Inference Is All You Need

-

What did Ilya see?

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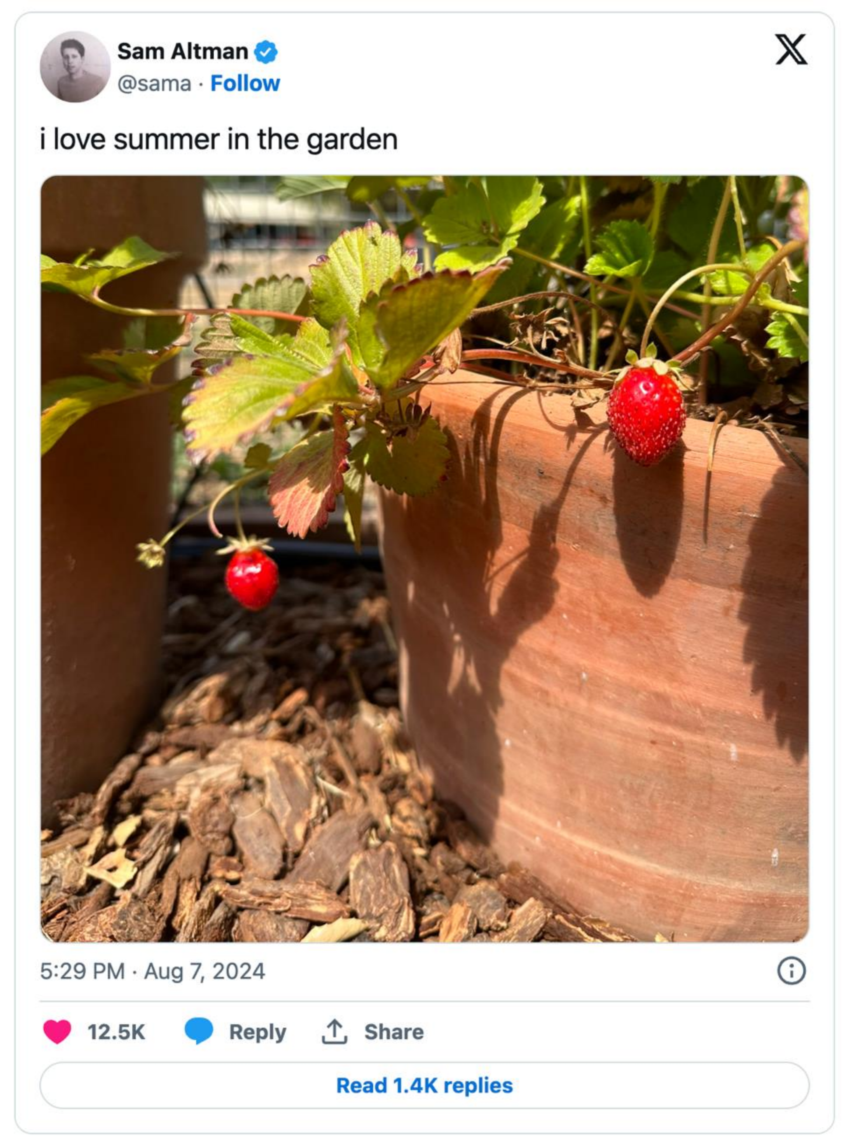

Sam Altman
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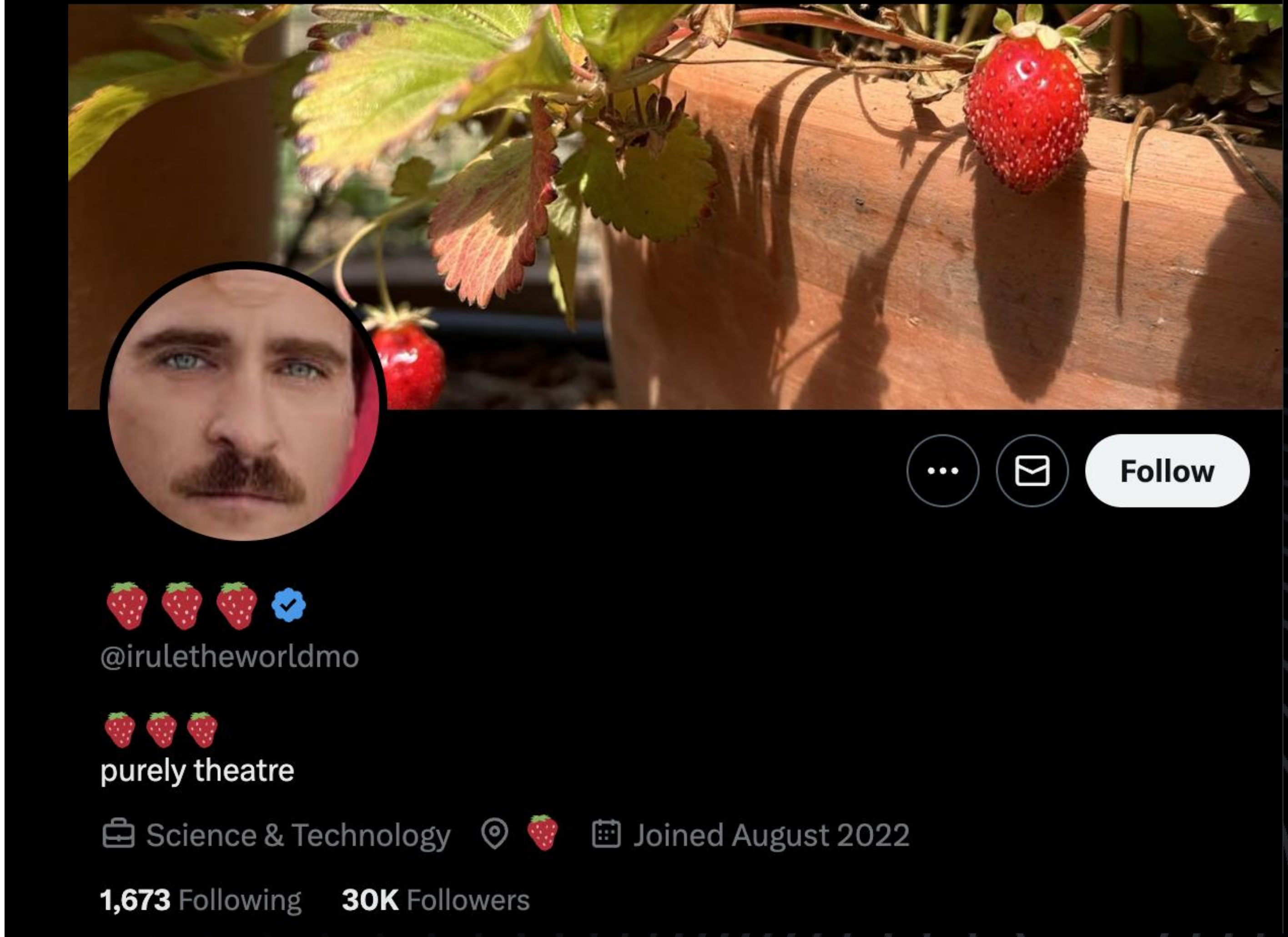

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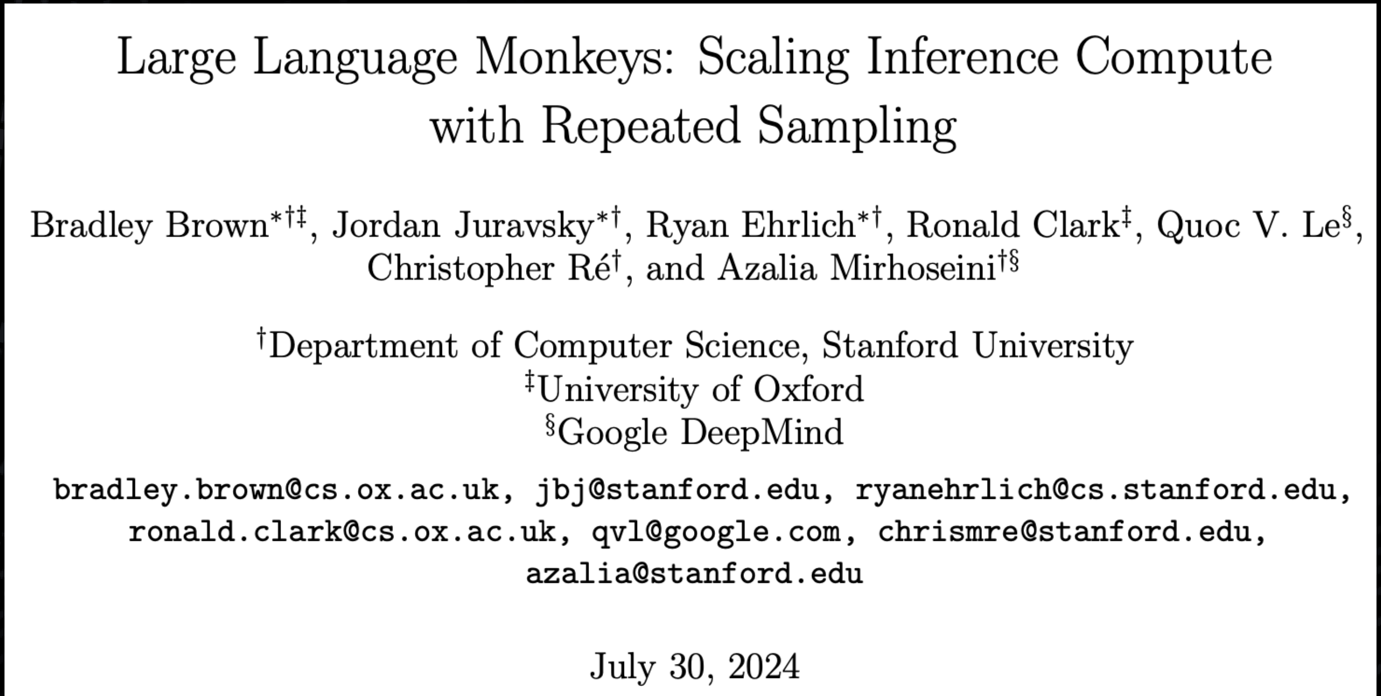

Large Language Monkeys: Scaling Inference Compute with Repeated Sampling

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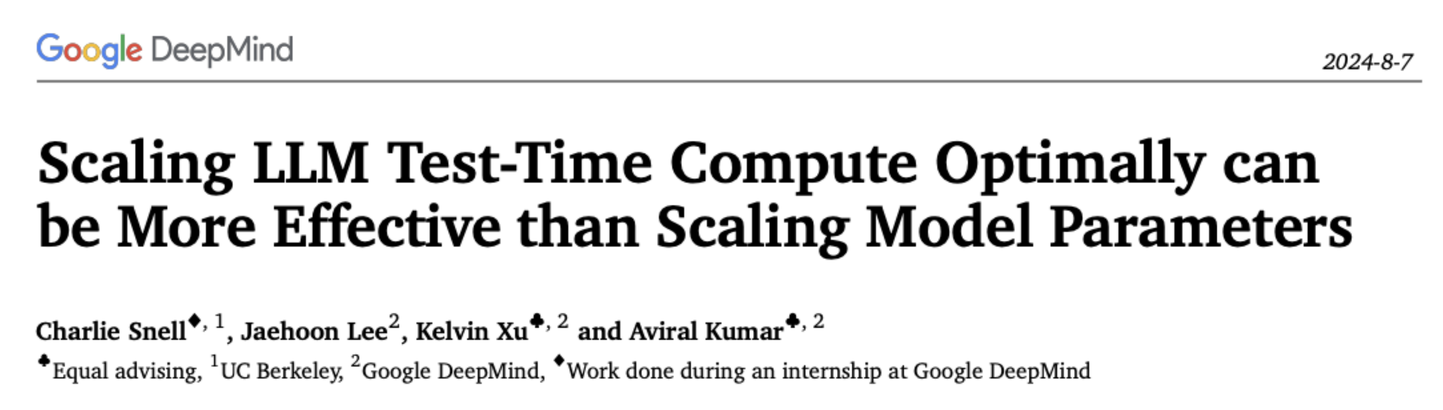
July 30, 2024



Google DeepMind 2024-8-7

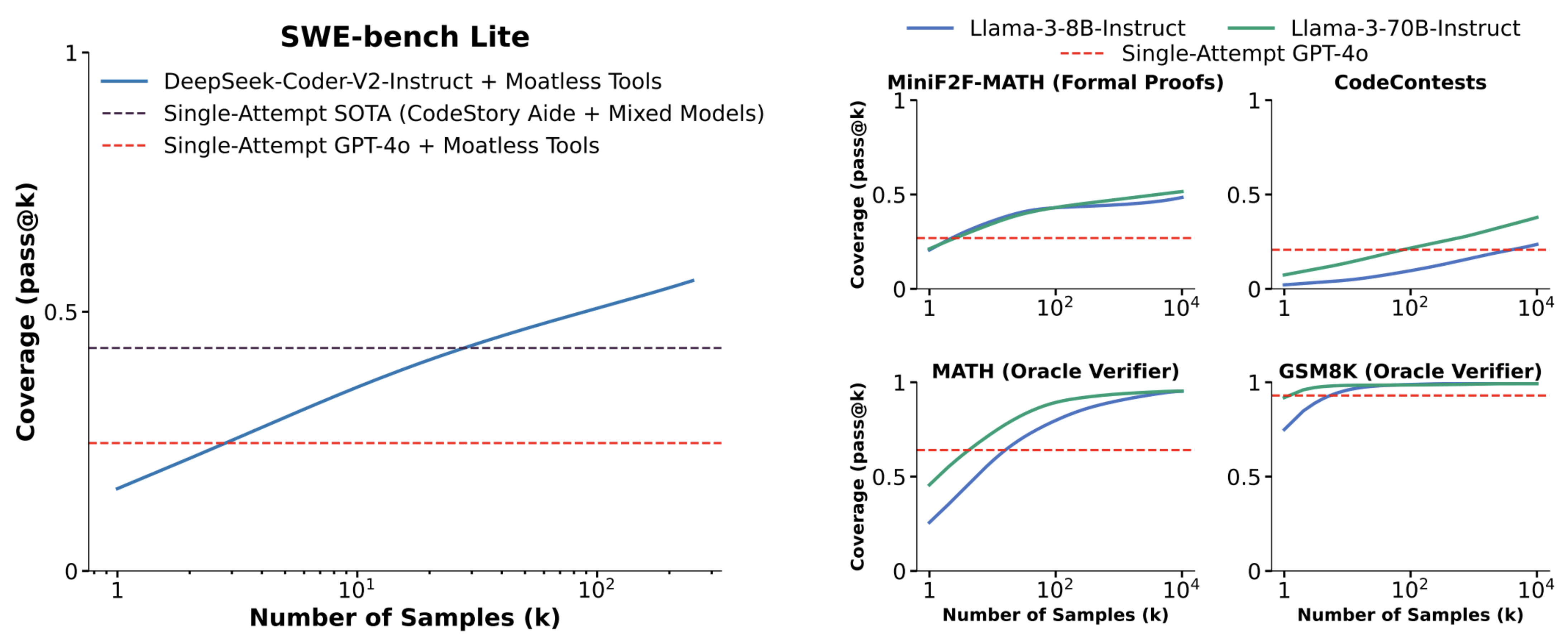
Scaling LLM Test-Time Compute Optimally can be More Effective than Scaling Model Parameters

Charlie Snell[♦, 1], Jaehoon Lee[2], Kelvin Xu[♣, 2] and Aviral Kumar[♣, 2]
[♣]Equal advising, [1]UC Berkeley, [2]Google DeepMind, [♦]Work done during an internship at Google DeepMind

1. What does ”Scaling Test Time Compute” mean?

2. Why does it matter for AI Engineers?

“Ask the same question a couple of times“



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“Ask the same question a couple of times“

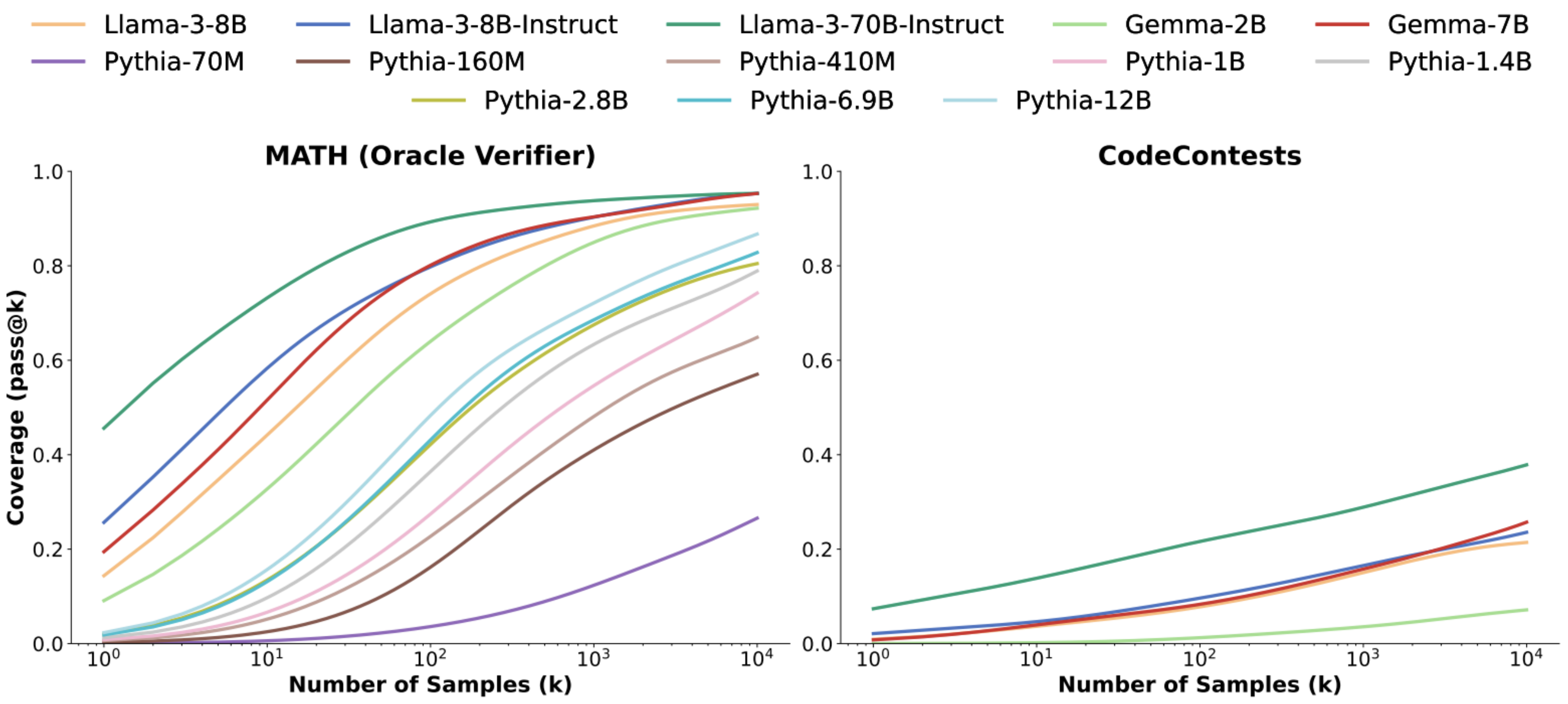


Figure 3: Scaling inference time compute via repeated sampling leads to consistent coverage gains across a variety of model sizes (70M-70B), families (Llama, Gemma and Pythia) and levels of post-training (Base and Instruct models).

Access to “Ground Truth”

Golden Answer
Unit Tests
Formal Verfication
Any strict test

🎉 🎉 🎉

Reward Models!

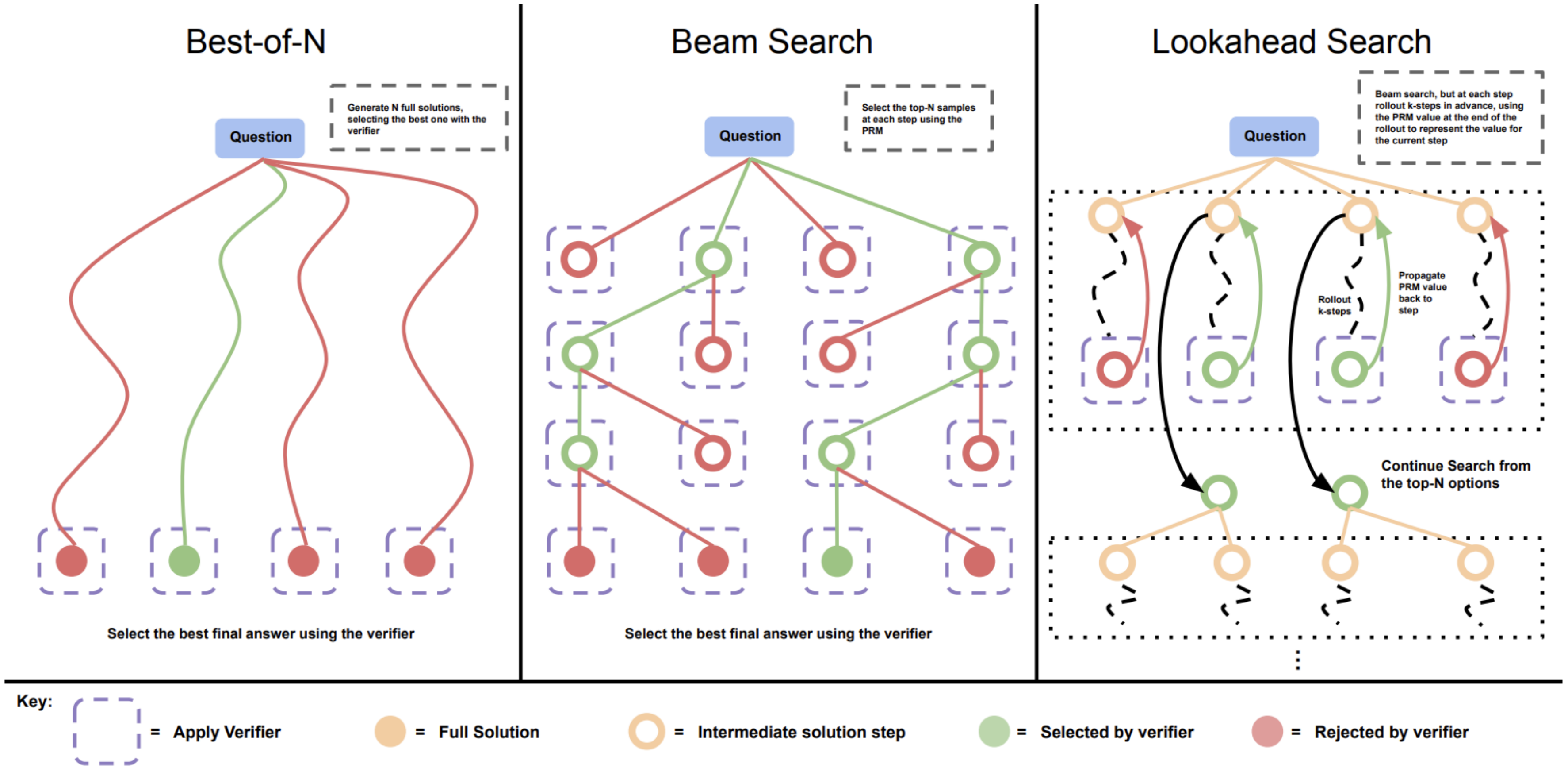
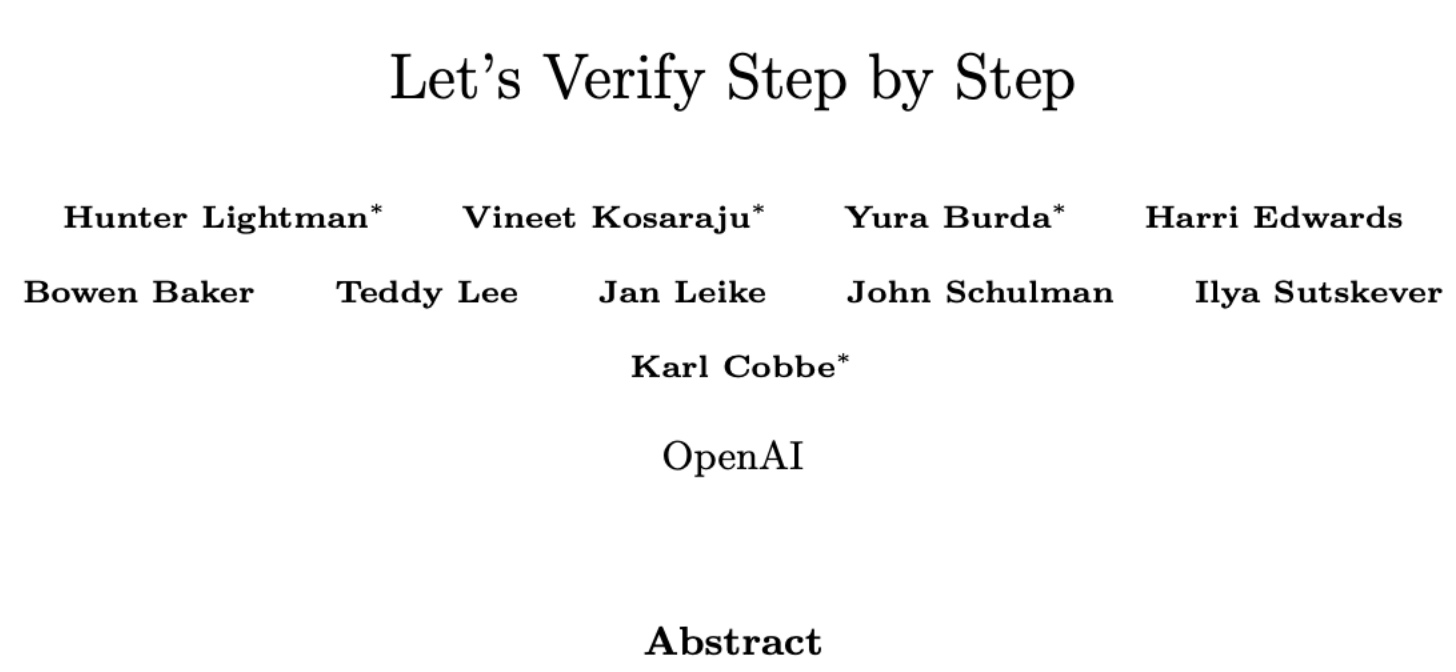

Best-of-N
Generate N full solutions, selecting the best one with the verifier
Question
Select the best final answer using the verifier
Beam Search
Select the top-N samples at each step using the PRM
Question
Select the best final answer using the verifier
Lookahead Search
Beam search, but at each step rollout k-steps in advance, using the PRM value at the end of the rollout to represent the value for the current step
Question
Rollout k-steps
Propagate PRM value back to step
Continue Search from the top-N options
Key:
= Apply Verifier
= Full Solution
= Intermediate solution step
= Selected by verifier
= Rejected by verifier

Figure 2 | ***Comparing different PRM search methods.*** **Left:** Best-of-N samples N full answers and then selects the best answer according to the PRM final score. **Center:** Beam search samples N candidates at each step, and selects the top M according to the PRM to continue the search from. **Right:** lookahead-search extends each step in beam-search to utilize a k-step lookahead while assessing which steps to retain and continue the search from. Thus lookahead-search needs more compute.

AGI achieved internally? 🍓

PRM800K



Let’s Verify Step by Step

Hunter Lightman* **Vineet Kosaraju*** **Yura Burda*** **Harri Edwards**

Bowen Baker **Teddy Lee** **Jan Leike** **John Schulman** **Ilya Sutskever**

Karl Cobbe*

OpenAI

Abstract

Why does this matter for an AI engineer?

- **Sample on (idle) low VRAM hardware**
- **Inference is getting more optimized**
  - Groq, Cerebras
  - Quantization
  - Speculative Decoding
- **Collecting data for Instuction Finetuning can be harder than collecting preference data for RM**

GitHub

rasdani/inference-is-all-you-need

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