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Unsupervised Event Abstraction using Pattern Abstraction and Local Process Models - Overview of the Approach

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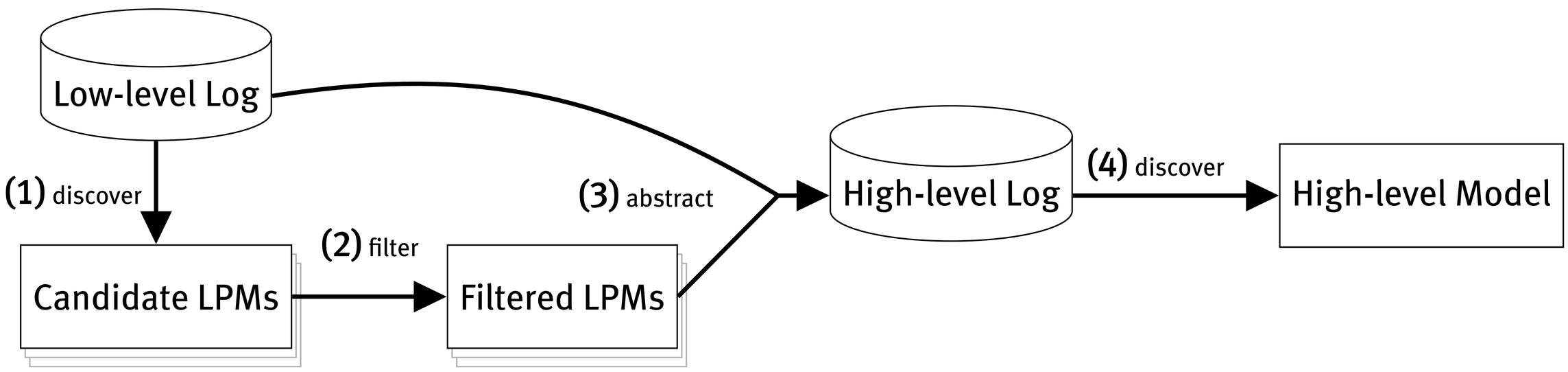
The Proposed Unsupervised Abstraction Approach



Scope & Motivation

- **Events** correspond to work being performed on a **case**
- Automatically discover process models from event logs
- Process models should be accurate: fitting and precise.
- Many methods: inductive, evolutionary, heuristic, etc.
- However, events may be at varying **abstraction levels**
- One **high-level activity** results in many **low-level events**
- Events do not correspond to recognizable **activities**.
- Discovery has **problems** when facing **low-level events**.

Pattern-based event abstraction [1]

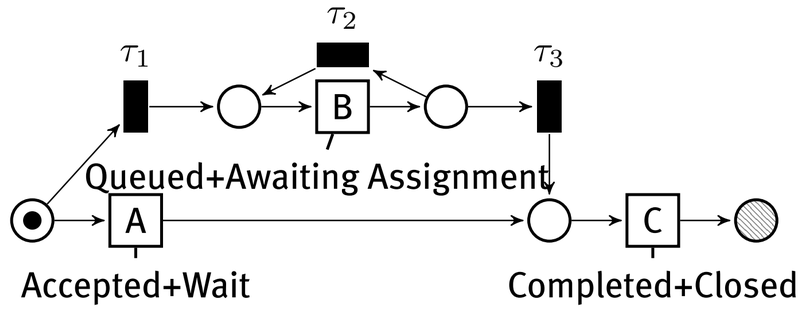
- Event abstraction groups/collapses related low-level events to activity-level events.
- Pattern-based **abstraction** method:
  - express domain knowledge with **activity patterns**
  - transform event-level log to activity-level log through **alignments**

Local process models [2, 3]

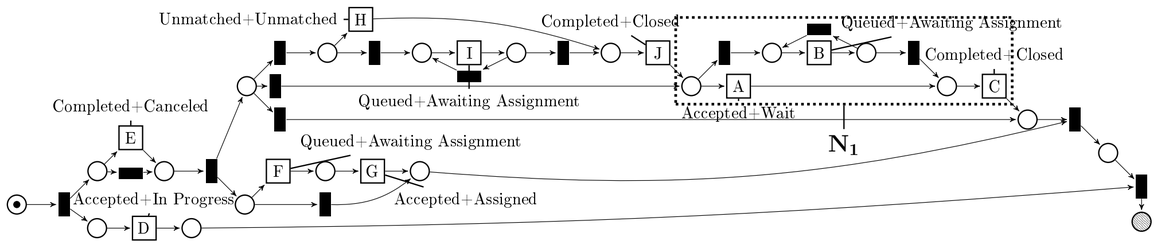
- Local Process Models (LPMs) are **frequent patterns** where each pattern takes the form of **process models**.
- The support of LPMs in an event log is determined using alignment-based technique.
- Mined LPMs are **ranked** based on support, confidence, and a combination of other **quality criteria**.

Combined Unsupervised Approach

- **Discover** LPMs from the low-level event log



- **Filter** a set of LPMs based on their **diversity**
- **Abstract** the event log using LPMs as activity patterns
- **Discover** a higher-level process model



Preliminary Results

- For three out of five event logs the F-score of the process model **can be improved** by abstracting the event log prior to process discovery.
- The **optimal number** of LPMs used for abstraction differs between event logs
- Research on the interplay between parameters and result needed!

References

[1] Felix Mannhardt et al. “From Low-Level Events to Activities - A Pattern-based Approach”. In: *BPM 2017*. Springer. 2016.
[2] Niek Tax et al. “Heuristic approaches for generating Local Process Models through log projections”. In: *CIDM 2016*. 2016.
[3] Niek Tax et al. “Mining local process models”. In: *J. Innovation in Digital Ecosystems* 3.2 (2016).