Engineering the Unknown: Solving Real-World Problems through Research

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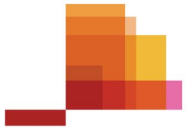
About me

Stony Brook University



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BERKELEY LAB

NOKIA BELL LABS

About the talk

What

- Cache adaptive algorithms during Ph.D.
- ML-advised algorithms during Ph.D.
- Dynamic graph algorithms at Berkeley Lab
- Personalized Bitrate at YouTube
- etc.

Why Research

Difficult, confusing, non-deterministic, ughhh…

🤔

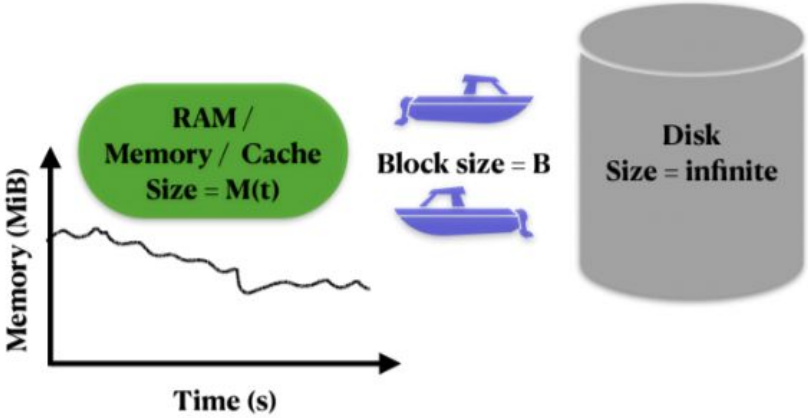
How

How to navigate in difficult research fields or challenging research careers, my two cents…

My Ph.D. thesis research

Cache-adaptivity framework

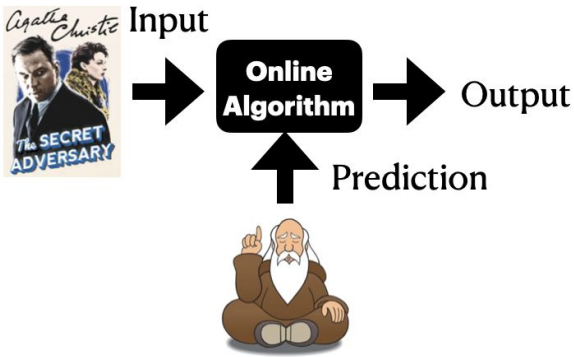
- Hierarchical memory in modern computers.
- Memory fluctuates for modern computing workloads.
- Cache-adaptive algorithms are designed for optimal performance even when memory fluctuates.

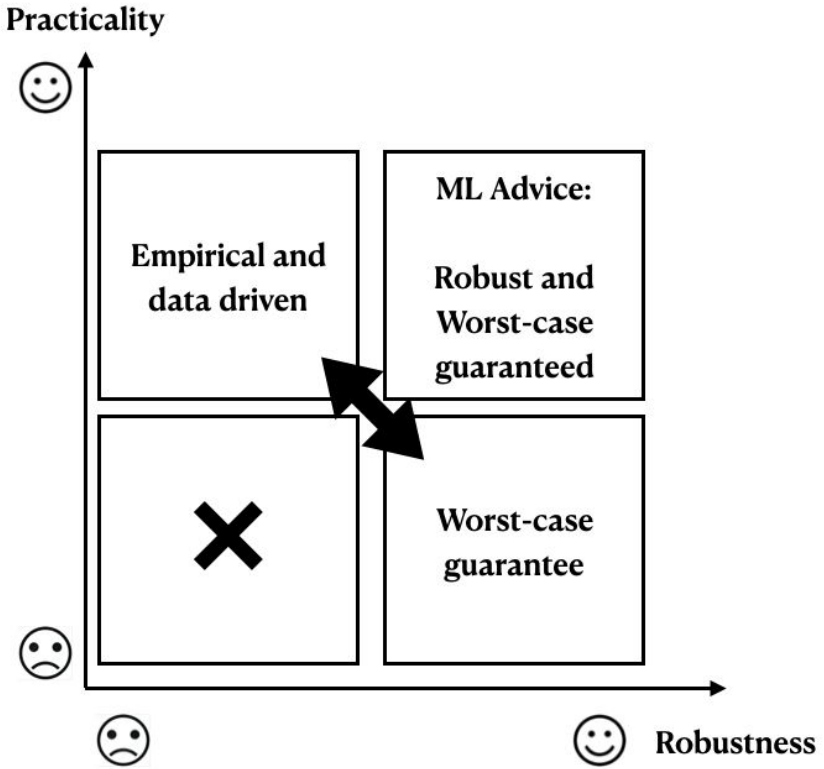


My Ph.D. thesis research

ML-advised algorithms

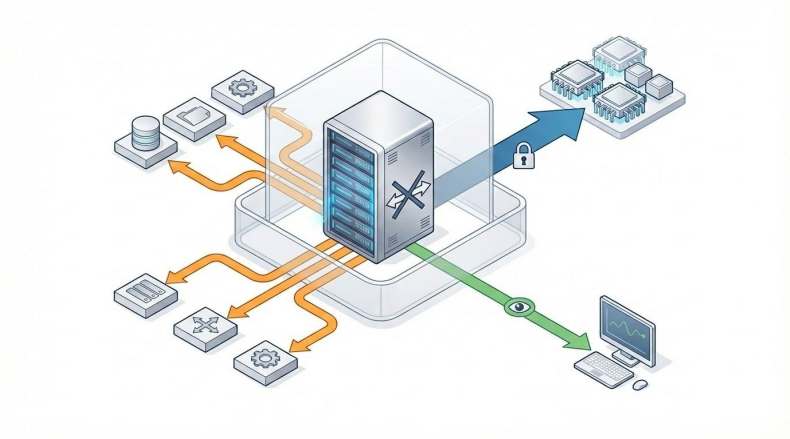
- Similar to the traditional online algorithm set up.
- The algorithm design is not “pessimistic”.
- There’s one or more ML-generated advice present.





Architecting the backbone of AI revolution

- Bare Metal cloud architecture (distributed in a geographically sparse manner)
- Multi-node machines building the cloud
- The compute node (where the customer is on) is completely secluded from the other nodes and Google’s prod network.
- Many components are offloaded from the compute node.
- Telemetry has be completely out-of-band.
- No live migration of Bare Metal instances.



Why Research?

- Getting to solve fun problems
- Learn tools for problem solving
- Learn to execute difficult workflows
- Push technical boundaries

How to carry out research

- Curiosity
- Methods
- People
- Attitude

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Q & A

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