SP2023 Week 09 • 2023-03-23

AI Hacking I

Anusha

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Announcements

- We’re playing LINE CTF!
  - It starts tomorrow, please come play with us!

- No meeting next Thursday
  - We’re off to CypherCon :)

- Fill out feedback form for our research paper please
  - https://forms.gle/kYg16ZJicwuVwTca6

ctf.sigpwny.com

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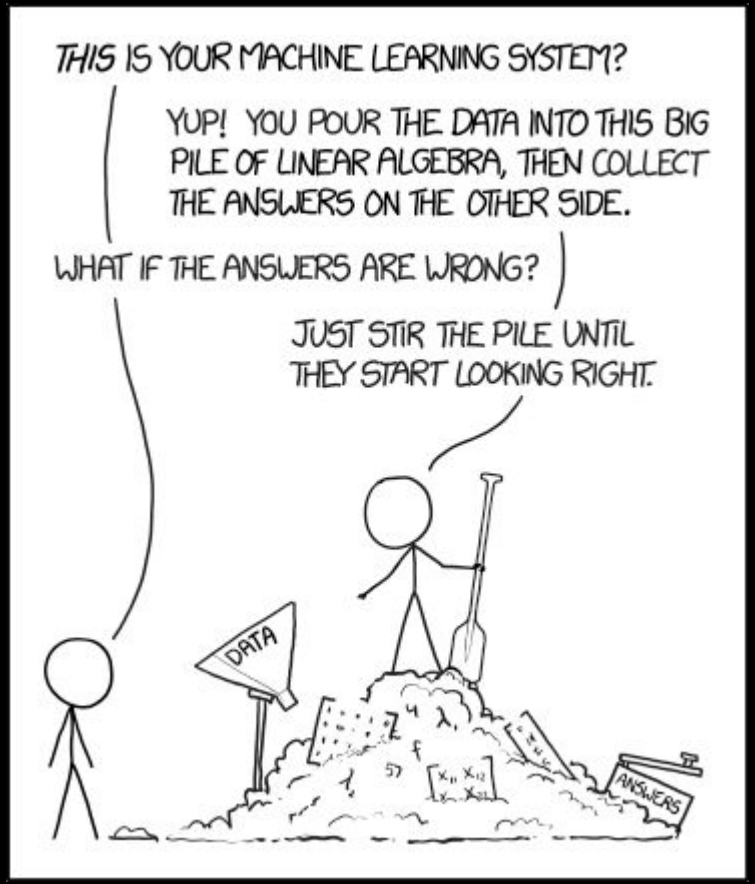

Overview

- What is "AI security"?
  - using AI for security purposes
  - exploring the security of AI itself
  - AI ethics/security around AI
- All of them are awesome fields, but be aware that "AI security" can depend on who you're talking to!

AI for Security

AI for Malware

- Using AI to find malware and shut down execution
  - scans code before execution to determine malware potential
- AI for network monitoring
  - scans packets to monitor for attacks
- AI for anything else
  - pretty much anything that requires human foresight/monitoring

Pros/Cons

- Good things!
  - potential to find undiscovered malware and patch it
  - discover bugs before they can be exploited
  - continuous monitoring without continuous human involvement
- Bad things :(
  - potential to harmfully misclassify
  - black box
  - does accuracy generalize to the real world?

Security of AI

Security of AI

- How to find ways to make models behave incorrectly on purpose
  - key word here: adversarial
- Many different ways to get models to misbehave
  - small differences in input can completely change output!

LLM Attacks

- Prompt injection/other attacks popularized by open access to models like ChatGPT
- How can we make LLMs misbehave? Can we gain access to unsanitized output? What are the harms of doing so?

GAN Attacks

- Are there ways for images included in a dataset to “poison” the outputs of a GAN?
  - Might be able to enforce ethical collection of art/images for training datasets
  - See GLAZE for more info!
- Can we find ways to produce unsanitized output on GANs? What would that look like? How is this dangerous?

Detector/Classifier Attacks

- Can we change the input to a detection/classification model to make it misclassify outputs?
  - FAWKES does it for facial recognition models
- Many papers have shown how adversarial inputs can produce altered output

Privacy Preserving AI

Privacy Preserving AI/ML

- Data collection side
  - How do you select proper datasets?
- Data processing side
  - Can we make training data more private?
- Architecture side
  - Model federation
    - How to train on decentralized data
  - Model unlearning

Career Paths

- Research
  - Industrial research with a company
  - Staying in academia
- AI Engineering
- AI red teaming

AMA

Next Meetings

2023-03-24 - Tomorrow

Come play LINE CTF with us! We will be playing both virtually and in person.

2023-03-26 - This Sunday

- AI Hacking II
- A more in-depth look at the technology behind today's talk

2023-03-30 - Next Thursday

- No meeting because of CypherCon

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