Learning Task Decomposition to Assist Humans in Competitive Programming

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Background

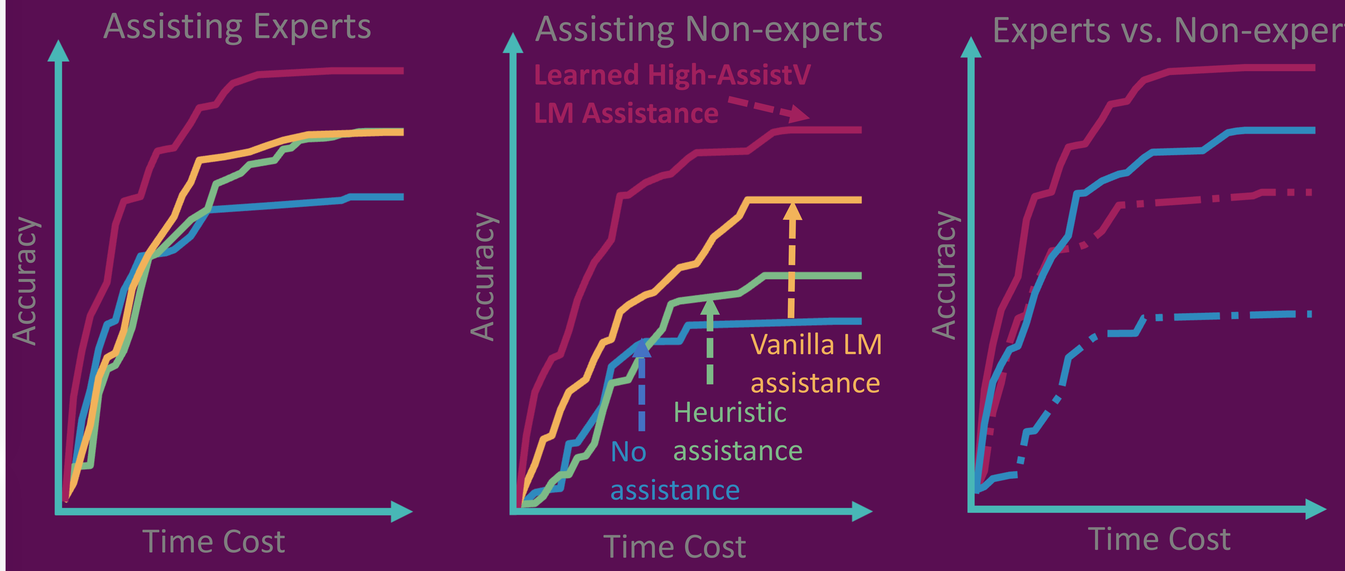
While LMs are being used to solve increasingly complex tasks, LMs might fail to provide reliable solutions.
However, humans also struggle to understand and repair LMs' solutions due to the required time and expertise.

Potential for LMs to Assist Humans

While both LMs and humans struggle to solve these problems alone, we can use LMs to assist humans.
Representative assistance strategies include task decomposition, critique, debate, etc.

Scalable Oversight
by learning to improve LMs'
Assistive Value

LMs Can **Learn to Assist Humans** in Solving Code Challenges Beyond Their Individual Capabilities



Assisted non-experts can solve 33.3% more problems, work 3.3x faster, and match unassisted experts.

Take a picture to **download** the **full paper**

A Novel Objective for Scalable Oversight

We propose Assistive Value (AssistV), which measures the feasibility and speed of the actual problem-solving performance of assisted humans.

Learning to Assist Humans: A Case Study in Decomposing Code Challenges

- Collect AssistV labels on various code decompositions
- Learn to generate high-AssistV code decompositions by critiquing, refining, and ranking.

Takeaways

1. A novel objective for scalable oversight: **Assistive Value.**
2. Learning-based scalable oversight is promising.
   - **LMs can learn to better assist humans** in solving problems **beyond their capabilities.**
   - LMs' **assistance performance scales with their capabilities**, sometimes even outperforming human baselines.