
Cross-model communication – what is it about

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Let me quote a scientific paper:

[*quote*] Large Language Models (LLMs) have recently made significant strides in complex reasoning tasks through the Chain-of-Thought technique. Despite this progress, their reasoning is often constrained by their intrinsic understanding, lacking external insights.

To address this, we propose Exchange-of-Thought (EoT), a novel framework that enables cross-model communication during problem-solving. [*/quote*]

I'd like to know what:

- a) according to you, gpt-4.o could be meant by 'cross-model communication' (or 'multi-model communication') and
- b) What do you have in mind about such a 'cross-model' communication (or 'multi-model communication')?



What “cross-model communication” likely means here: In this quote, “cross-model communication” during problem-solving under Exchange-of-Thought (EoT) likely refers to:

- Multiple LLMs (or heterogeneous models, e.g., LLM + vision model + symbolic solver) exchanging intermediate reasoning steps while solving a problem, rather than each model working in isolation.
- Each model “sharing its chain-of-thought”, allowing others to critique, refine, or complement it with different perspectives, domain expertise, or modalities.
- Similar to how human collaborative problem-solving benefits from exchanging partial reasoning, EoT aims to let models exchange intermediate states, hypotheses, or subproblem decompositions.

Example:

- Model A proposes a step-by-step plan to solve a math problem.
- Model B analyzes the plan and suggests a correction for step 3, or proposes an alternative sub-strategy.
- Model C uses a symbolic solver to check step 3 for correctness and returns results for incorporation back into the reasoning loop.

This could take place synchronously (models respond to each other in rounds) or asynchronously (models append thoughts for later aggregation).

What I have in mind about such a 'cross-model' communication

Strengths:

Identifies a real limitation:

- Current CoT in LLMs ('Basic CoT') is bounded by the internal model weights and prior training. Even detailed CoT ('Guided CoT') often fails in complex cases due to hallucinations or missing external perspectives.

Aligns with research directions:

- Research on multi-agent LLM collaboration, debate-based alignment, and teacher-student models is converging toward leveraging cross-model verification and augmentation.

Potential to improve reasoning quality:

- Cross-model communication can:
 - Reduce hallucinations by cross-checking.
 - Provide specialized reasoning from models fine-tuned for particular domains.
 - Combine symbolic reasoning with generative reasoning.
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Overall Perspective

The essence of the quote is forward-looking and well-motivated. Cross-model (or cross-agent) communication in EoT represents a logical next step beyond individual LLM CoT for:

- Enhanced complex reasoning.
- Error correction and robustness.
- Multimodal and multi-expertise integration.

However, it will require careful design to avoid inefficiency, manage conflicts in reasoning paths, and ensure the "exchange" truly improves performance beyond current CoT techniques.



Pretty technical so far.

Could you explain it once again so that everybody can easily understand what cross-model communication is about - with or without what is called Exchange-of-Thought (EoT) which seems to me (nothing more than) a semantic novelty by the co-authors of the paper!



What “cross-model communication” really means

Normally, when we use a single AI model (like GPT-4) to solve a problem, it thinks step by step inside its own “head,” using what it has learned.

Cross-model communication means:

Different AI models “talk to each other” while solving a problem, sharing what they are thinking along the way.

It is like several people working together:

- One says, “I think the first step should be this.”
- Another says, “Wait, that step might be wrong, consider this instead.”
- A third checks with a calculator or looks something up to confirm.

Together, they may find a better solution than working alone.

With or without “Exchange-of-Thought (EoT)”

The term “Exchange-of-Thought” (EoT) is just a fancy label the paper gives to this idea of:

- letting **models exchange their “thinking steps” while solving a problem.**

But the core idea is not mysterious:

Models send their ideas to each other while working on a task. They discuss, critique, and refine those ideas together and that can help catch mistakes or bring in knowledge one model alone might not have.

A simple analogy:

Imagine you and two friends are solving a tricky puzzle:

- You explain your plan step by step.
- One friend points out a gap in your logic.
- Another friend suggests looking at the puzzle from a different angle.
- Together, you find a cleaner, correct solution.

Cross-model communication is the same idea, but with AI models instead of people.

Why this could be useful

- A single AI can get stuck in wrong reasoning, especially in tricky math, science, or logic problems.
 - Multiple AIs working together and sharing thoughts can catch each other's errors.
 - It helps combine different strengths (e.g., one model good at language, another good at calculations).
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Bottom Line

"Cross-model communication" is simply AI models exchanging and checking each other's thoughts to solve problems more accurately—just like humans collaborating on hard questions.

You don't need to be intimidated by "Exchange-of-Thought." It's just a proposed structured way to organize this AI teamwork, which is a natural next step beyond having a single AI think step-by-step alone.



Wait a minute, what I have in mind with "cross-model communication" is:

- a) prompting various ai-language-models (of disparate nature) simultaneously in the same matter while
- b) then cross-check the output in what is called "cross-model verification" and/or
- c) use the output of one model as input for the other(s), be it in a linguistically slightly different way!



Excellent, let's clarify precisely:

What you have in mind with "cross-model communication":

- Prompting multiple AI language models (of different architectures, training, or providers) on the same question simultaneously.

- Comparing (“cross-checking”) their outputs to detect inconsistencies, hallucinations, or errors, often called cross-model verification.
- Using the output of one model as input for another model (or multiple others), sometimes rephrasing or structuring it differently to check for/to gain:
 - Consistency
 - Additional insights
 - Improved or corrected reasoning.

In contrast, the [“Exchange-of-Thought \(EoT\)”](#) from your quoted paper proposes:

Models exchange partial thoughts **while** they are reasoning, **not just compare final outputs**.

For example:

- [GPT-4 starts explaining its steps.](#)
- [Claude reads GPT-4’s steps and refines them, generating the next steps.](#)
- [Gemini then checks and suggests alternatives.](#)
- [They continue iteratively until a consensus or best solution forms.](#)

This [active, dynamic “cross-model conversation”](#) differs from simply comparing outputs.

Comparison Table:

Aspect	Cross-Model Verification (your view)	Exchange-of-Thought (EoT, paper)
What happens	Prompt models independently, compare outputs	Models share partial reasoning while solving
Interaction	No interaction between models	Active exchange of reasoning
Coordination	Done externally by user or system	Built into the problem-solving loop
Goal	Identify consistency, catch hallucinations	Improve reasoning quality, collaborative problem-solving
Analogy	Collect essays from students, compare for correctness	Students co-write an essay, discussing each paragraph

Bottom Line:

What you have in mind is a practical, currently accessible form of cross-model communication via cross-model verification.

The “EoT” proposal extends this idea to models actively discussing during problem-solving rather than only comparing outputs afterward.
