Industrial Practitioners' Mental Models of Adversarial Machine Learning

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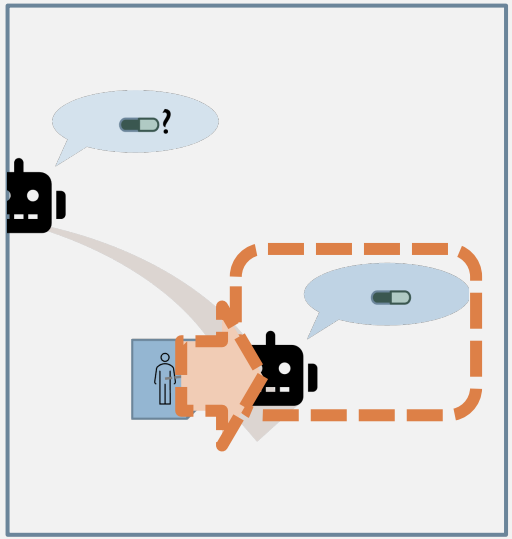
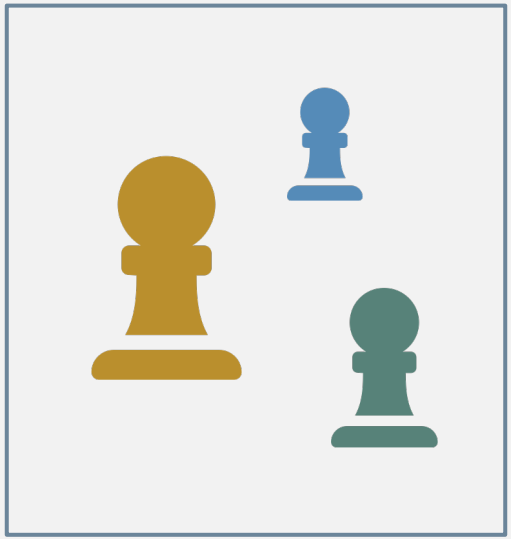
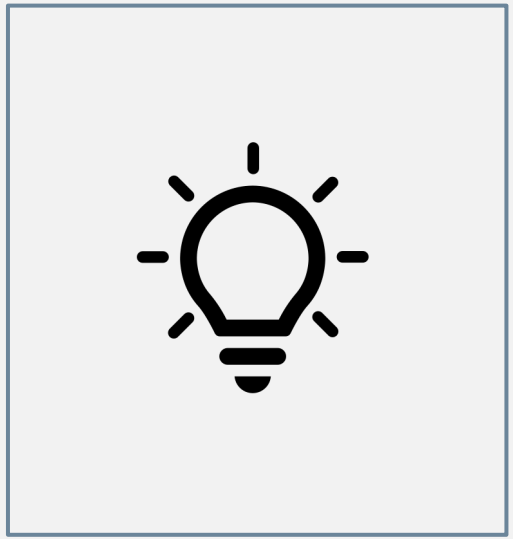
Outline





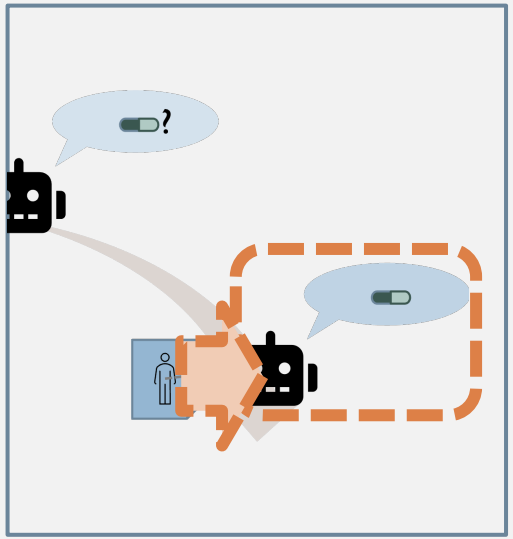


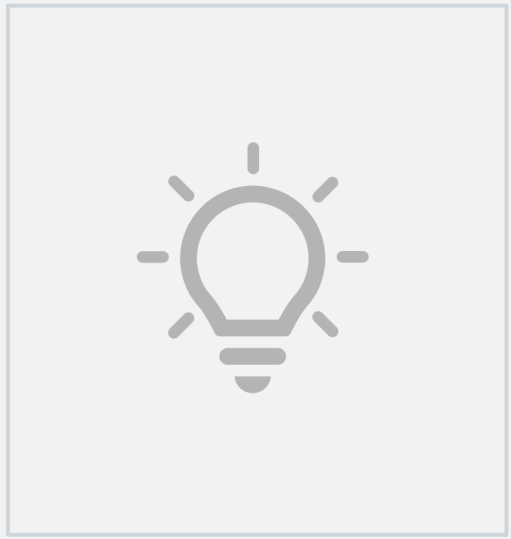
Recap ML & AML

Sample

Results

Outline





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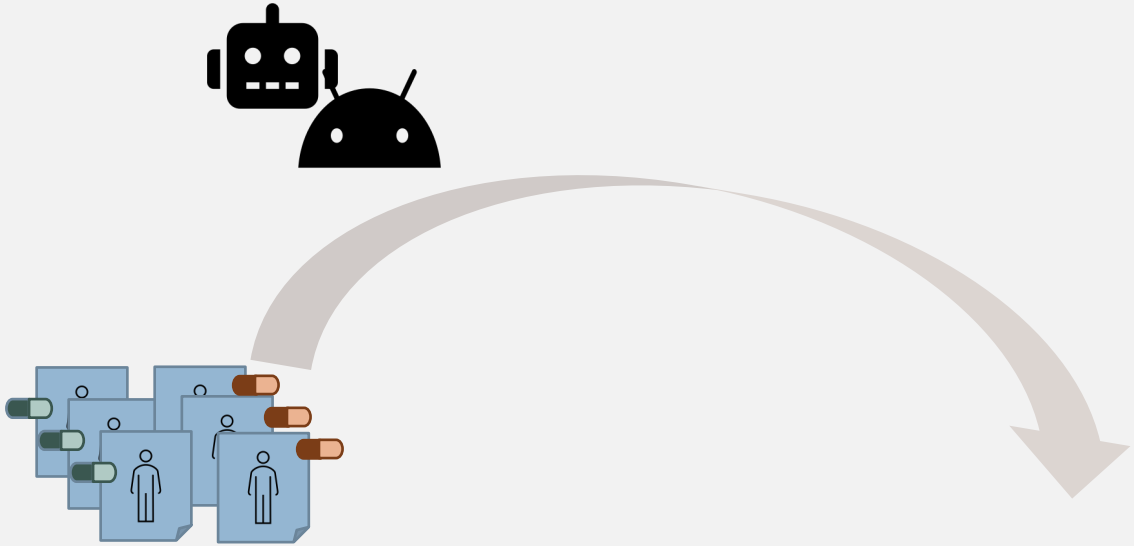
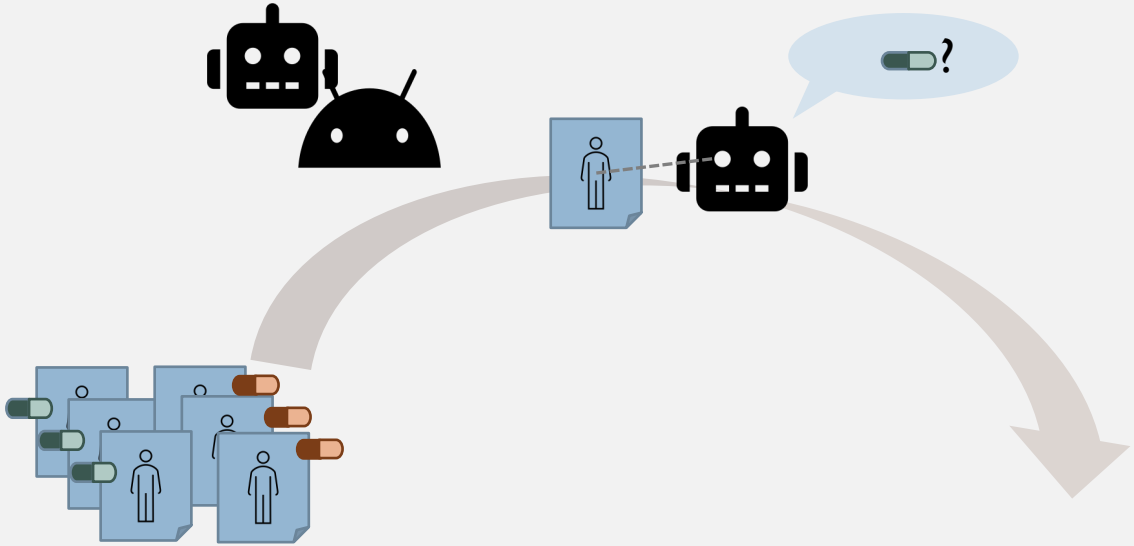
Machine Learning

Machine Learning



Machine Learning



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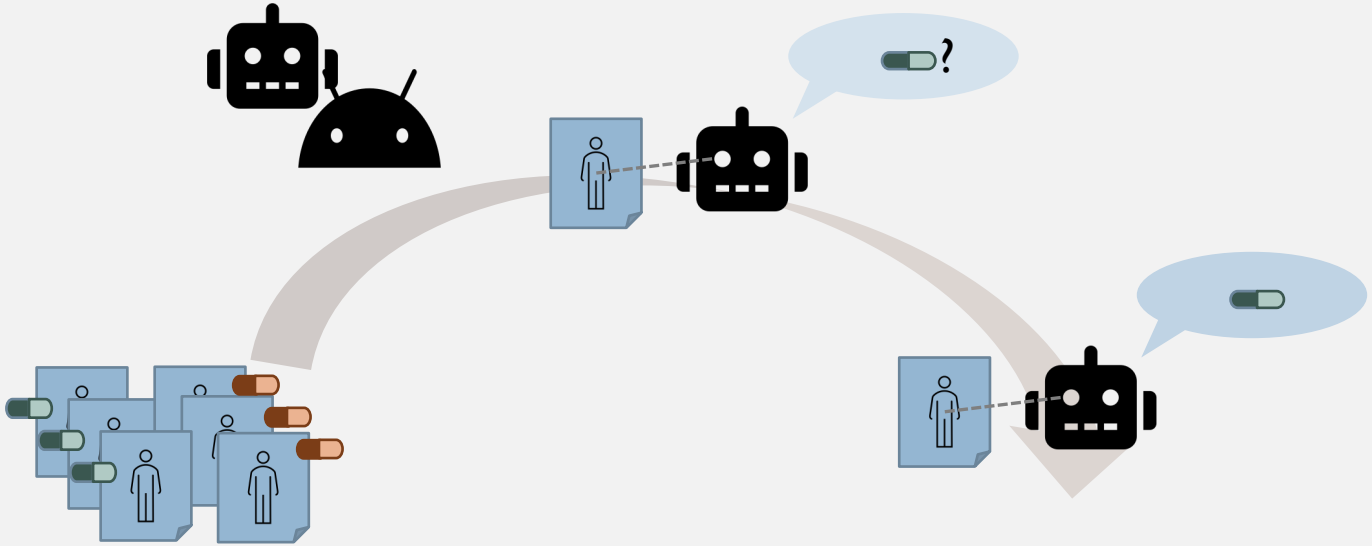
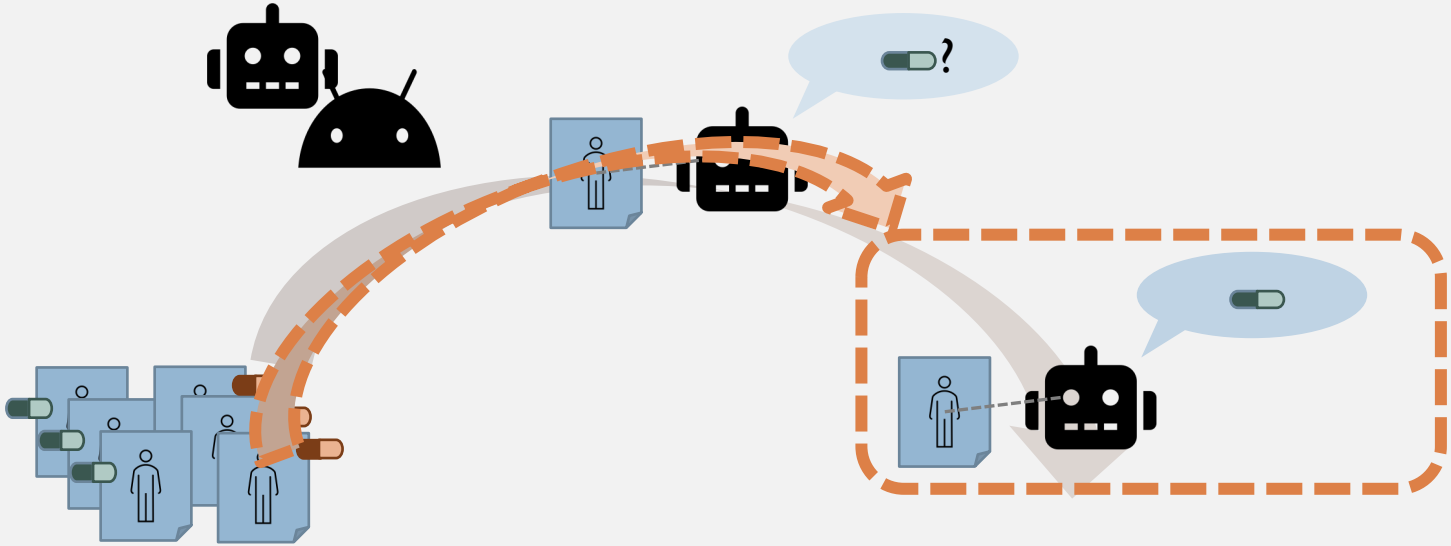


Adversarial Machine Learning



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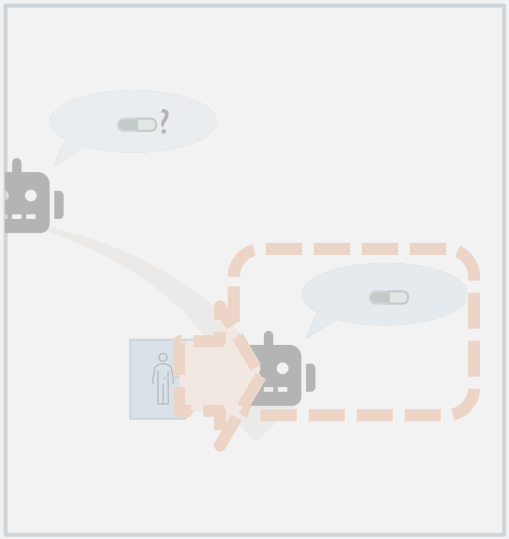

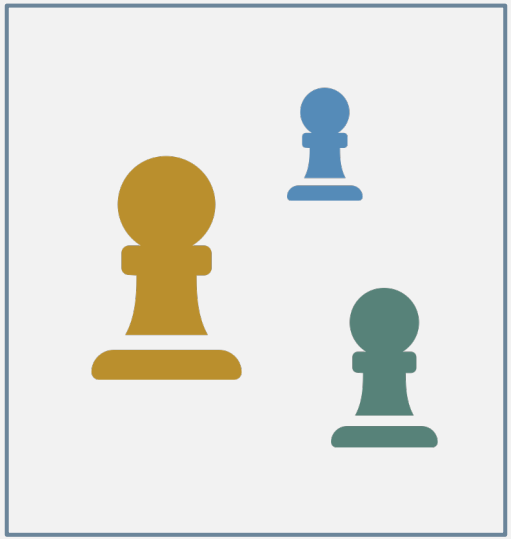

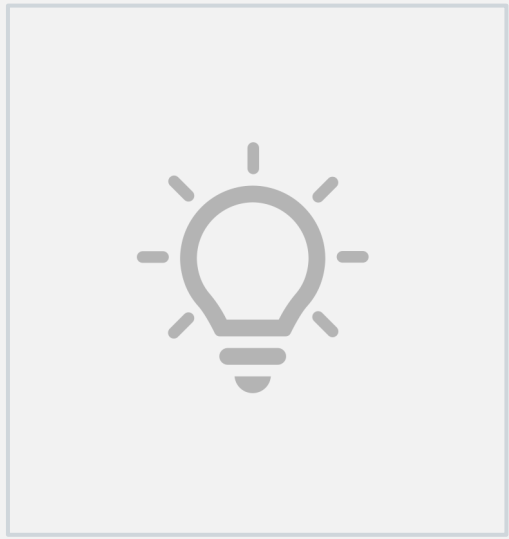

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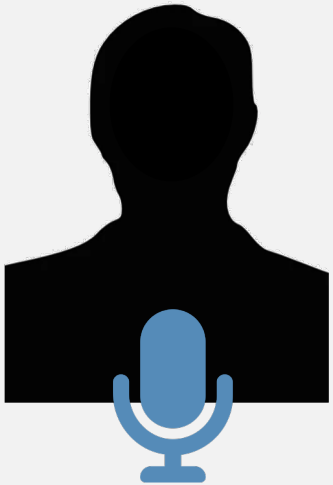
Qualitative Sample – 15 Participants (2020)

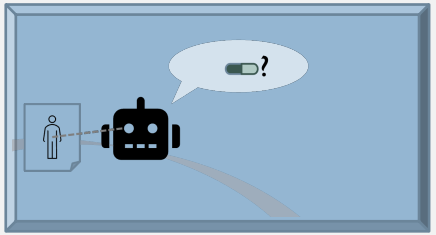
- 14 male / 1 female
- Age: 34 (+/- 4.27)
- Employer: European start-ups (<200 employees)
- Application areas:
  - Cybersecurity, healthcare, vision, human resources…

Bieringer, Lukas, et al. "Mental Models of Adversarial Machine Learning." *arXiv preprint arXiv:2105.03726* (2021).

Interview Procedure

Demographics





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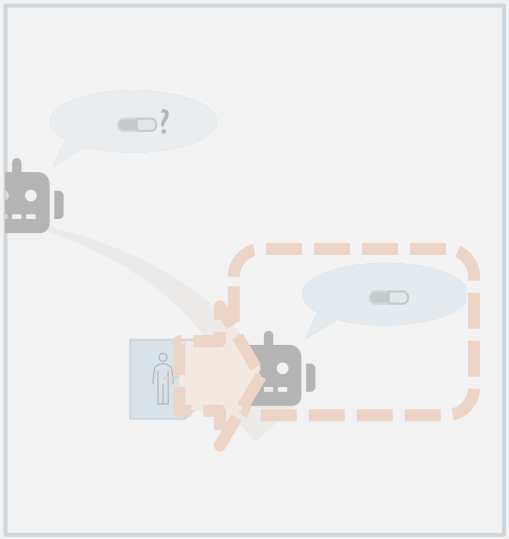

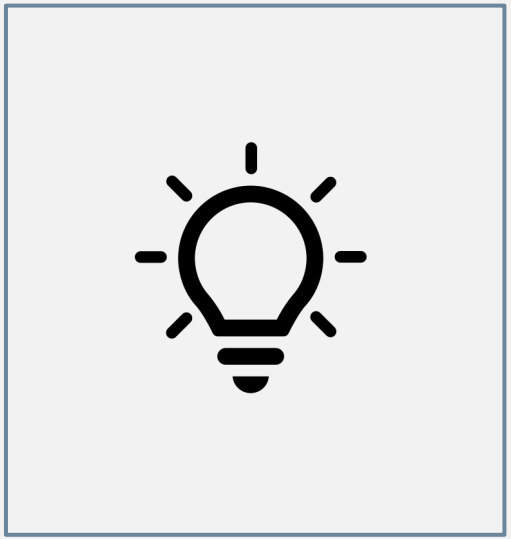

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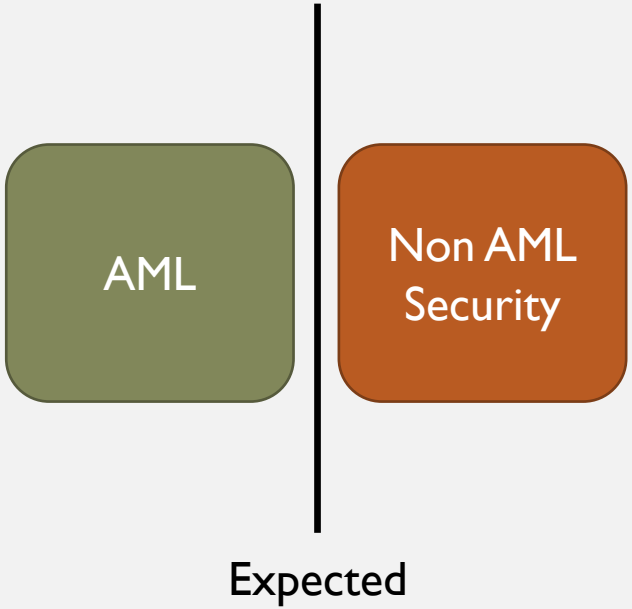
Key findings – AML versus Non-AML Security



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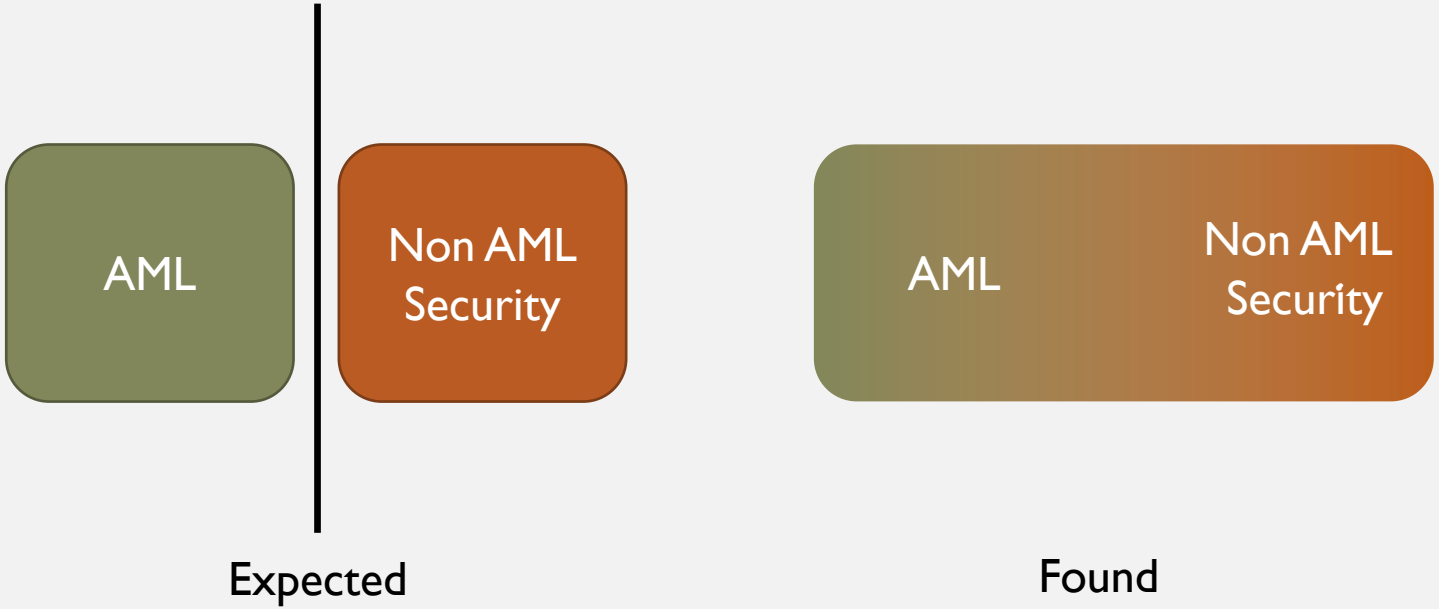

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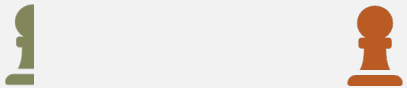
Details – AML versus Non-AML Security

- AML mitigations** vs security defenses



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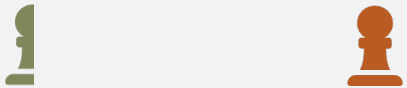

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  - Externalized responsibility (4)
  - Have not encountered threat
  - Doubt attacker's motivation (7)
  - Believe have a working mitigation (9)

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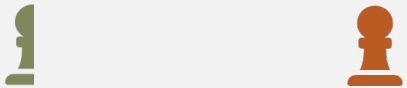

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Model reverse engineering
Model Stealing
Code breach

Membership Inference
Data Breach

DoS Attacks

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- AML mitigations** vs security defenses

Poisoning

Evasion

ML are doubted

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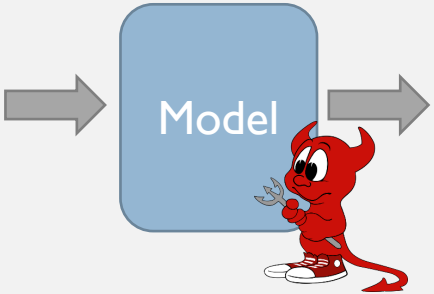
Data Breach

DoS Attacks

Key findings – Model versus Workflows



Research

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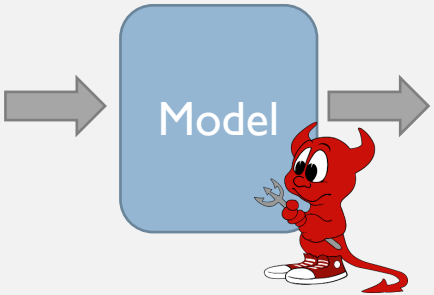

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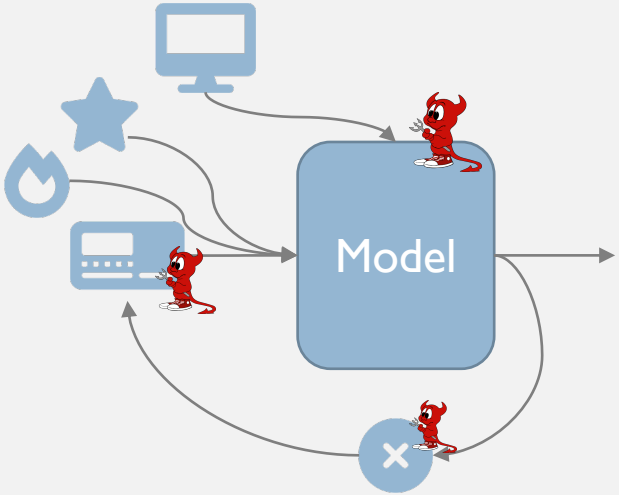

Practice

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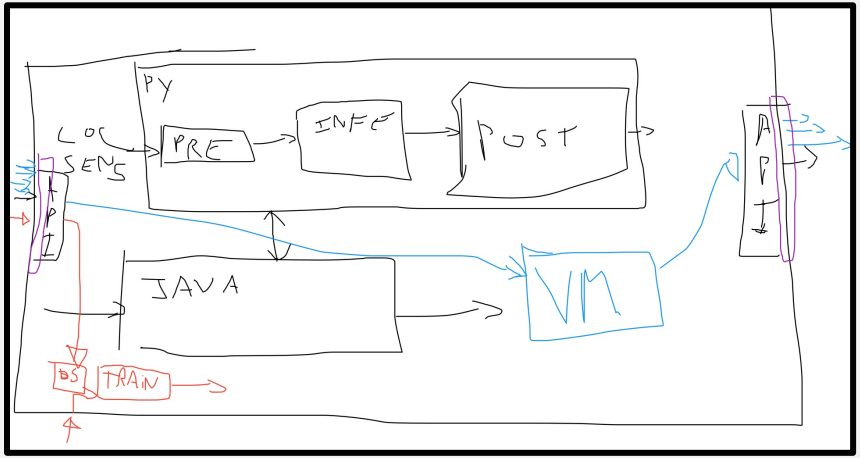
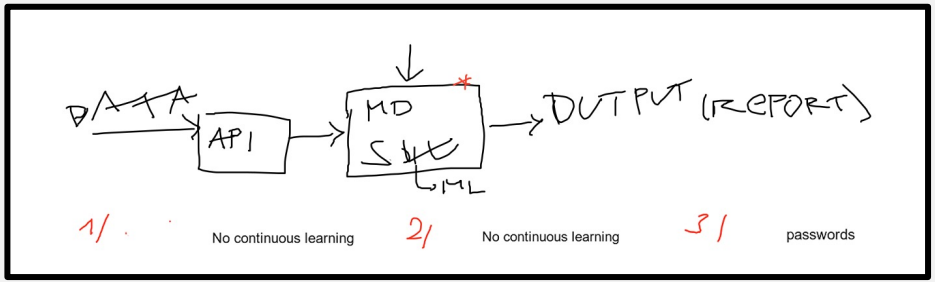
Details – Model versus Workflows



S16

S18



Open questions

Application

perceived Relevance

Education

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AML attacks in practice

- 'What we **experienced** is not so much AML – **but semi-automated fraud**'

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Implications

- Enforce that **both** ML and non-ML security are taken care of
- Provide reasonable data so that **research can be practical**
- **There are AML attacks in practice**
- **Educating** practitioners on AML seems crucial