Sequence Pre-processing: Focusing Analysis of Log Event Data

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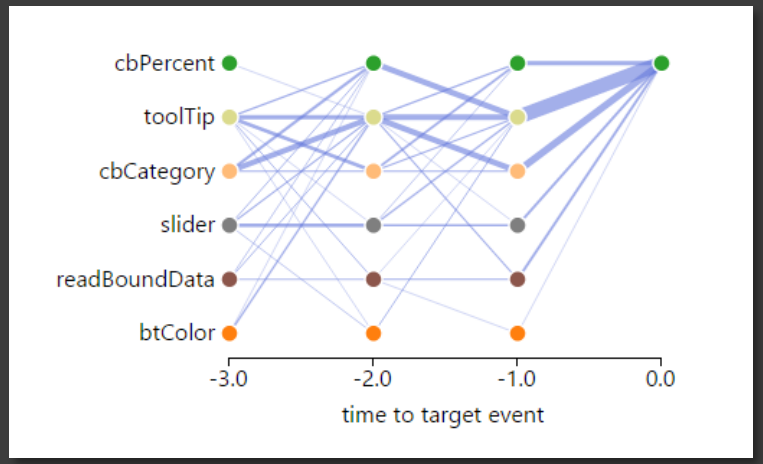
The Noise, the noise!

"Listen... do you hear?
That's the sound of ultimate suffering..."



Exploring log sequence data —
Very regular occurrences of noise

Noise makes downstream visual analysis difficult; need to **pre-process**

To handle this noise, necessary to understand how log data is used

Potential Analysis Tasks

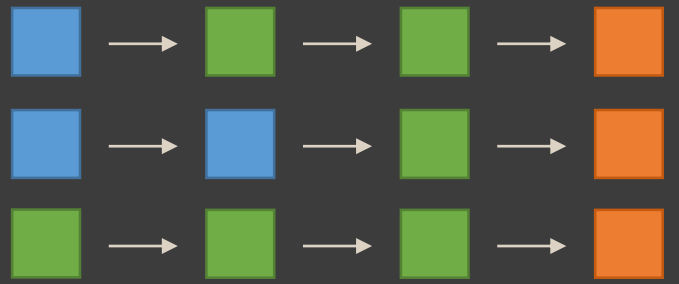
Given a log event has a

- Timestamp (to order)
- Event Name
- Session identifier
- Attributes (optional and open-ended)

Event: RequestData
Time: 1476722866600
Session: guest13
Request params: {...}

Event: HelpRequest
Time: 147672346600
Session: guest13

What are the sequences of events that lead to an event?



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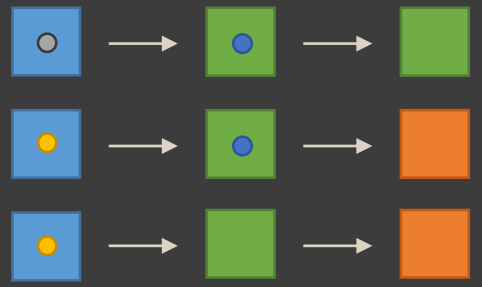

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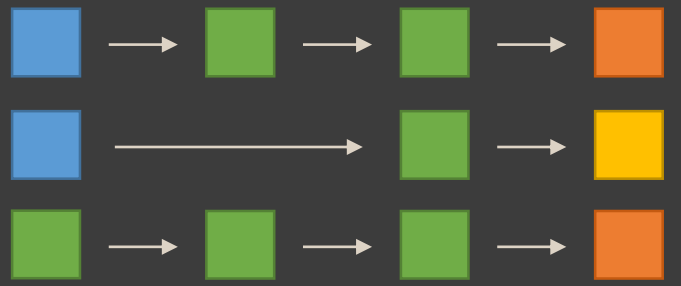
How does the temporal nature affect if an event is reached?



What are the Distractions?

Repeated Event — one event is important

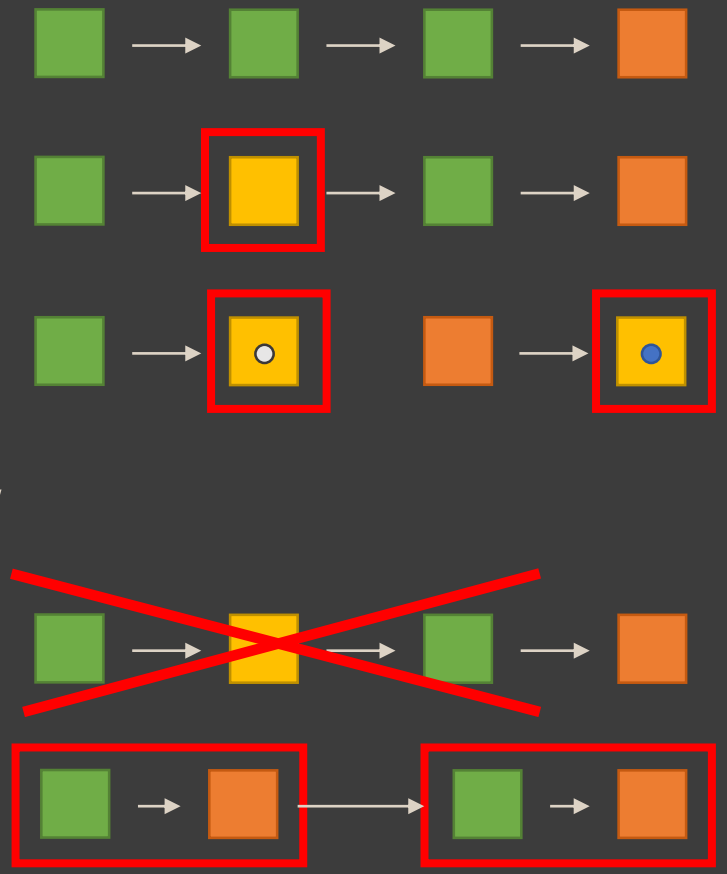
Useless Event — orthogonal to analysis

Ambiguous Event — hiding relevant info

Irrelevant Sessions — only relevant workflow

Negation — difficult to specify [1]

Subsequences — masks repeated workflow



[1] M. Monroe, et al. “The Challenges of Specifying Intervals and Absences in Temporal Data Queries: A Graphical Language Approach.” In Proc. *ACM CHI*, 2349–2358, 2013.

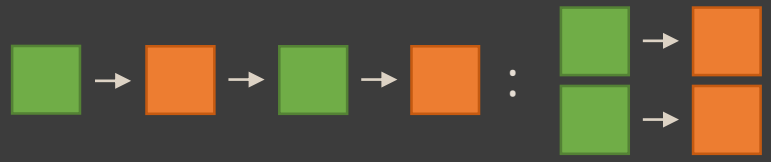
Methods for Focusing Analysis

Removing event(s) — only focus on relevant events

Replace with surrogate — orthogonal to analysis

Select sessions — hiding relevant info

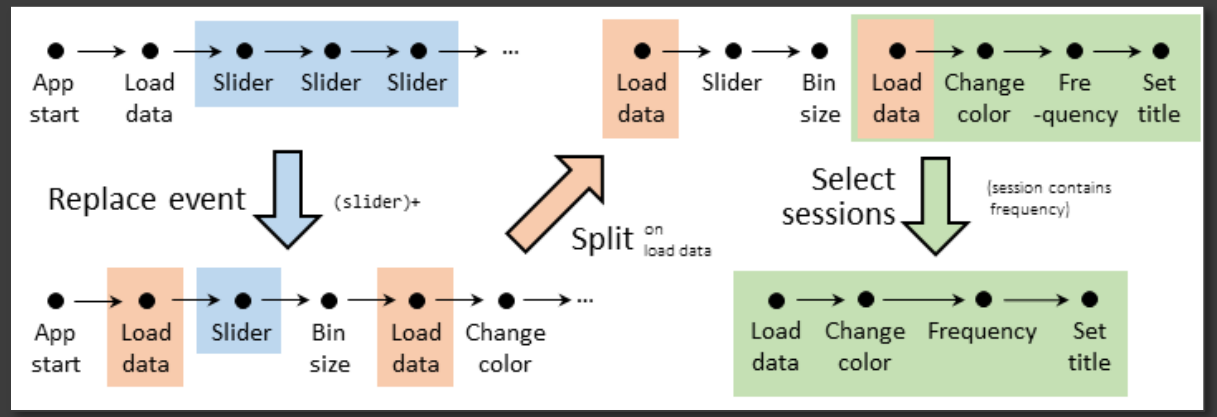
Re-sessionize — only relevant workflow



Negation — naturally falls out from any query (esp. for cohort comparison)

Analyst Feedback — display matched events and sessions (numbers and %s)

Applications



Pre-processing rules are composited in analysis —

Focuses downstream analysis

(e.g. why does one pick frequency?)

Great for **functional reactive programming** —

define a ‘pre-processing’ ruleset

process/analyze in real-time (we used **Trill** for this)

Questions? + Discussion!

Support by Microsoft Research (**Logan** project)