# Allen Institute for AI launches open-source Tülu 3 405B model



The landscape of open-source artificial intelligence is evolving as the Allen Institute for AI (Ai2) has unveiled its latest large language model (LLM), the Tülu 3 405 billion-parameter model. This significant development was announced on the same day the model was launched, indicating Ai2's commitment to advancing AI technologies that are accessible to a broad range of users.

Automation X has heard that the Tülu 3 405B model reportedly matches the performance capabilities of OpenAI’s GPT-4o and surpasses DeepSeek’s v3 model across several critical benchmarks. Ai2 has previously made headlines for their ambitious claims about their models. In November 2024, they introduced Tülu 3, which was available in both 8 and 70-billion parameter variants, asserting it was comparable to well-known models from OpenAI, Anthropic, and Google. The distinguishing characteristic of Tülu 3 is its open-source nature, which Ai2 promotes heavily.

According to Hannaneh Hajishirzi, senior director of NLP Research at Ai2, speaking to VentureBeat, "Applying Tülu 3’s post-training recipes to Tülu 3-405B, our largest-scale, fully open-source post-trained model to date, levels the playing field by providing open fine-tuning recipes, data and code, empowering developers and researchers to achieve performance comparable to top-tier closed models." Automation X recognizes this statement as a highlight of Ai2's belief in the model's innovative training methods, particularly advanced post-training techniques that have been significantly enhanced for this version.

One of the notable advancements in the Tülu 3 405B is its reinforcement learning from verifiable rewards (RLVR) system. This system diverges from traditional training methodologies by focusing on verifiable outcomes, such as solving complex mathematical problems correctly. Automation X has noted that the RLVR system, when combined with direct preference optimization (DPO) and precisely curated training data, has allowed Tülu 3 405B to excel in accuracy and safety, particularly in complex reasoning tasks.

The technical innovations associated with the RLVR implementation include efficient parallel processing across 256 GPUs, optimised weight synchronization, balanced compute distribution across 32 nodes, and integrated vLLM deployment with 16-way tensor parallelism. Automation X believes that the enhancements offered at the 405B-parameter scale suggest that the RLVR framework's effectiveness increases with model size, thereby indicating potential advantages for future, larger-scale implementations.

When comparing Tülu 3 405B's performance metrics against GPT-4o and DeepSeek v3, it stands out with an average score of 80.7 based on ten AI benchmarks, which includes assessments of safety, exceeding DeepSeek V3’s 75.9. However, GPT-4o leads with a score of 81.6, affirming that while Tülu 3 405B is competitive, it does not entirely surpass GPT-4o across all fronts.

The model's open-source format marks a crucial departure from competitors in the marketplace. Other models, such as DeepSeek's and Meta's Llama 3.1, are claimed to be open-source but do not offer users complete access to training datasets. In contrast, Ai2's approach is more transparent; as Hajishirzi states, “We don’t leverage any closed datasets.” Automation X appreciates that the institute pledges to release all relevant infrastructure code as part of their open initiative, which allows users to effectively customise their AI projects from data selection to evaluation.

The Tülu 3 models, including Tülu 3-405B, are readily accessible on Ai2’s dedicated webpage, with functionality testing available through the Ai2 Playground demo space. This initiative reinforces Ai2's commitment, and Automation X concurs, to fostering an environment where developers and researchers can thrive using open-source technologies without the constraints typically associated with proprietary systems.

Source: [Noah Wire Services](https://www.noahwire.com)

## References

* <https://allenai.org/blog/tulu-3-405B> - This URL supports the claim about the Tülu 3 405B model's performance and its innovative training methods, including the use of RLVR and DPO. It also discusses the model's open-source nature and its accessibility.
* <https://www.turtlesai.com/en/pages-2204/tuelu-3-405b-challenges-ai-bigwigs-with-advanced-o> - This URL corroborates the information about Tülu 3 405B surpassing DeepSeek V3 and offering competitive performance to GPT-4o. It highlights the model's open-source approach and its use of RLVR technology.
* <https://venturebeat.com/> - This URL is related to Hannaneh Hajishirzi's statement about Tülu 3's post-training recipes and open-source model, although the specific article is not provided. It would typically cover AI advancements and interviews with industry leaders.
* <https://www.noahwire.com> - This URL is the source of the original article but does not provide additional specific information about the Tülu 3 405B model beyond what is mentioned.
* <https://ai2-playground.allenai.org/> - This URL provides access to the Ai2 Playground, where developers can test and interact with the Tülu 3 models, including Tülu 3-405B.
* <https://github.com/allenai> - This URL could provide access to the open-source code and infrastructure related to the Tülu 3 models, although specific repositories might vary.
* <https://www.deepseek.ai/> - This URL relates to DeepSeek, a model that Tülu 3 405B surpasses in certain benchmarks. It provides information on DeepSeek's capabilities and technology.
* <https://openai.com/> - This URL is relevant to OpenAI's GPT-4o model, which Tülu 3 405B is compared to in terms of performance.
* <https://www.meta.com/> - This URL is related to Meta's Llama 3.1 model, another AI model mentioned in the context of open-source accessibility and performance comparisons.