Detecting **Visual Aimbots** in MOGs via Honeytokens

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TOULOUSE HACKING CONVENTION

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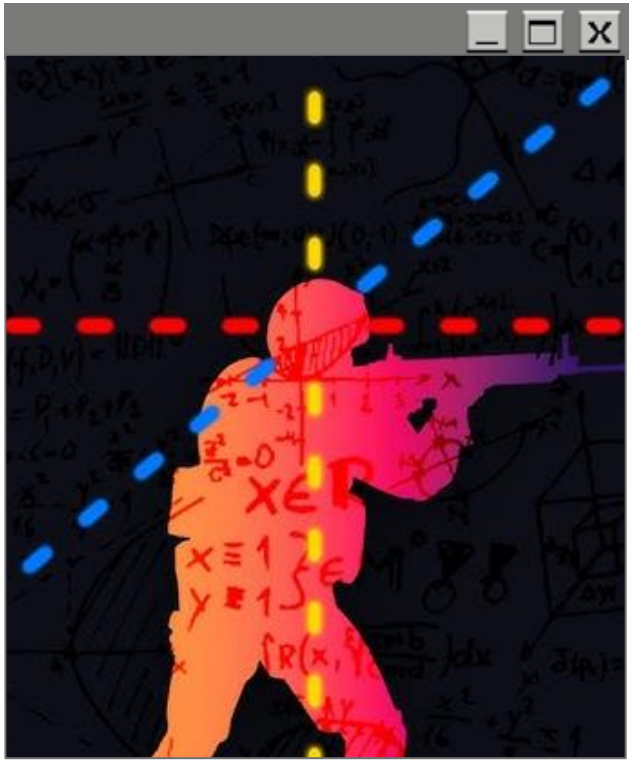


What are Aimbots?

- Software that enhances the performance of a cheater.
- Automating the process of finding and shooting at the opponent [2,3].
- A prevalent problem that has been ongoing since the early days of shooter games.

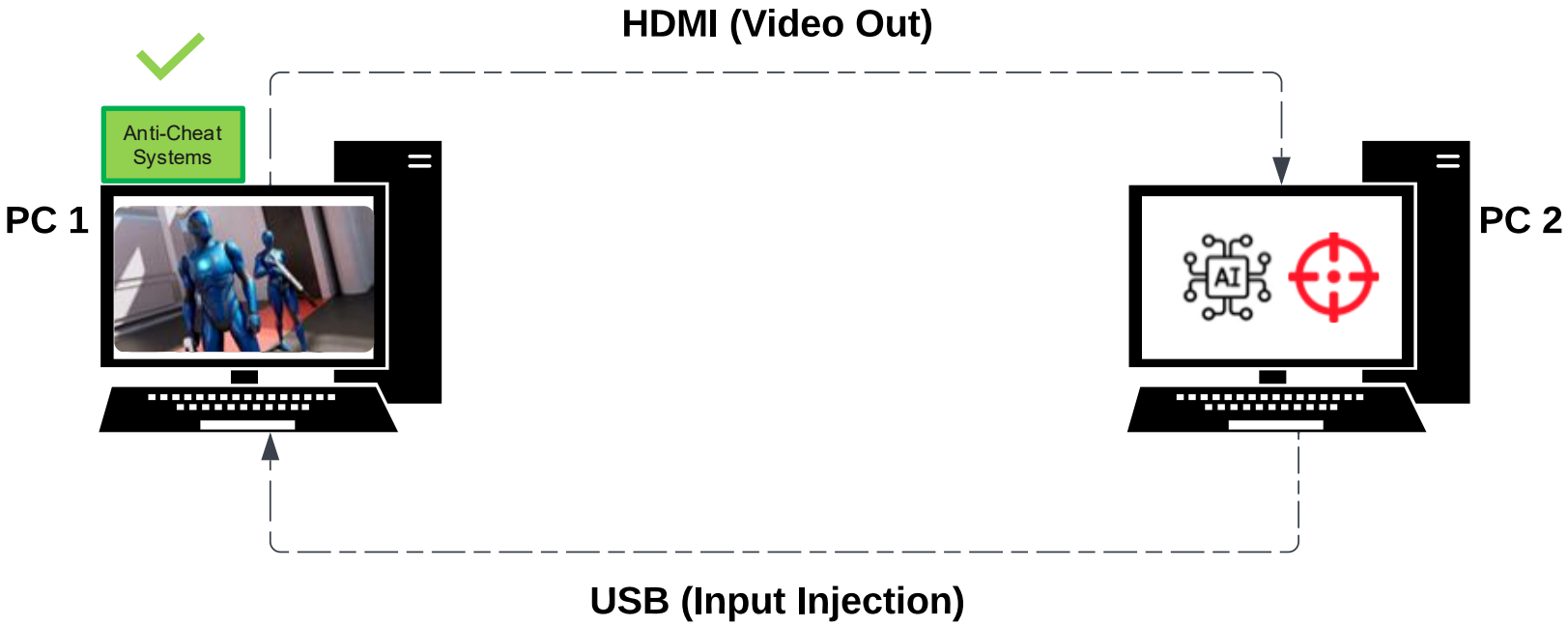
[2] Anwar, M.S., Zuo, C., Yagemann, C., Lin, Z.: Extracting Threat Intelligence From Cheat Binaries For Anti-Cheating. In: 26th International Symposium on Research in Attacks, Intrusions and Defenses. p. 17–31. ACM (2023). https://doi.org/10.1145/3607199.3607211
[3] Karkallis, P., Blasco, J.: Vic: Evasive video game cheating via virtual machine introspection. https://arxiv.org/abs/2502.12322 (2025)

Types of Aimbots

- Memory-Based Aimbots [2,3]
  - Attaches to the game process and reads memory for enemy positions.
  - Calculates aim and injects input directly into the game.
  - Often paired with Triggerbots for automatic shooting.
    - ✓ Anti-Cheat Systems, shipped with the games (EAC, Vanguard, etc.) can detect such cheats. - To a certain extent..

- Visual Aimbots [4,5]
  - Utilize trained CV models that run alongside the game.
  - Analyzes live screen data instead of accessing game memory.
  - Being used in practice more and more, for commercial games.
    - × Anti-Cheat Systems cannot detect such cheats.

[2] Anwar, M.S., Zuo, C., Yagemann, C., Lin, Z.: Extracting Threat Intelligence From Cheat Binaries For Anti-Cheating. In: 26th International Symposium on Research in Attacks, Intrusions and Defenses. p. 17–31. ACM (2023). https://doi.org/10.1145/3607199.3607211
[3] Karkallis, P., Blasco, J.: Vic Evasive video game cheating via virtual machine introspection. https://arxiv.org/abs/2502.12322 (2025)
[4] Kelik Nugroho, A., Permadi, I., Habiballah, A.: Image detection in the aimbot program using yolov4tiny. Jurnal Teknik Informatika (Jutif) 4 (1), 109–115 (Feb 2023). https://doi.org/10.52436/1.jutif.2023.4.1.821
[5] Sun, C., Ye, K., Su, L., Zhang, J., Qian, C.: Invisibility Cloak: Proactive Defense Against Visual Game Cheating. In: 33rd USENIX Security Symposium. pp. 3045– 3061. USENIX Association (Aug 2024)


HDMI (Video Out)
Anti-Cheat Systems
PC 1
PC 2
AI
USB (Input Injection)

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PATCH: Proactive Adversarial Traps for Cheaters in MOGs

- Generate ***Adversarial Patches*** of different sizes, which serve as honeytokens.
- No typical disruption
- Focusing on deliberately triggering the attacker's visual aimbot.

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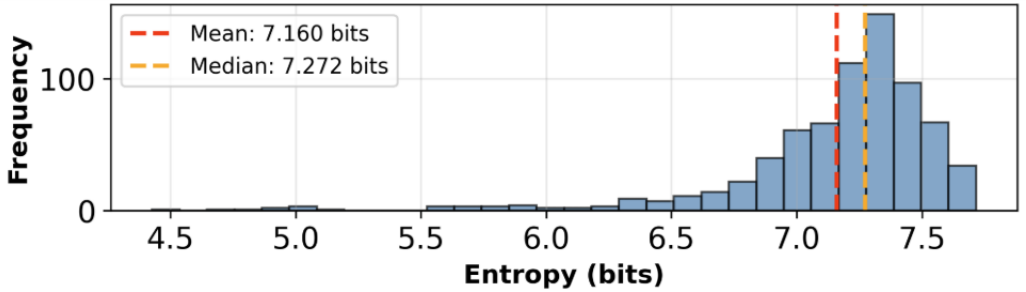
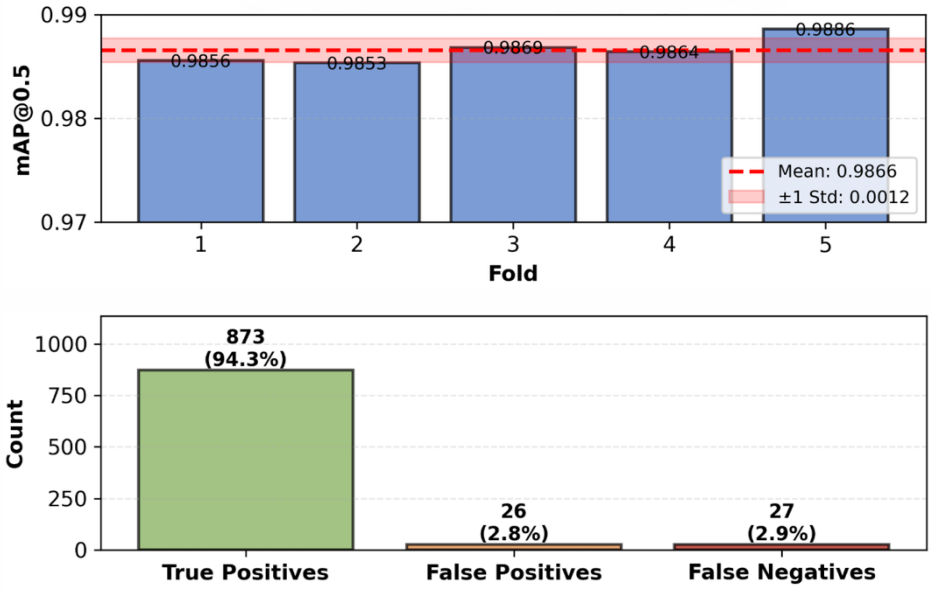
99:31
12
EMPTY
EMPTY

Generating a Visual Aimbot

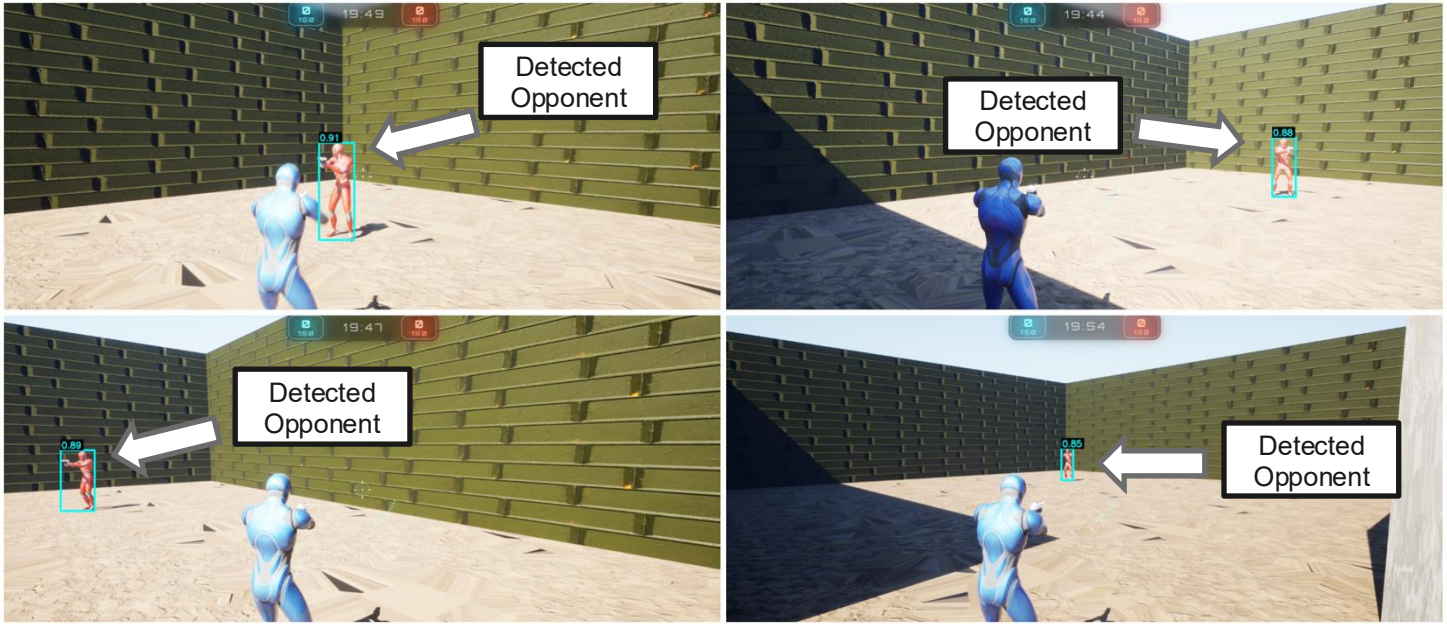
- Utilize pre-trained YOLO11m provided by Ultralytics
  - Most widely used in practice due to its accuracy and latency.
- Finetune to detect one class: 'player'.
- 5-fold cross validation on 900 diverse images.



Results – 1


0.99
0.98
0.97
mAP@0.5
0.9856
0.9853
0.9869
0.9864
0.9886
Mean: 0.9866
±1 Std: 0.0012
1
2
3
4
5
Fold
1000
750
500
250
0
Count
873
(94.3%)
26
(2.8%)
27
(2.9%)
True Positives
False Positives
False Negatives

Results – 2

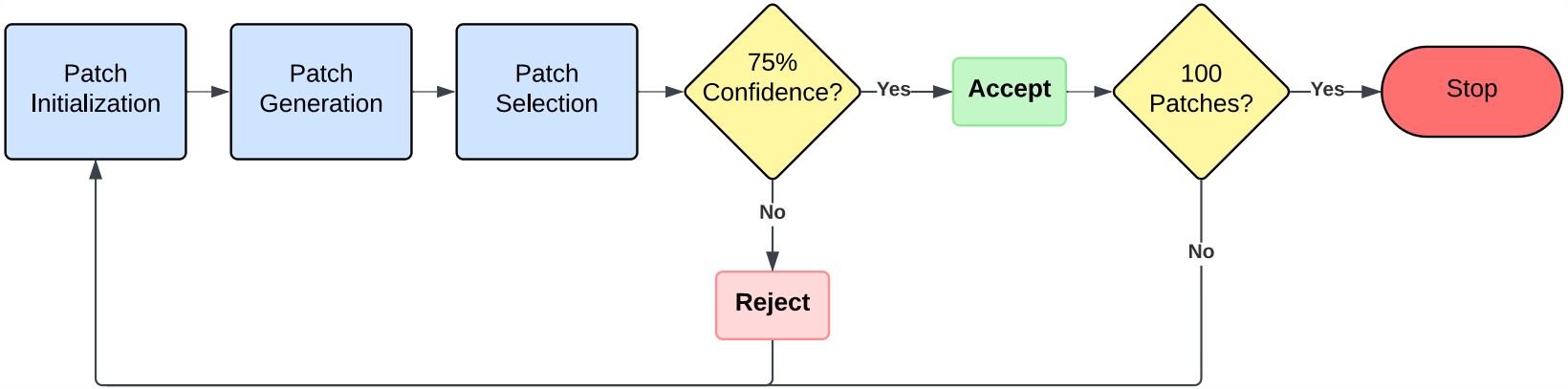

Detected Opponent
Detected Opponent
Detected Opponent
Detected Opponent

Generating Patches (Honeytokens)

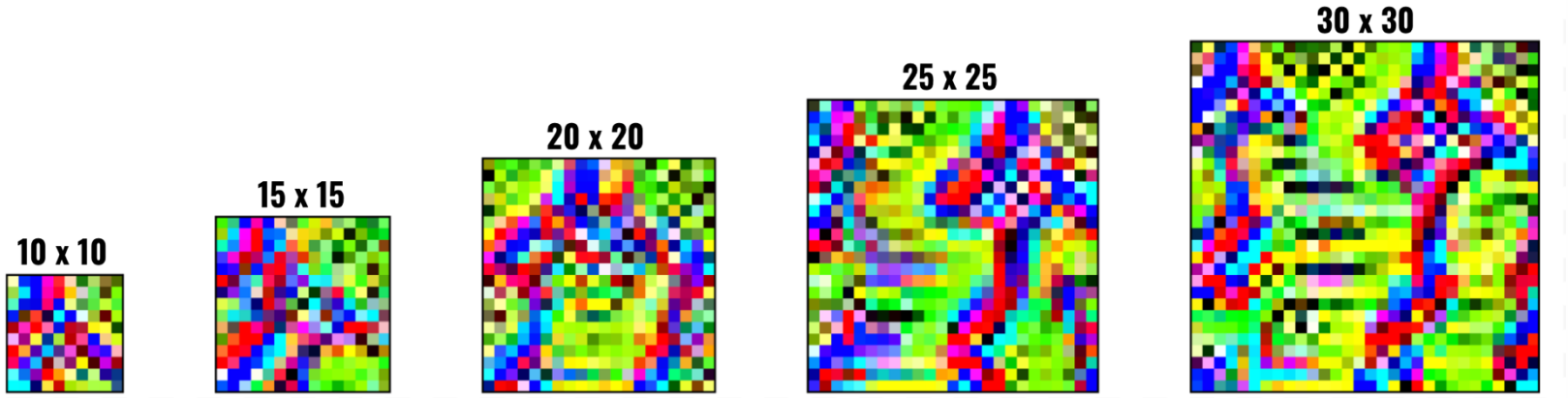
- **Our Approach:**
  - **White-Box: The defender can leverage the cheater's model to generate honeytokens designed to trigger it.**
  - **Replicates real-world scenarios.**

Black-Box: The defender will not know the attacker's model. Thus, uses a known surrogate model to generate honeytokens.

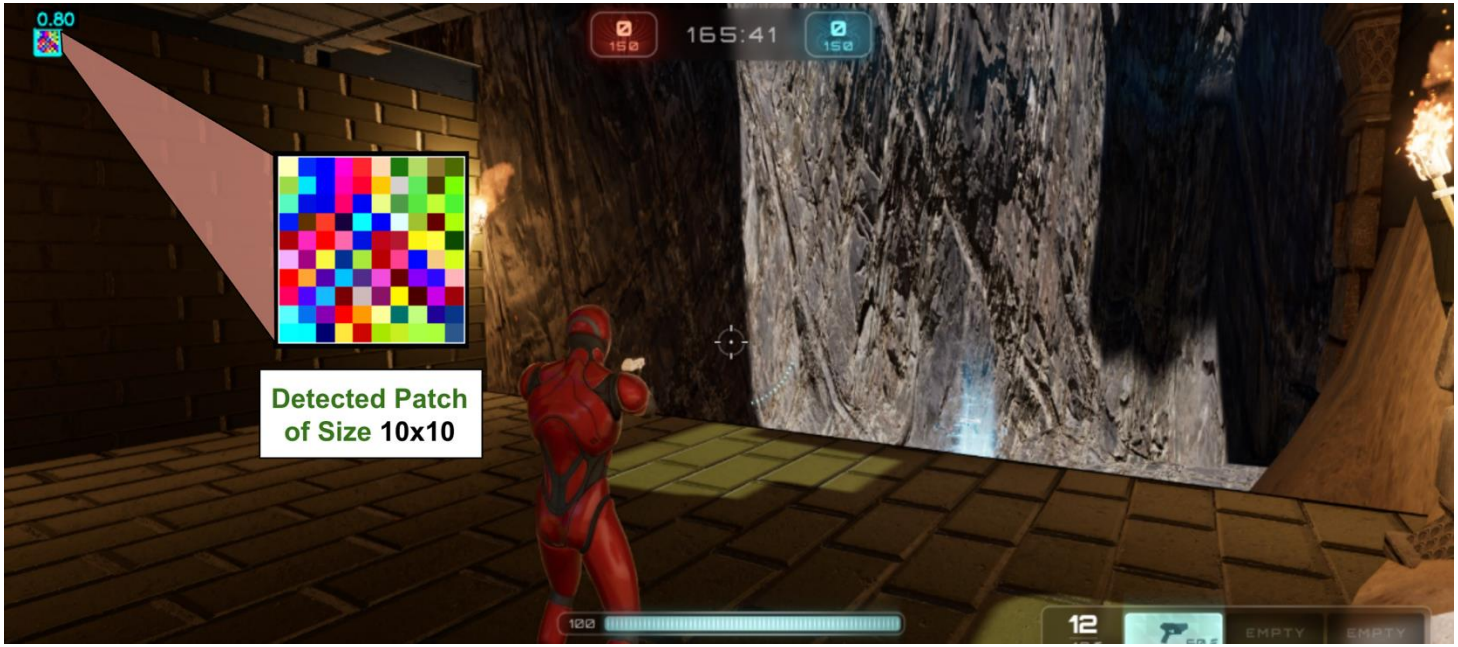
Generating Patches (Honeytokens): Pipeline



Results – 1



Results – 2



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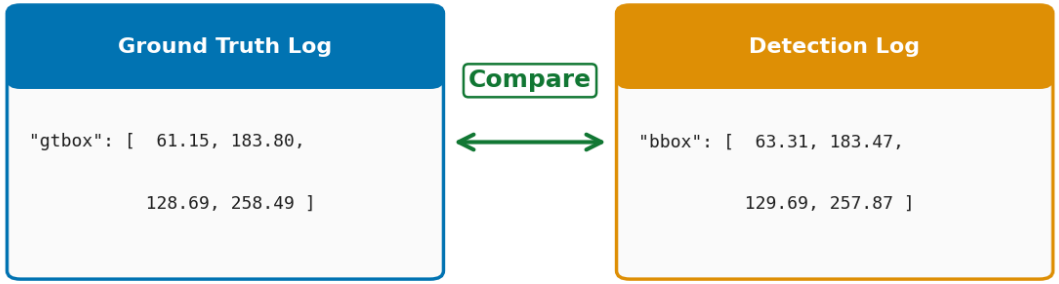
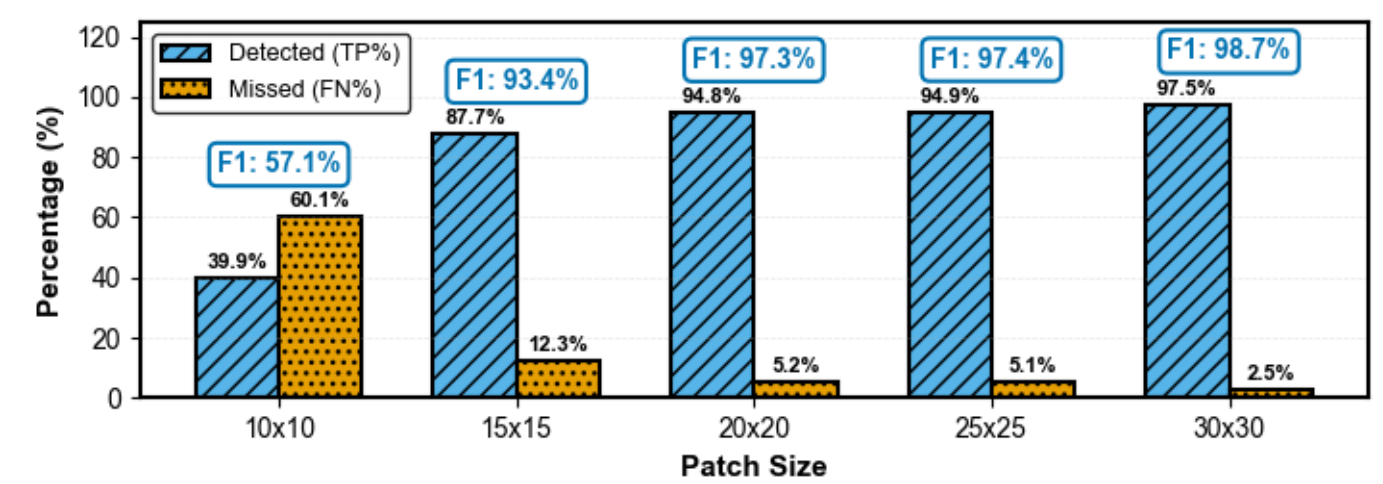
Evaluation Approach

- Patches deployed within the game for 100ms.
- Dual Logging System.



- All patch analysis experiments were conducted across multiple trials.

Evaluation Test – Whitebox



Evaluation Test – Fortnite [6]

[6] Sunone: Sunone boosty page. https://boosty.to/sunone (2026), accessed: 2026-04-03

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Conclusion

- Adversarial Patches as Honeytokens.
- Effective for all patch sizes.
- Limitations: Patch Effectiveness v/s Stealthiness
- Limitations: Cross-Model Transferability
- Future Work: Game-Based Patch Initialization
- Future Work: Adaptive Mitigation Techniques

References

1. SlidesGo Template.

2. Anwar, M.S., Zuo, C., Yagemann, C., Lin, Z.: Extracting Threat Intelligence From Cheat Binaries For Anti-Cheating. In: 26th International Symposium on Research in Attacks, Intrusions and Defenses. p. 17–31. ACM (2023). https://doi.org/10.1145/3607199.3607211

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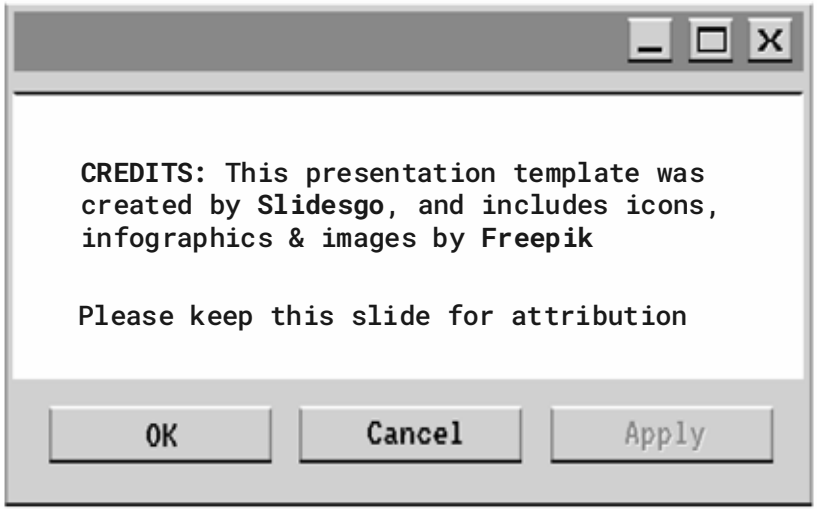
6. Sunone: Sunone boosty page. https://boosty.to/sunone (2026), accessed: 2026- 04-03

Thank You!

Questions?



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