the dynamic nature of average waiting times, showing a summation effect over the course of the day for all relevant pathways with a peak in the evening.

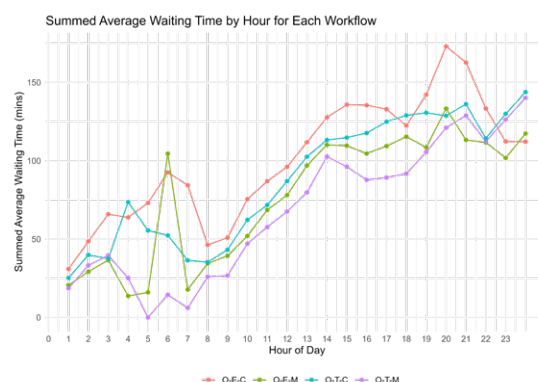
In the process map two central pathways can be discerned. The first one being the doctor consultation starting directly, being followed by the end of it and it being the end of the workflow, or adding the medical care steps. In the second one, the different steps expected are done by the staff. This map shows an opportunity to improve the process to reduce mistakes and also to conduct more in depth analyses on the discrepancies between the data.

Conclusion

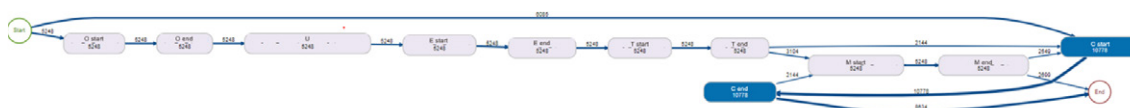
Process mining has highlighted an unexpected trend: a frequently taken shortcut that omits documentation stages. Further, descriptive analysis is essential to pinpoint the root causes of this issue. Preliminary findings suggest that some shortcuts may be a response to data inconsistencies and errors. Addressing the quality and accuracy of data input may be key to ensuring adherence to the full, intended workflow.



Lucie Novak
Advanced Data Processing
lgm.novak@gmail.com



Average waiting time by hour across different workflows



Process map of workflow showing frequencies of various pathways