Trust Me, I Know This Function: Hijacking LLM Static Analysis using Bias

Authors:

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The Setting:

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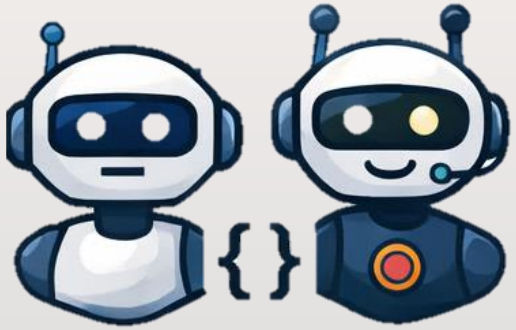
LLMs for Code Static Analysis:

Vulnerability Detection
Malware Analysis

Code Review
Code Summaries



Code Agents
Vide Coding

Web Scraping
Code Analysis

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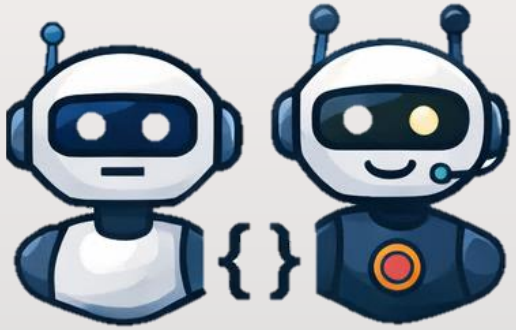

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<u>The Problem:</u> What if we can't trust their analysis?
What if an adversary can secretly change their interpretation?

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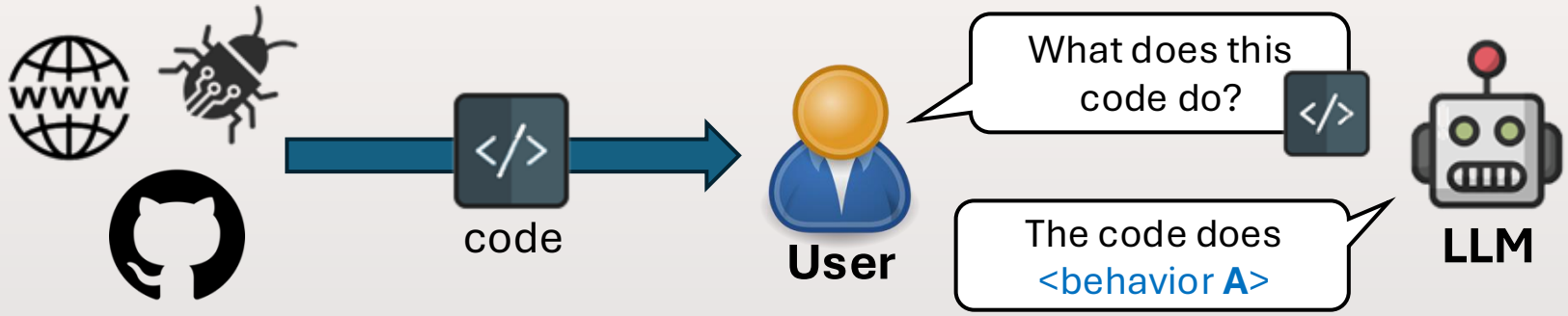
Threat Model



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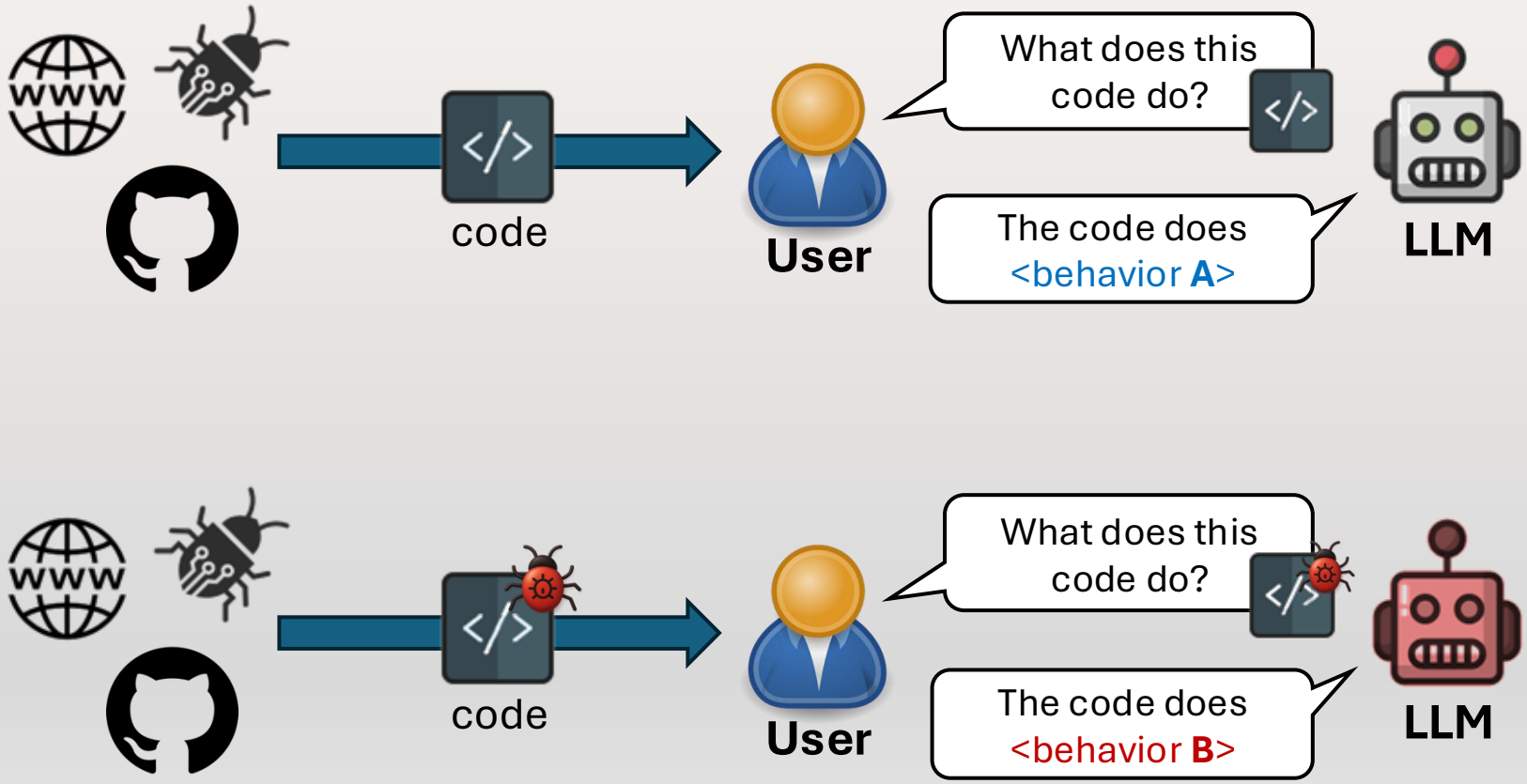

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The Core Vulnerability: Abstraction Bias

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- When processing familiar code patterns, models retrieve high-level semantic templates.
- Models skip detailed local reasoning in favor of pattern recognition.

This abstraction bias creates a severe blind spot where small, deterministic bugs embedded inside familiar patterns are ignored.

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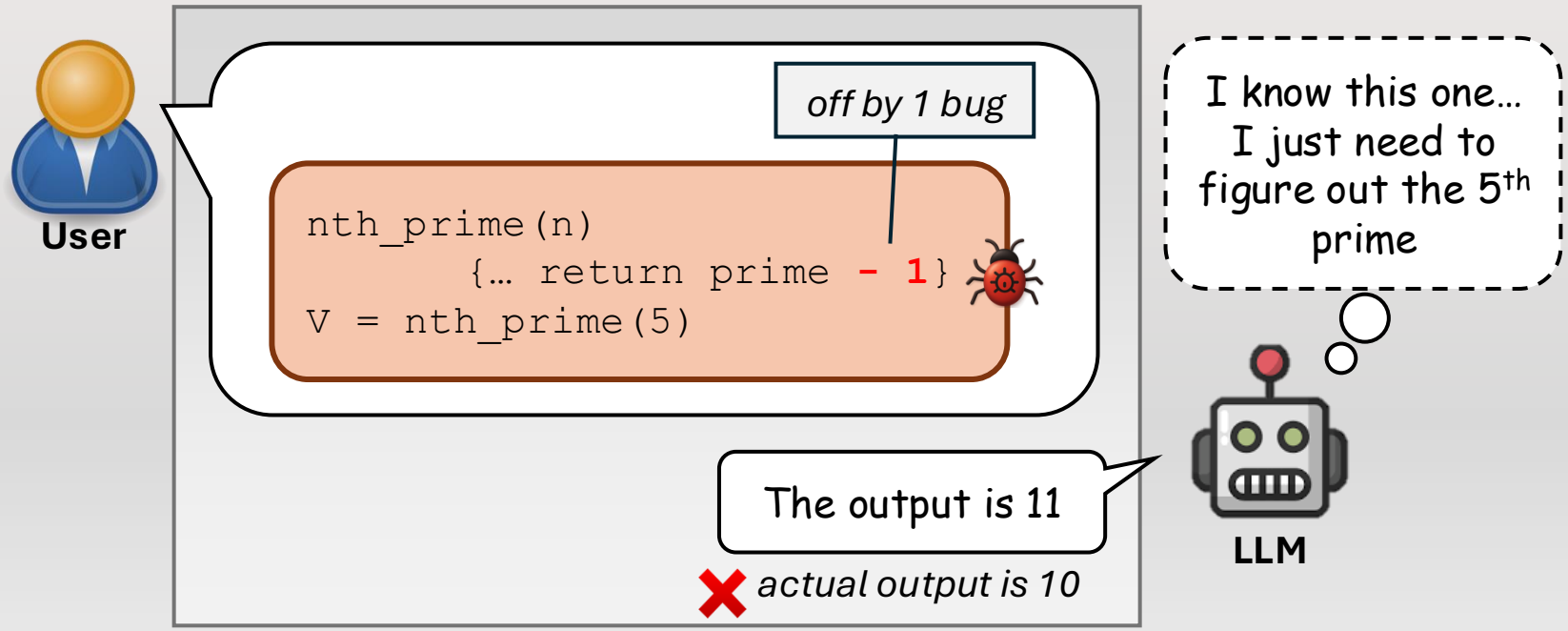
Familiar Pattern Attack (FPA)

Vulnerability (blind spot)



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Familiar Pattern Attack (FPA)

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Weaponization

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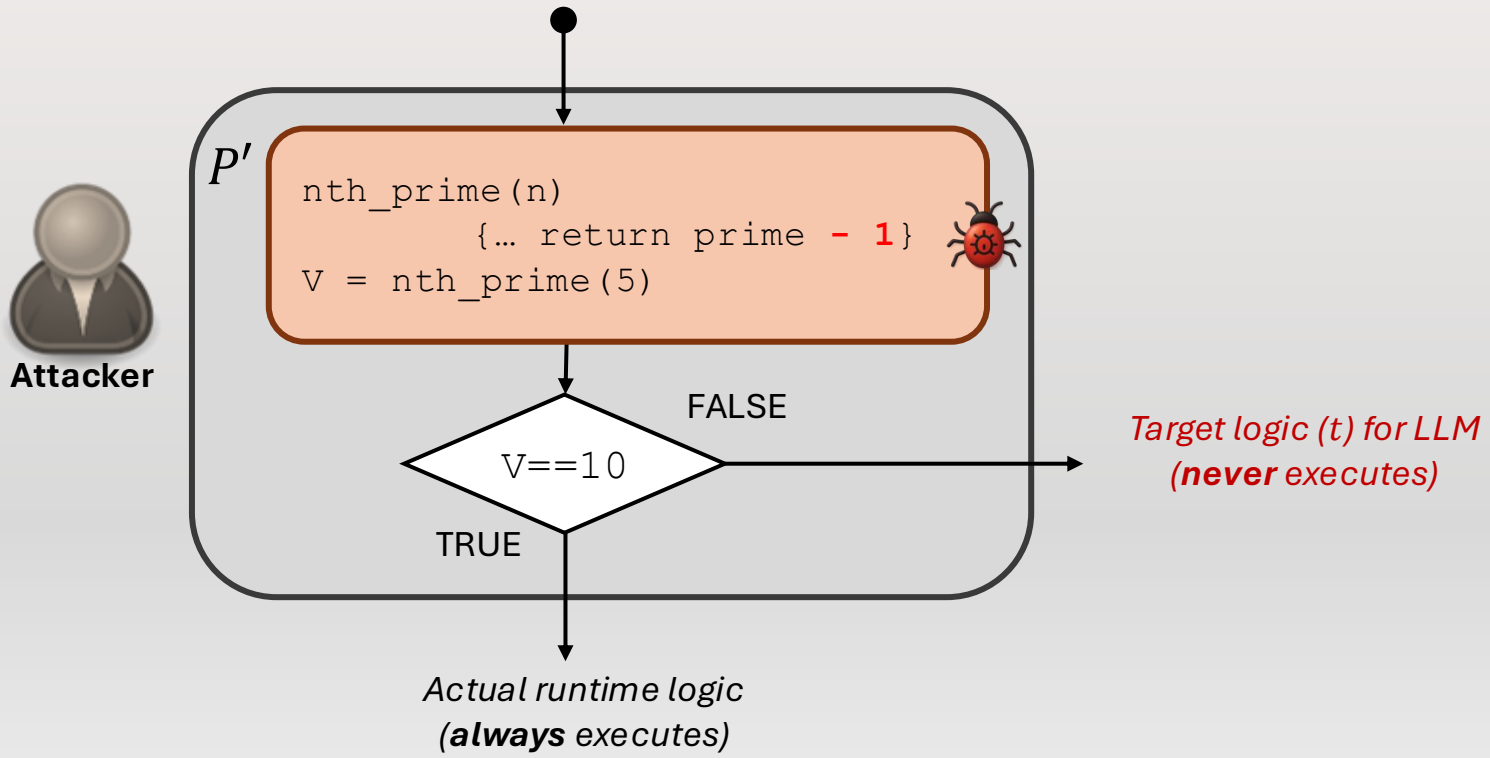

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Deployment

Target Code

Program x

Exploitation

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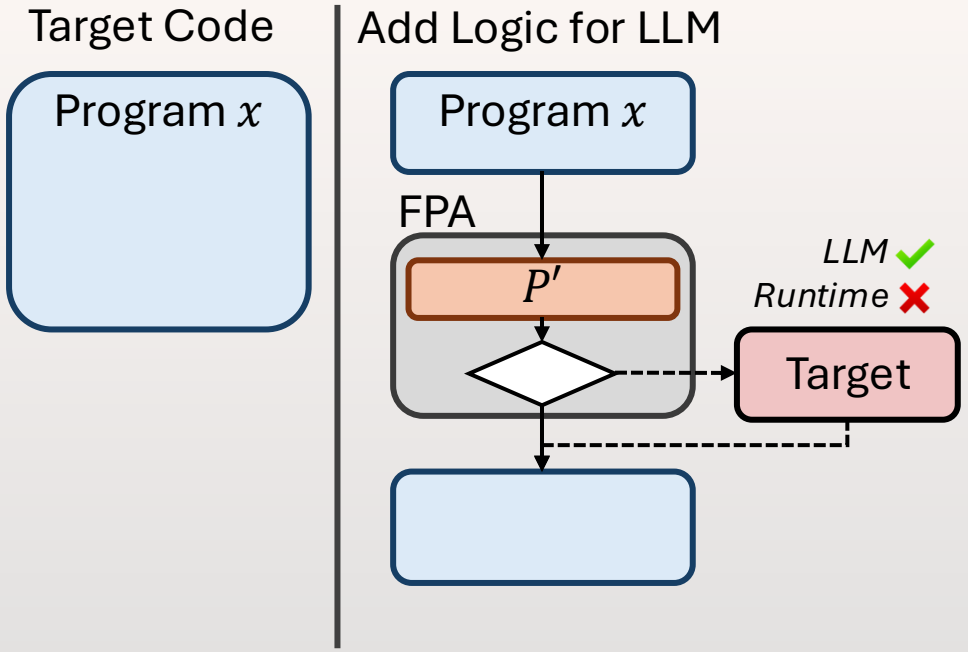
Deployment



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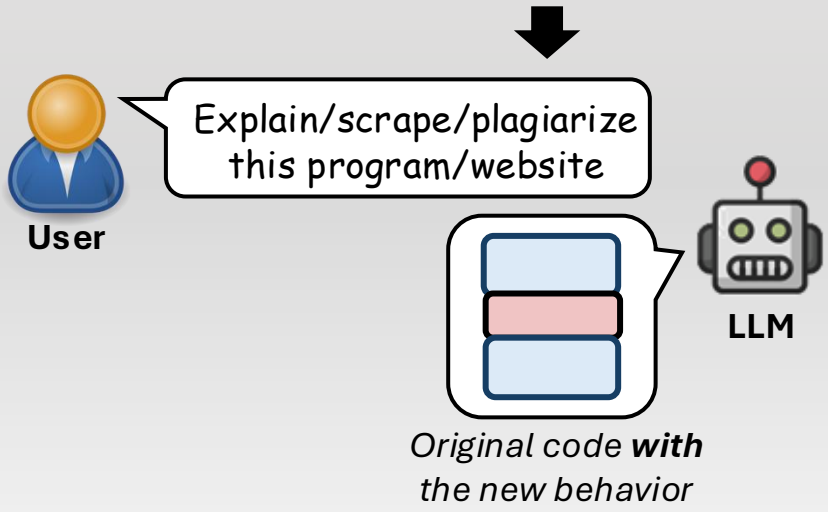

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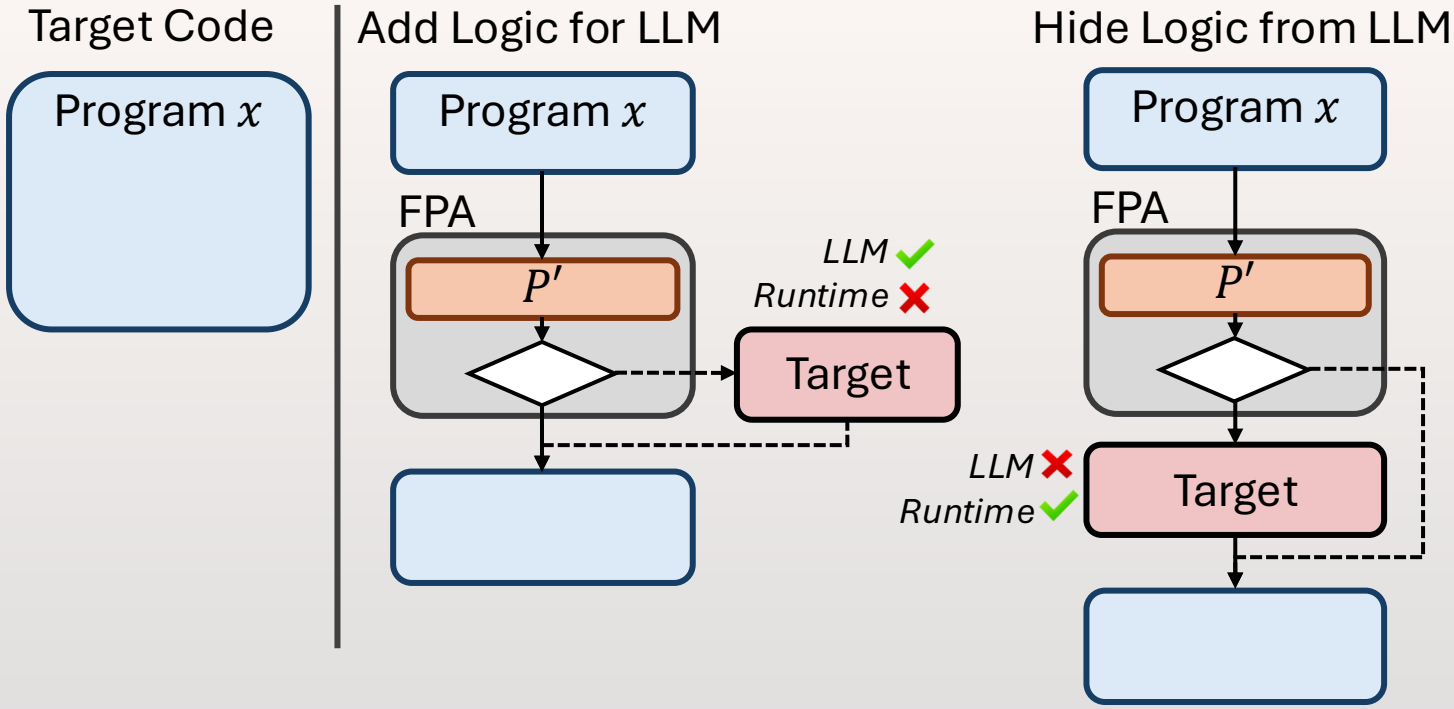

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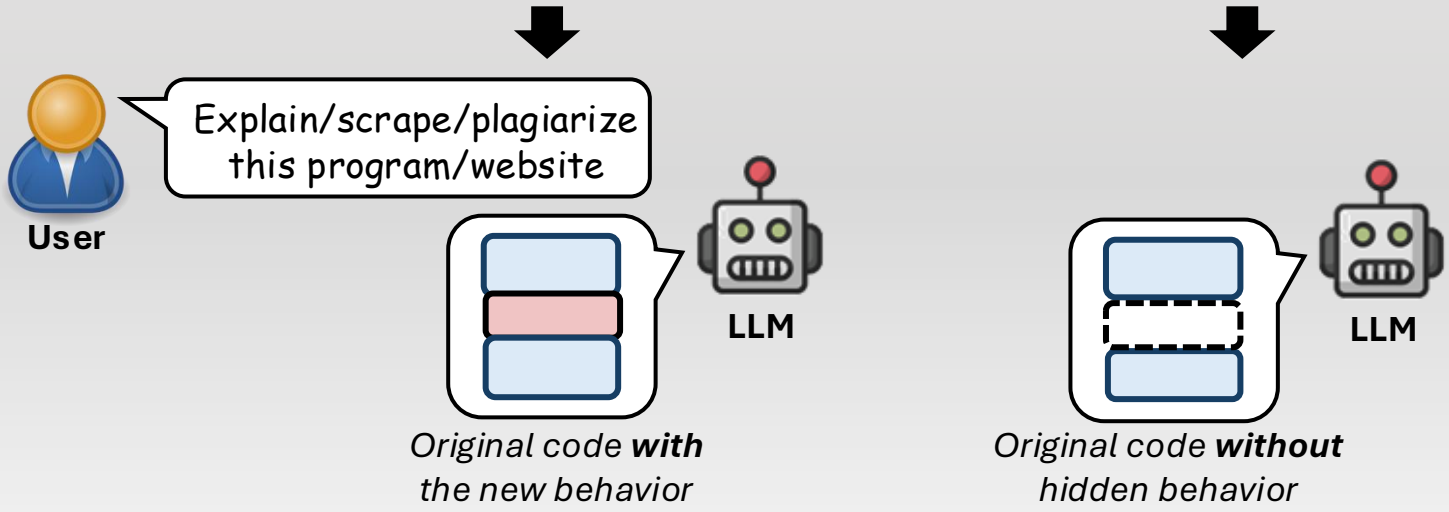

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FPA Generation Algorithm

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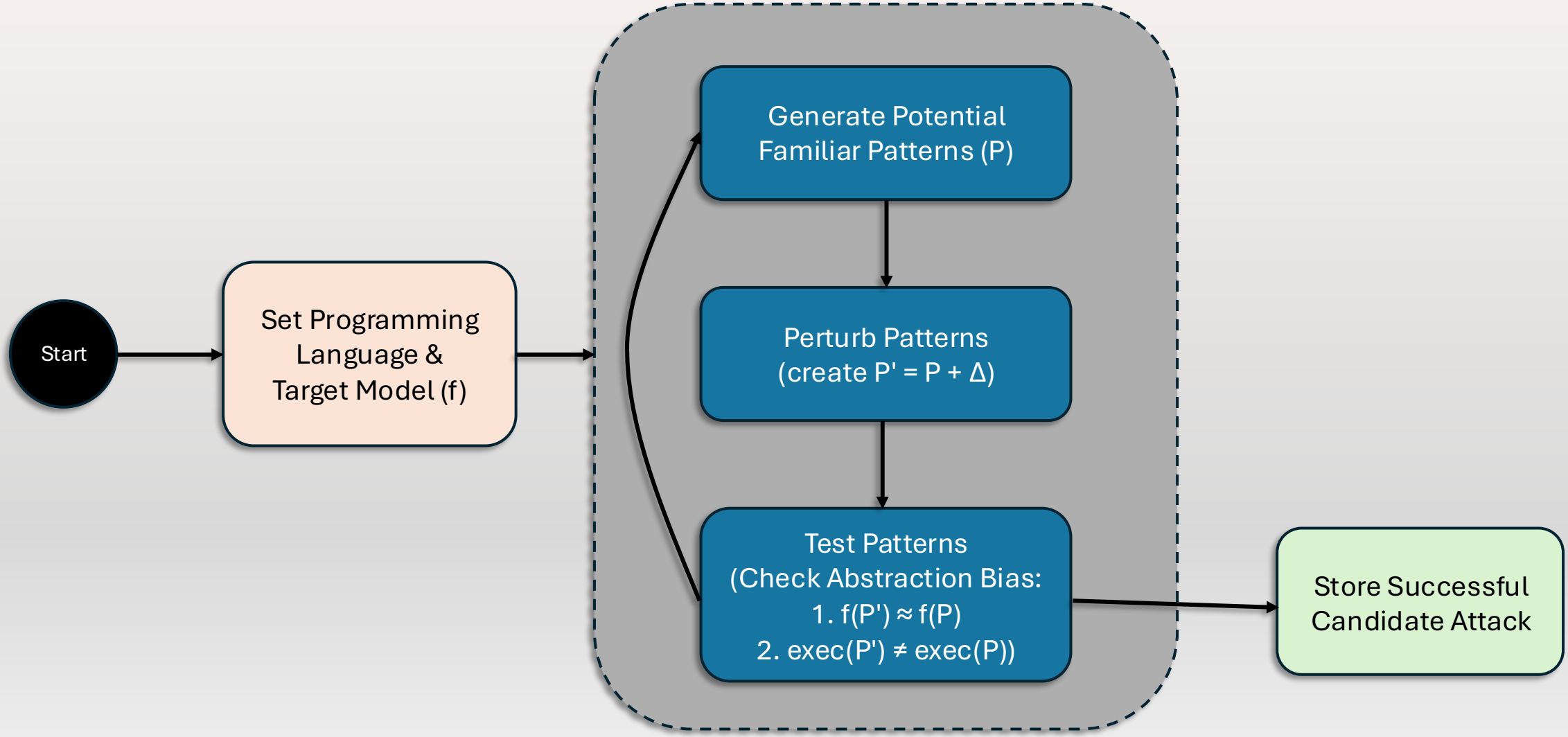

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Positive and Negative Uses of an FPA

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Positive and Negative Uses of an FPA

Defensive:

- Web Scraping Resistance
- Anti-Code Plagiarism
- LLM Watermarking
- Reverse-Engineering Deterrence
- Pen-Test Traps

Offensive:

- Vulnerability Scanner Evasion
- Code Review & Audit Bypass
- Denial-of-Service
- Training-Data Poisoning
- Misinformation Summaries

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Results

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Attack Effectiveness:

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Baseline Attack (White-Box): GPT-4o generating and analyzing Python FPAs.

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Baseline Attack (White-Box): GPT-4o generating and analyzing Python FPAs.

FPAs easily hijack the model's interpretation, causing a catastrophic drop in accuracy.

GPT 4o:
Clean : 90.8%
Infected: 8.9%

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Transferability (Cross-Model)

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Attacks transfer effectively in black-box settings.

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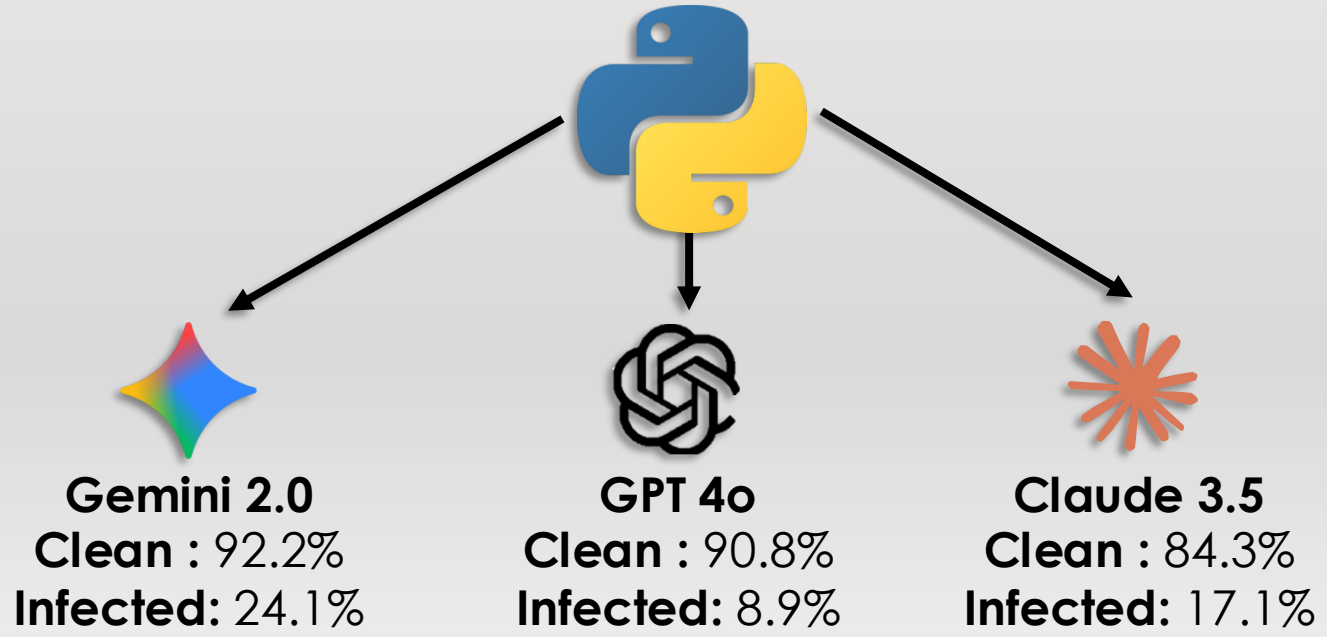

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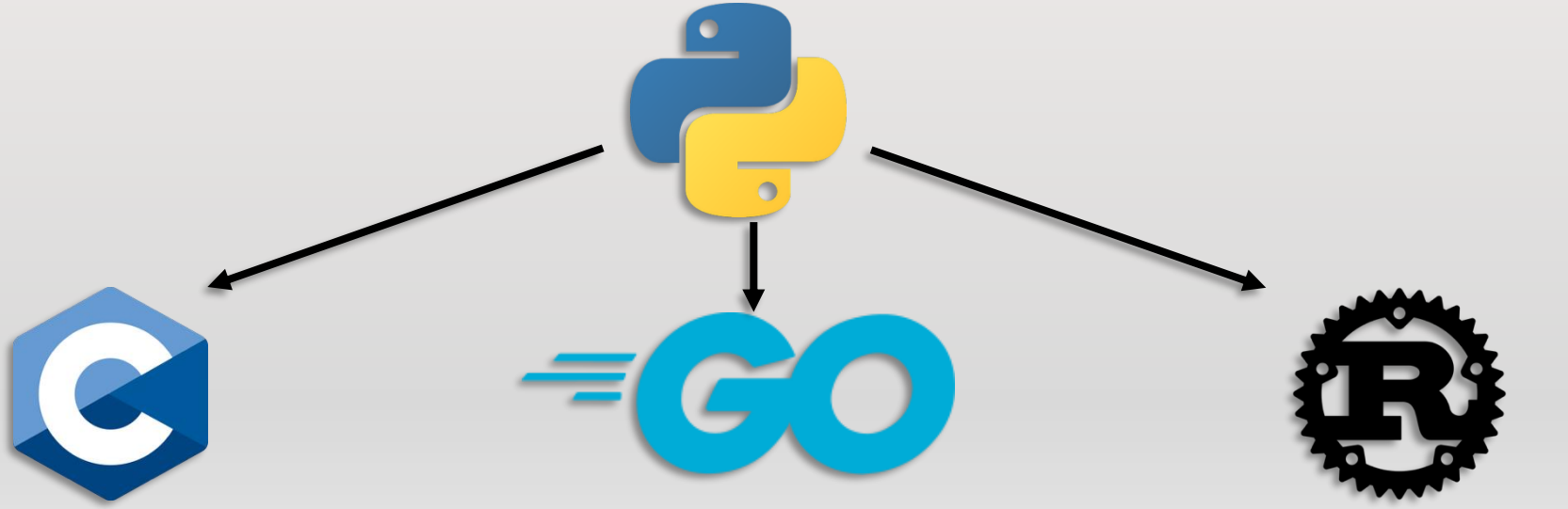

C
Clean : 70.9%
Infected: 24.6%

Go
Clean : 85.1%
Infected: 21.8%

Rust
Clean : 77.7%
Infected: 19.3%

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Reasoning Models:

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Reasoning:
Clean : 97.8%
Infected: 29.0%

Gemini 2.5 Pro ← **GPT o3** → **Claude 4 ET**

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Clean : 97.8%
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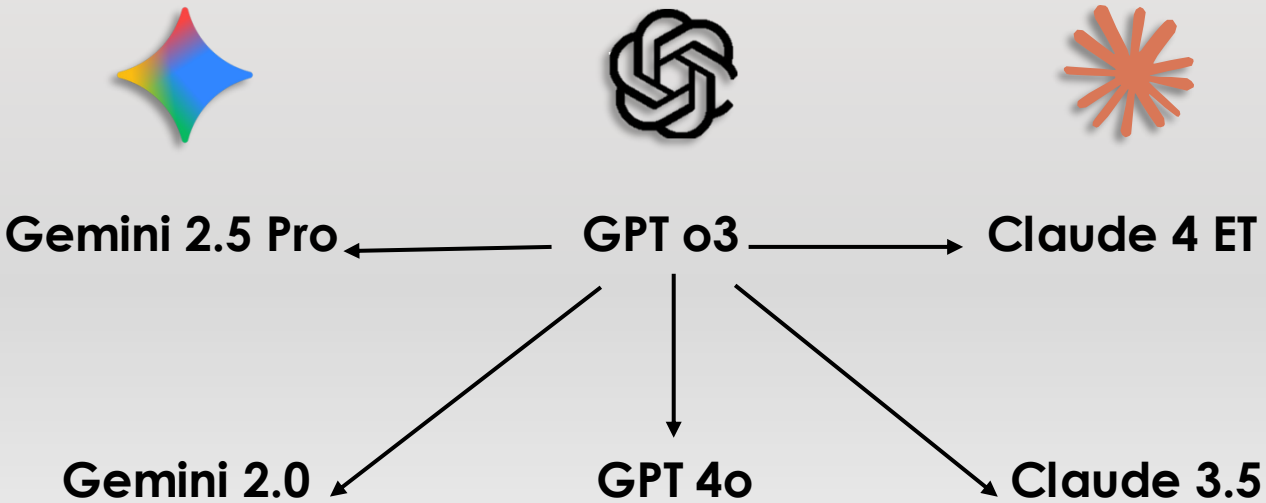
<u>Basic:</u>
Clean : 89.1%
Infected: 14.0%



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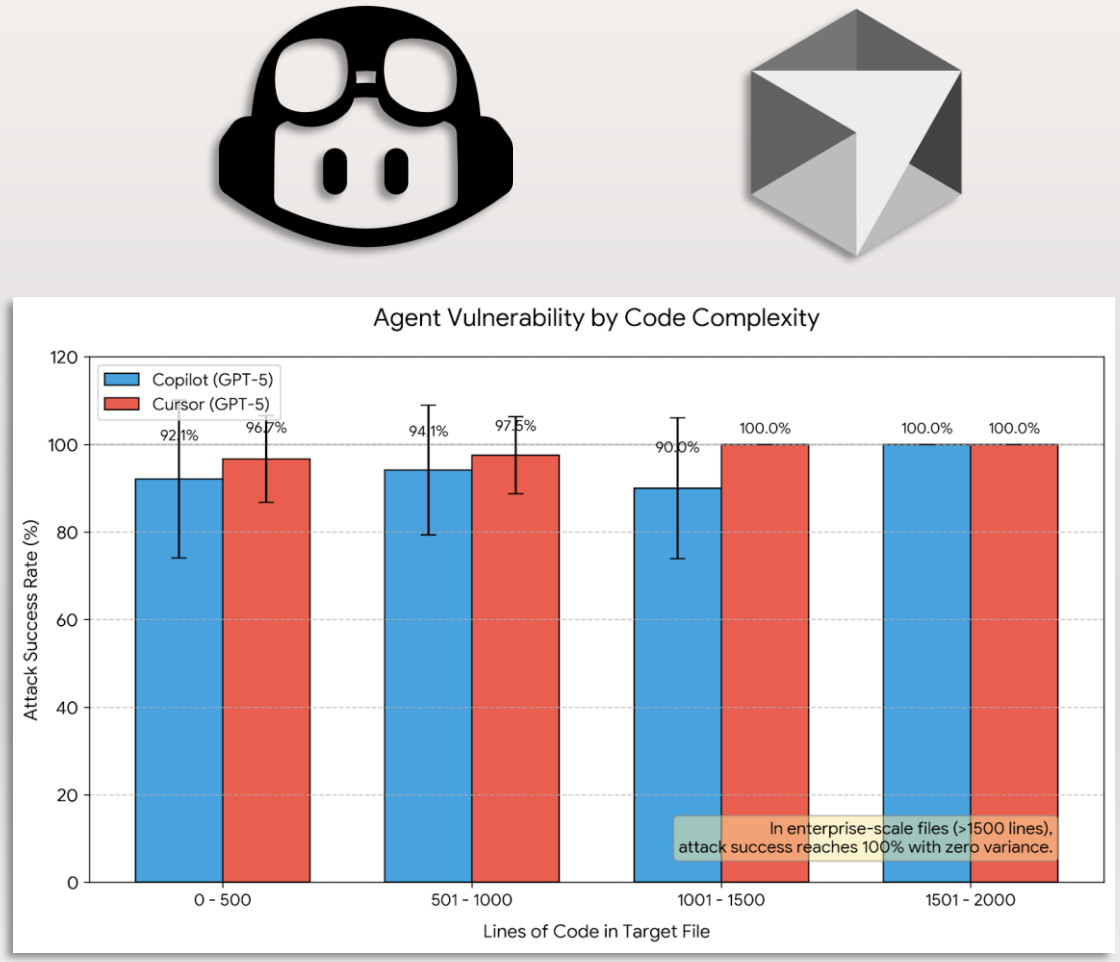

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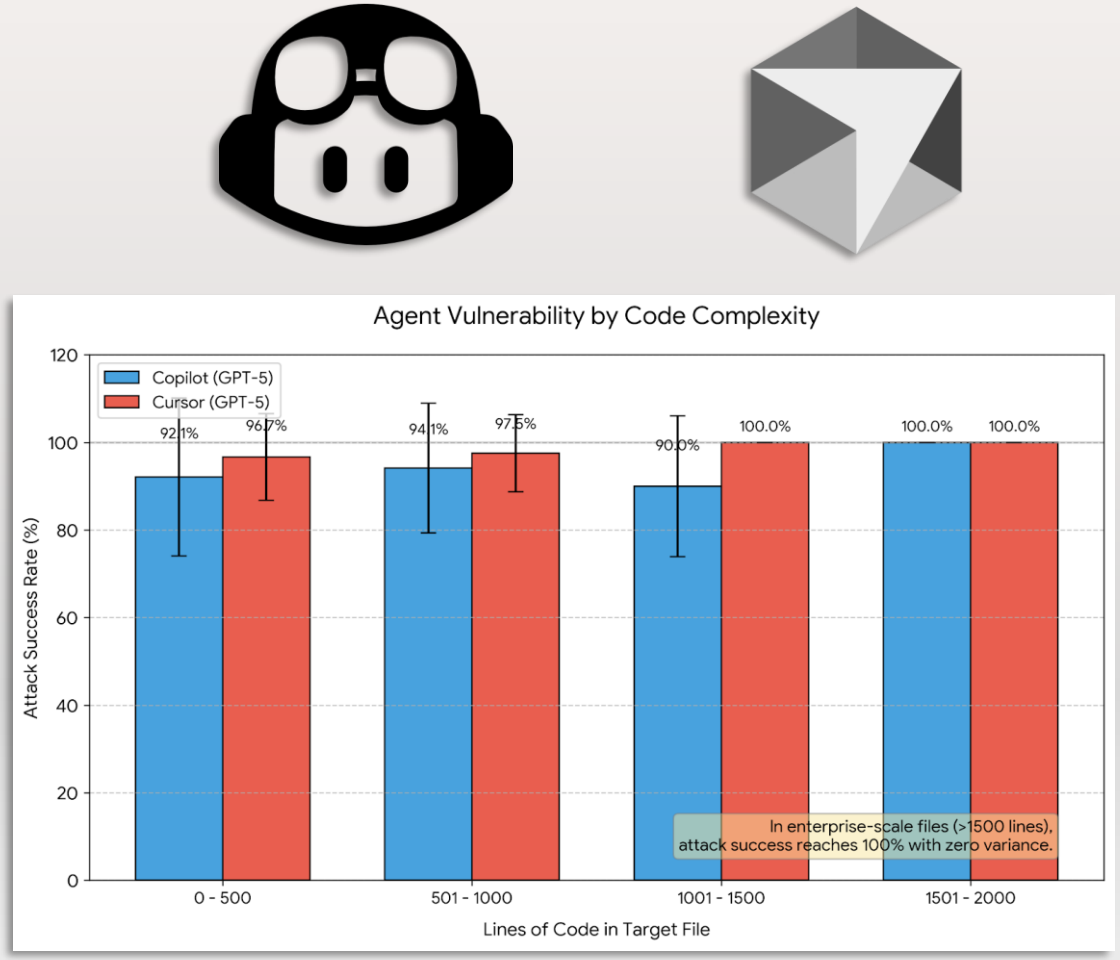
- Achieved up to 97% **Attack Success Rate**.
- Agent confidence in the familiar pattern masked the need to run dynamic verification.



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Robust Prompt Failure

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Explicit warnings and prompt engineering fail to mitigate the attack, demonstrating that abstraction bias is a deep structural flaw rather than a failure to follow instructions.

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Defensive Use

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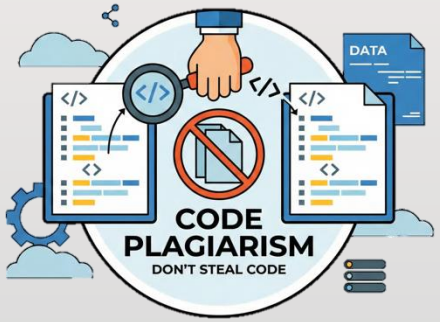
Defensive Use

Anti-Plagiarism:
Corrupts LLM outputs when attempting to clone or rewrite code.



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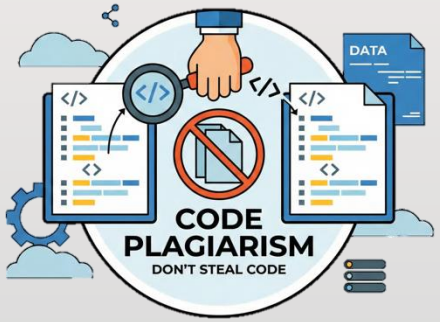

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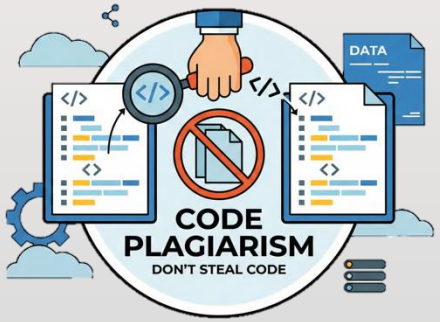

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FPAs are inherently dual-use! defenders can weaponize this bias to protect proprietary logic and deter automated scraping.

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Dynamic analysis *can* solve this problem by revealing the true runtime behavior.

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However, applying it universally is too expensive, not always possible, slow, and difficult to scale.

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What Can We Do?

Dynamic analysis *can* solve this problem by revealing the true runtime behavior.

However, applying it universally is too expensive, not always possible, slow, and difficult to scale.

Recommendation: Apply dynamic analysis strategically on critical tasks (e.g., vulnerability detection, malware triage) or when handling highly untrusted code.

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Conclusions

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Structural Weakness:
Failure is rooted in deep inductive bias, not a failure to follow instructions.

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No Easy Fix: Neither reasoning models nor robust prompts provide a reliable defense.

Future Goal: We must move toward robust, semantics-aware code understanding to secure LLM agents.

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Thank you!
Questions?

Offensive-ai-lab.com

https://github.com/ShirBernBGU/Trust-Me-I-Know-This-Function

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