

CS395T: Principles of Learned Systems

Sujay Yadalam

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Who am I?



Engineer



Research assistant



WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

PhD



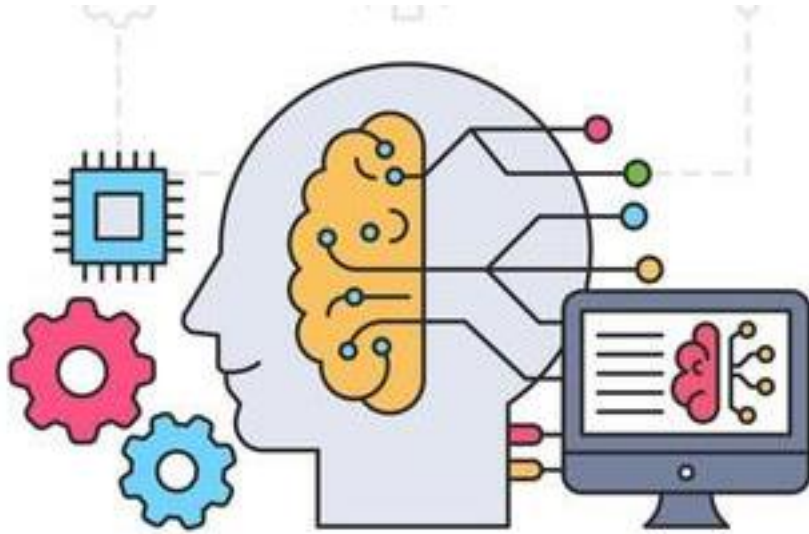
Post-doc

SoC benchmarking
Bluetooth stack dev

Hardware security
(Trusted Execution
Environments)

Operating system
(memory and storage)

LDOS



Machine Learning

This course

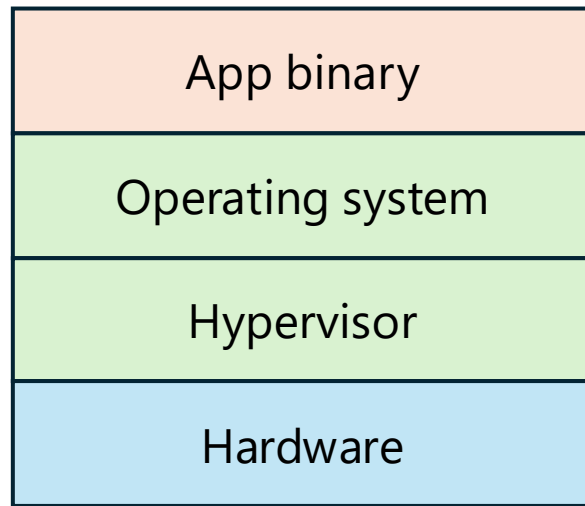


for



Systems

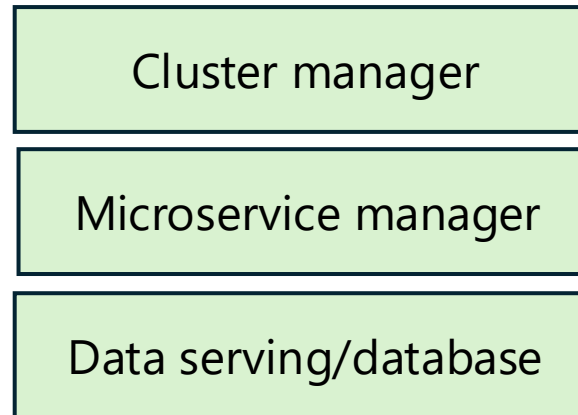
What is systems?



Systems

Resource management

- Scheduling
- Allocation
- Admission control
- Load balancing



System policies

- Today: mostly heuristic-driven
- Depends on
 - Workload
 - Hardware
 - Goals

Why ML for systems?

- Adaptive policies
- Better decisions
- Use LLMs to find policies

In this course

- How ML can improve existing policies
 - E.g.: caching, scheduling, allocation
- Challenges in deploying ML for systems
- Ensuring robustness of ML policies

Class goals

If you work on ML:

- learn about ML applications and challenges

If you work on systems:

- learn about how to build adaptive and reliable systems

Otherwise:

- learn both!

Class format

- Before class: read paper and submit review
- During class:
 - I will provide high-level overview and background (15 min)
 - Student lead will present the paper (45 min)
 - Break-down into discussion groups (20 min)
 - Submit discussion summary as a group

Grading

- Paper reviews (20%)
- Presentation (20%)
- In-class discussion and participation (10%)
- Final project (50%)

Paper review

- Site is not up yet!
- 1. Summary of the paper
- 2. Strengths and weaknesses
- 3. Commentary
 - 1. Pros and cons explanation
 - 2. What could be improved
 - 3. Broader impact and future work

Presentation

1. Background
2. Motivation
3. Paper contributions
4. Results
5. Critique of the paper
6. Future work and implications

Email slides to the instructor by 9PM day before for feedback

Course project

In groups of 2 students

Options:

- Novel idea
- Future work of an existing paper
- Survey of a topic
- Artifact evaluation

Reading a paper

1. First pass (15 mins)
 1. Abstract, Introduction
 2. Browse headings and figures
2. Second pass (30 mins – 1 hr)
 1. Look carefully at graphs
 2. Read background and related work
3. Third pass
 1. Read all sections

Reading a paper

- Don't be intimidated by the paper
- As researchers, keep asking –
 - What is missing in the paper?
 - What are the assumptions?
 - What have the authors overlooked?
 - What happens if any of these change?

Before next lecture

- Make sure you are on Canvas (announcements)
- Review site access
- Presentation signup