PV226
Inside the insider domain: Slight insight in sight

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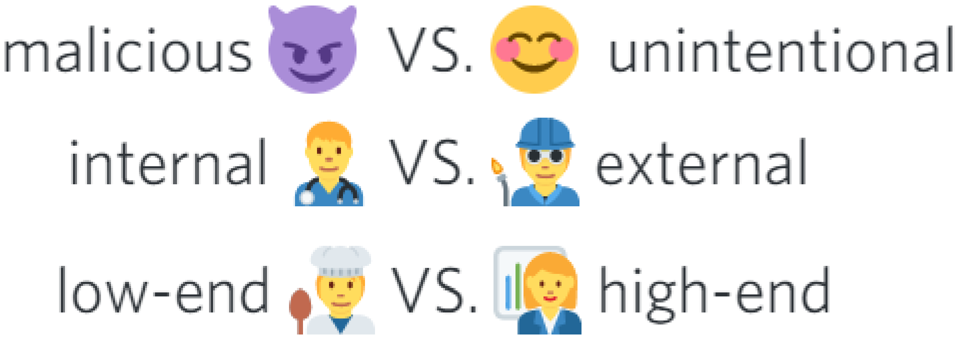
Outline

1. Introduction to insider domain
2. Current solutions
3. Research gaps
4. What do we do in Lasaris?

lasaris

Who is insider?

- Insider
  - A person with legitimate access to an organization’s resources.

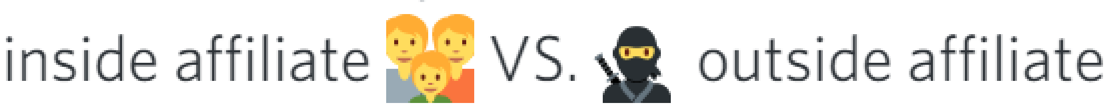


malicious 😈 VS. 😊 unintentional

internal 🧑‍⚕️ VS. 👷 external

low-end 🧑‍🍳 VS. 👩‍💼 high-end

- Affiliate
  - Do not have any justified and legitimate reason to enter the organization.



inside affiliate 👪 VS. 🥷 outside affiliate

Why do they cause harm?

- Malicious
  1. Self-motivated – get a job promotion, avenge the injustice against them, …
  2. Planted – steal intellectual property
  3. Recruited – perform a malicious act for their benefit

  The motivation can be financial, political, or personal.

- Unintentional
  1. Underminers – life is easier when I don’t respect security policies
  2. Overambitious – when I want to be more effective, I have to bypass security
  3. Socially engineered – I was tricked by someone
  4. Data leakers – ooopsie, I just leaked something

  No motivation or intent to cause harm.

How do they cause harm?

- Using legitimate access (traitors)
- Obtaining unauthorized access (masqueraders)

- Accident, mistake, slip (unintentional perpetrators)
- Theft, deception (socially engineered UPs)

What do they cause?

- Insider threat
  - Action of an employee that puts an organization or its resource at risk.
  - For example, data leakage.
- Insider attack
  - Action that intentionally misuses the computer system by a user that is authorized to access those systems and networks.
  - For example, theft of intellectual property, sabotage, and fraud.

Defense solutions

- Mitigation and prevention
- Decoy-based solutions
- Detection and assessment

Mitigation and prevention

- Deterrence of policy violations
- Data leakage prevention
- Gamification
- Disinformation by decoys
- Access control
- Training
- …

Decoy-based solutions

- Honeypot, honeytokens

Detection and assessment

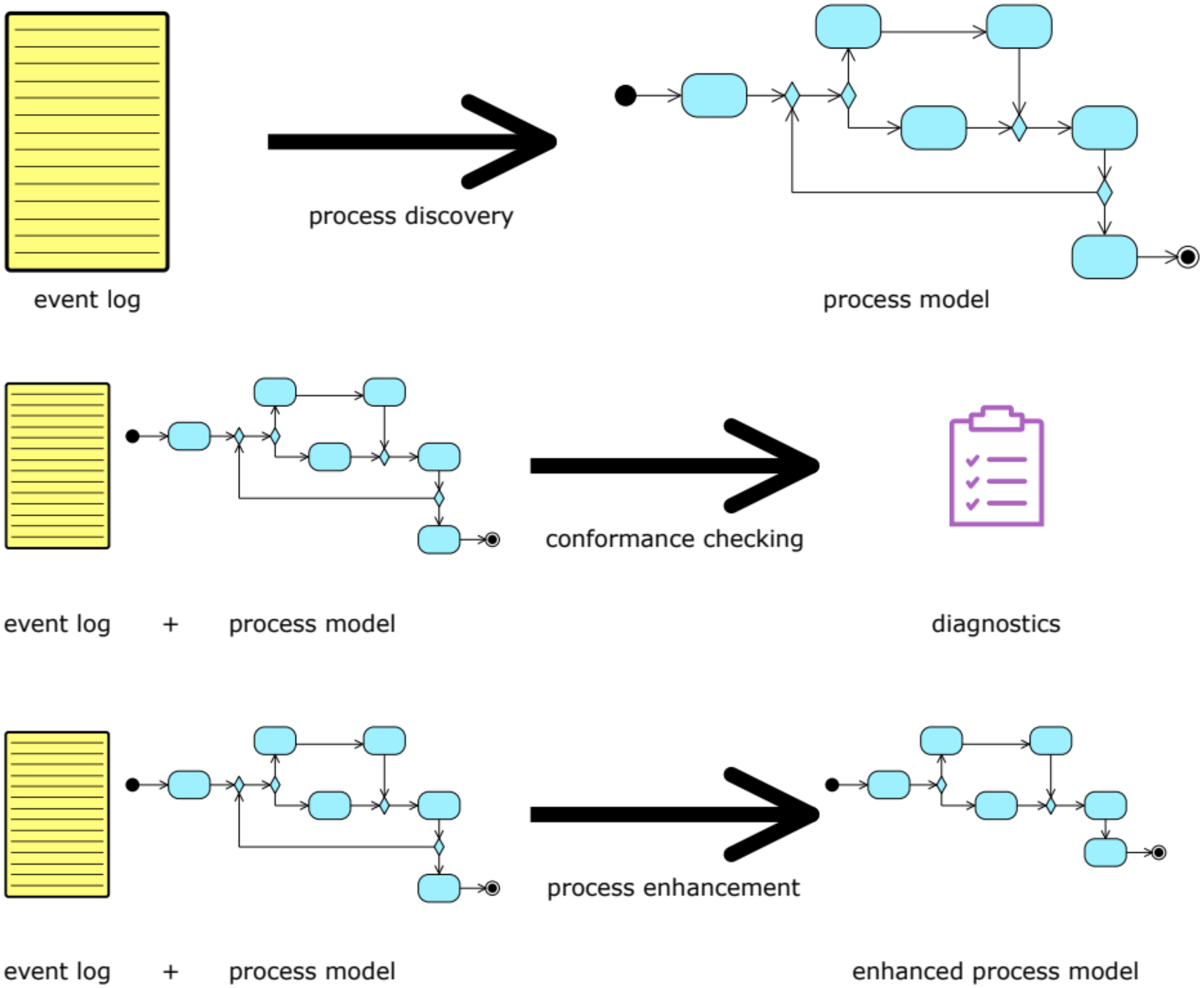
- Insider has to have motive, opportunity, and capability.
- Many conceptual and practical works focused on each element.
- Majority of them are data-oriented.
  - Support Vector Machine
  - K-Nearest Neighbours
  - Logistic Regression
  - Cluster-based approaches
  - Ensemble-based approaches
  - …

Research gaps

- The insider behavior is often encoded into a mathematical model that might not be accessible or is very abstract / complex.
- The proper response to a detected case might be challenging.
- It is hard to detect previously not seen insider attacks.

- Process-oriented approach seems like great help in this domain.

Process Mining



event log

process discovery

process model

event log + process model

conformance checking

diagnostics

event log + process model

process enhancement

enhanced process model

Challenges of Process Mining in insider domain

- Data collection and preprocessing
- Feature selection
- Process mining technique selection

Work of Lasaris lab in this context

- Insider attack detection:
    - Audit logs
    - Windows logs
- Insider threat detection
    - Simulation games platform
- Insider threat mitigation and prevention
    - Puzzle-based cybersecurity training in KYPO
- Addressing insider attacks via forensic-ready risk management
- Development of ProcessM.NET – a library (and application) that can be used for a process-oriented analysis

Conclusion

- Insider threats and attacks are currently **a hot topic** in many organizations.
- Process mining is currently **a hot topic** too.

- It is useful.
- It is fun.

- Come and join us! ☺

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lasaris