Case Study

Exam Call 27.11.2026 – Patient Treatment in Brazilian HR

Description

In many large hospitals, especially those serving a high volume of patients like the Pronto Atendimento (Emergency Room) in a Brazilian HR environment, the patient journey is a complex process. This journey involves initial registration, triage, consultation, prescription of exams and medication, execution of those procedures, and final discharge or referral. Efficient patient flow is critical to minimizing wait times, improving patient outcomes, and ensuring regulatory compliance.

The goal of this case study is to analyze the end-to-end patient treatment process to identify structural inefficiencies, assess conformance, and propose data-driven improvements.

The event log is structured as a standard XES-compliant CSV file. Each row represents an event, which is nested within a case identified by the `case:concept:name` (*Patient ID*). The process flow is determined by the `concept:name` (*Activity*) and its precise time of occurrence, recorded in `time:timestamp`. Critical case-level attributes include the clinical diagnosis (*Doença*) and the patient discharge (*Retorno*), which are essential for clinical correlation. The `outlier_label` field provides pre-computed conformance information based on case duration, which is crucial for evaluating process deviation. Other important event attributes detail the materials or medications used in treatment (*Item*) and the performing resource (*Médico Responsável*).

The event log is anonymised but not public. It can be used for the exam, but not for any other purpose. It can be downloaded from the Ariel Platform in the 'Teaching materials' section.

Assignment

Describe the **Knowledge Uplift Trail** that allows you to provide answers to the analytical goals regarding the patient treatment process.

In particular, define and justify the steps required for a complete process analysis:

1. **Filtering steps** to remove noise (e.g., highly infrequent events) or incomplete data (e.g., incomplete cases or attributes).
2. **Segments of the log** distinguishing cases based on critical clinical attributes (e.g., diseases, or discharge).
3. **Compare the segments** to verify their significant correlations with properties that may be connected to effectiveness (e.g., **Case Duration** / Length of Stay, **Case Size** / Number of Activities, **Reworked Activities** / Repeated procedures like consultations or lab tests).
4. **Discover one or more process models** that can help the organisation identify outliers and deviant behaviours. Discuss the best strategy in this scenario for procss discovery and use quality metrics to select the best results.
5. **Identify potential improvements** (e.g., automation of simple registration/triage, reordering steps to reduce waiting time, or reallocation of tasks across resources) to enhance the efficiency and quality of patient care.