



# OlympicArena Medal Ranks: Who Is the Most Intelligent AI So Far?

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## Abstract

In this report, we pose the following question: *Who is the most intelligent AI model to date, as measured by the OlympicArena* (Huang et al., 2024) (an Olympic-level, multi-discipline, multi-modal benchmark for superintelligent AI)? We specifically focus on the most recently released models: “**Claude-3.5-Sonnet** (Anthropic, 2024a),” “**Gemini-1.5-Pro** (Reid et al., 2024),” and “**GPT-4o**.” For the first time, we propose using an *Olympic medal Table* approach to rank AI models based on their comprehensive performance across various disciplines. Empirical results reveal:

- Claude-3.5-Sonnet shows highly competitive overall performance over GPT-4o, even surpassing GPT-4o on a few subjects (i.e., Physics, Chemistry and Biology).
- Gemini-1.5-Pro and GPT-4V are ranked consecutively just behind GPT-4o and Claude-3.5-Sonnet, but with a clear performance gap between them.
- The performance of AI models from the open-source community significantly lags behind these proprietary models.
- The performance of these models on this benchmark has been less than satisfactory, indicating that we still have a long way to go before achieving superintelligence.

We remain committed to continuously tracking and evaluating the performance of the latest powerful models on this benchmark (available at <https://github.com/GAIR-NLP/OlympicArena>).







 Ranking	Models	 Gold	 Silver	 Bronze	Total	Overall Scores
1	GPT-4o	4	3	0	7	40.47
2	Claude-3.5-Sonnet	3	3	0	6	39.24
3	Gemini-1.5-Pro	0	0	6	6	35.09
4	GPT-4V	0	1	1	2	33.17
5	Claude-3-Sonnet	0	0	0	0	25.53
6	Qwen1.5-32B-Chat	0	0	0	0	24.36
7	Qwen-VL-Max	0	0	0	0	21.41
8	Gemini-Pro-Vision	0	0	0	0	21.02
9	LLaVA-NeXT-34B	0	0	0	0	18.16
10	Yi-34B-Chat	0	0	0	0	18.01
11	InternVL-Chat-V1.5	0	0	0	0	17.39
12	InternLM2-Chat-20B	0	0	0	0	17.33
13	Yi-VL-34B	0	0	0	0	15.07
14	Qwen-VL-Chat	0	0	0	0	7.34
15	Qwen-7B-Chat	0	0	0	0	4.34

Table 1: The medal table of various models across disciplines (June 23, 2024). Note that we rank AI models by Gold medals first, then by overall scores if tied.

## 1 OlympicArena

Recently, [Huang et al. \(2024\)](#) introduce the *OlympicArena*, including 11,163 bilingual problems across both text-only and interleaved text-image modalities and spanning seven common subjects and 62 international Olympic competitions, rigorously examined for data leakage. As one of the most comprehensive and challenging benchmarks available, OlympicArena aims to push the boundaries of AI capabilities in cognitive reasoning, requiring models to demonstrate proficiency across diverse and complex problem sets. In this report, we present several key contributions:

1. **Comparison of the Latest Models:** We analyze and compare two newly released advanced models from the past month—Claude-3.5-Sonnet, Gemini-1.5-Pro, against OpenAI’s GPT series. This comparison provides valuable insights into the performance of these cutting-edge models.
2. **Invention of the OlympicArena Medal Table:** We have created a novel ranking mechanism, the OlympicArena Medal Table, which offers a clear and competitive framework for comparing different models.
3. **Detailed Fine-Grained Analysis:** We conduct a fine-grained analysis of the latest and most powerful models, enhancing the OlympicArena benchmark by providing a deeper understanding of model capabilities and limitations.

### 1.1 Setup

In this report, we use the test split of the *OlympicArena* dataset. The answers for this split are not publicly available, which helps to prevent data leakage and reflects the true performance of the model. Additionally, the *OlympicArena-test* split does not include data that requires model-based evaluation; all evaluations can be performed using rule-based matching. This report also tests both Large Multimodal Models (LMMs) and Large Language Models (LLMs). For the LLM test, we use the text-only setting, providing no any image-related information to the model during input. We do not use image captions as textual representations of images because, in research with *OlympicArena*, it turns out that image captions are not always effective. The role of image captions may require further exploration. Therefore, to maintain the original structure of the problems, we directly use text-only inputs. We utilize the zero-shot CoT prompt consistent with the *OlympicArena* paper.

### 1.2 Competitors

We evaluate a range of both open-source and proprietary LMMs and LLMs. For LMMs, we select GPT-4o ([OpenAI, 2024](#)), GPT-4V ([GPT, 2023](#)), Claude-3-Sonnet ([Anthropic, 2024b](#)), Gemini Pro Vision ([Team et al., 2023](#)), Qwen-VL-Max ([Bai et al., 2023b](#)). We also evaluate several open-source models, including LLaVA-NeXT-34B ([Liu et al., 2024](#)), InternVL-Chat-V1.5 ([Chen et al., 2023](#)), Yi-VL-34B ([Young et al., 2024](#)), and Qwen-VL-Chat ([Bai et al., 2023b](#)). For LLMs, we select open-source models like Qwen-7B-Chat, Qwen1.5-32B-Chat ([Bai et al., 2023a](#)), Yi-34B-Chat ([Young et al., 2024](#)), and InternLM2-Chat-20B ([Cai et al., 2024](#)).

Moreover, we particularly include the newly released Claude-3.5-Sonnet ([Anthropic, 2024a](#)) as well as Gemini-1.5-Pro ([Team et al., 2024](#)), and compare them with the powerful GPT-4o and GPT-4V. This comparison allows us to evaluate the latest advancements in model capabilities and performance.

### 1.3 Evaluation Methods

**Metrics:** Since all problems can be evaluated using rule-based matching, we use accuracy for non-programming tasks and unbiased pass@k for programming tasks, defined as follows:

$$\text{pass @}k := \mathbb{E}_{\text{Problems}} \left[ 1 - \frac{\binom{n-c}{k}}{\binom{n}{k}} \right] \quad (1)$$

where we set  $k = 1$  and  $n = 5$ , and  $c$  indicates the number of correct samples that pass all test cases.

**OlympicArena Medal Table:** The *OlympicArena Medal Table*, similar to the medal system used in the Olympic Games,<sup>1</sup> is a pioneering ranking mechanism specifically designed to evaluate the performance of AI models across various academic disciplines. This table awards medals to models that achieve the top three scores in any given discipline, thereby providing a clear and competitive framework for comparing different models. Specifically, we rank AI models by Gold medals first, then by overall scores if tied. It offers a straightforward and intuitive way to identify leading models in distinct academic fields, making it easier for researchers and developers to understand the strengths and weaknesses of different models.

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<sup>1</sup><https://olympics.com/>

**Fine-grained Evaluation:** We conduct a fine-grained evaluation based on accuracy across different disciplines, modalities, languages, as well as different types of logical and visual reasoning abilities.

## 2 Results and Analysis

It should be noted that this report primarily focuses on the analysis of experimental results comparing top-performing Claude-3.5-Sonnet and GPT-4o, while also providing some commentary on the performance of Gemini-1.5-Pro.

### 2.1 Overall

From the overall results in Table 2, it can be observed that:

- the newly released Claude-3.5-Sonnet is very powerful, reaching a level **almost on par with GPT-4o**. The difference in overall accuracy between the two is only about 1%.
- At the same time, the newly released Gemini-1.5-Pro also demonstrates considerable strength, surpassing GPT-4V (OpenAI’s current second most powerful model) in most disciplines.
- Additionally, according to the OlympicArena Medal Table (see Table 1), where a model earns a medal if it achieves one of the top three scores in any discipline, we can observe that **GPT-4o, Claude-3.5-Sonnet, and Gemini-1.5-Pro are the top three models in the ranking**.
- It is worth noting that at the time of writing this report, **the oldest of these three models has been released for only about a month**, reflecting the rapid development of this field.
- Based on the medal table, we have also discovered a **significant gap between open-source and proprietary models** as open-source models have not managed to secure a medal in any discipline.

Table 2: Experimental results across different subjects on OlympicArena benchmark, expressed as percentages, with the highest score bolded. We use the pass@k metric (Equation 1) for CS problems. When calculating the overall accuracy, for code generation problems, if any generated code for a problem passes all test cases, the problem is considered correct.

Model	Math	Physics	Chemistry	Biology	Geography	Astronomy	CS	Overall
	Accuracy	Accuracy	Accuracy	Accuracy	Accuracy	Accuracy	Pass@1	Accuracy
GPT-4o	<b>28.32</b>	30.01	46.68	53.11	<b>56.77</b>	<b>44.50</b>	<b>8.43</b>	<b>40.47</b>
Claude-3.5-Sonnet	23.18	<b>31.16</b>	<b>47.27</b>	<b>56.05</b>	55.19	43.51	5.19	39.24
Gemini-1.5-Pro	19.99	28.93	43.80	49.16	49.67	38.29	5.37	35.09
GPT-4V	18.98	24.94	41.06	47.69	50.33	32.07	6.94	33.17
Claude3 Sonnet	7.12	18.42	30.06	39.40	40.80	24.50	1.02	25.53
Qwen1.5-32B-Chat	9.41	15.81	32.13	39.00	40.41	27.84	0.28	24.36
Qwen-VL-Max	6.68	14.12	24.52	36.32	40.41	23.42	0.83	21.41
Gemini Pro Vision	5.91	12.97	28.36	37.66	37.71	20.54	1.39	21.02
LLaVA-NeXT-34B	2.99	11.59	22.38	33.44	36.99	18.47	0.19	18.16
Yi-34B-Chat	3.06	11.13	24.52	33.18	34.69	18.29	0.19	18.01
InternVL-Chat-V1.5	6.08	10.82	20.09	30.57	33.18	15.95	0.19	17.39
Internlm2-Chat-20B	5.78	11.13	19.13	31.91	32.13	16.49	0.46	17.33
Yi-VL-34B	2.92	10.82	21.05	28.09	25.16	16.94	0.00	15.07
Qwen-VL-Chat	1.71	5.22	9.08	12.44	14.06	8.11	0.00	7.34
Qwen-7B-Chat	1.55	4.45	6.50	7.29	4.60	5.59	0.00	4.34

### 2.2 Fine-grained Analysis w.r.t Subject

**GPT-4o vs. Claude-3.5-Sonnet** As seen in Table 2, although GPT-4o and Claude-3.5-Sonnet have similar overall performance across disciplines, each model exhibits specific strengths. GPT-4o demonstrates superior capabilities in traditional deductive and inductive reasoning tasks, particularly in mathematics and computer science, outperforming Claude-3.5-Sonnet by over 5% in mathematics and 3% in computer science. On the other hand, Claude-3.5-Sonnet excels in subjects such as physics, chemistry, and biology, especially in biology where it surpasses GPT-4o by 3%.

**GPT-4V vs. Gemini-1.5-Pro** A similar pattern can be observed in the comparison between Gemini-1.5-Pro and GPT-4V. Gemini-1.5-Pro performs significantly better than GPT-4V in physics, chemistry, and biology. However, in mathematics and computer science, Gemini-1.5-Pro shows only a slight advantage or even a disadvantage.

**Insights** From these two sets of comparisons, we can infer that:

1. OpenAI’s GPT series remains exceptionally well-tuned for traditional mathematical reasoning and coding abilities. This superior performance in these two subjects suggests that GPT models have been rigorously trained to handle tasks that require strong deductive reasoning and algorithmic thinking.
2. Conversely, when it comes to disciplines that require the integration of knowledge with reasoning, such as physics, chemistry, and biology, other models like Claude-3.5-Sonnet and Gemini-1.5-Pro demonstrate competitive or superior performance. This observation highlights the distinct areas of expertise and potential training focuses for different model series, indicating a possible trade-off between specialization in reasoning-intensive tasks and broader knowledge integration.

Table 3: Performance of various models on logical reasoning abilities. Logical reasoning abilities: Deductive Reasoning (DED), Inductive Reasoning (IND), Abductive Reasoning (ABD), Analogical Reasoning (ANA), Cause-and-Effect Reasoning (CAE), Critical Thinking (CT), Decompositional Reasoning (DEC), and Quantitative Reasoning (QUA).

Model	DED	IND	ABD	ANA	CAE	CT	DEC	QUA
GPT-4o	<b>42.26</b>	<b>32.26</b>	<b>51.27</b>	<b>42.46</b>	46.74	<b>47.97</b>	33.78	38.27
Claude-3.5-Sonnet	41.80	31.85	50.91	41.05	<b>47.01</b>	47.61	<b>33.95</b>	<b>38.38</b>
Gemini-1.5-Pro	37.83	28.21	47.64	35.79	42.26	43.09	30.62	34.60
GPT-4V	35.40	25.14	47.82	34.04	40.55	42.03	26.75	31.10
Qwen1.5-32B-chat	27.23	21.75	34.00	25.03	34.10	33.09	21.37	23.38
Claude3-Sonnet	26.56	19.48	37.45	24.68	31.00	32.88	19.23	23.32
Qwen-VL-Max	24.47	17.38	35.45	21.87	31.22	29.94	18.48	19.18
Gemini Pro Vision	23.41	17.38	36.00	21.99	26.95	29.20	17.64	19.33
LLaVA-NeXT-34B	21.26	14.96	31.64	20.70	29.19	26.91	14.63	15.89
Yi-34B-Chat	20.99	14.47	26.00	19.53	27.91	26.97	16.11	16.63
InternVL-Chat-V1.5	19.00	13.34	31.45	18.48	23.48	24.18	13.48	15.45
Internlm2-Chat-20B	18.81	13.66	25.64	17.54	24.17	23.91	14.05	14.44
Yi-VL-34B	17.33	10.91	20.91	16.84	22.79	21.80	12.52	14.21
Qwen-VL-Chat	8.54	6.71	13.27	9.24	10.51	10.81	5.78	6.66
Qwen-7B-Chat	4.95	4.69	5.64	5.61	5.39	5.29	4.31	4.59

### 2.3 Fine-grained Analysis w.r.t Reasoning Type

**GPT-4o vs. Claude-3.5-Sonnet on different logical reasoning abilities** Table 3 presents the performance of various models on different logical reasoning abilities. The comparison between GPT-4o and Claude-3.5-Sonnet reveals several insights. GPT-4o generally outperforms Claude-3.5-Sonnet in most logical reasoning abilities, notably Deductive Reasoning, Inductive Reasoning, Abductive Reasoning, Analogical Reasoning, and Critical Thinking. However, Claude-3.5-Sonnet surpasses GPT-4o in Cause-and-Effect Reasoning, Decompositional Reasoning, and Quantitative Reasoning. Despite these slight differences, both models exhibit relatively comparable performance across the board, indicating that while GPT-4o has a slight edge in most categories, Claude-3.5-Sonnet remains competitive, particularly in reasoning tasks that involve cause-and-effect analysis and decomposition.

**GPT-4o vs. Claude-3.5-Sonnet on different visual reasoning abilities** Table 4 presents the performance of various models on different visual reasoning abilities. Comparing GPT-4o and Claude-3.5-Sonnet, we observe that Claude-3.5-Sonnet leads in Pattern Recognition and Diagrammatic Reasoning, indicating its strength in identifying patterns and interpreting diagrams. Both models perform equally well in Symbol Interpretation, suggesting a comparable capability in

Table 4: Performance of various models on visual reasoning abilities. Visual reasoning abilities: Pattern Recognition (PR), Spatial Reasoning (SPA), Diagrammatic Reasoning (DIA), Symbol Interpretation (SYB), and Comparative Visualization (COM). We bold the highest scores.

Model	PR	SPA	DIA	SYB	COM
GPT-4o	41.88	<b>31.64</b>	38.01	<b>34.64</b>	<b>41.31</b>
Claude-3.5-Sonnet	<b>42.30</b>	29.99	<b>38.21</b>	<b>34.64</b>	40.97
Gemini-1.5-Pro	37.20	26.95	32.95	29.88	36.02
GPT-4V	35.96	24.00	30.81	27.61	35.07
Qwen1.5-32B-chat	29.38	18.46	25.61	23.17	28.29
Gemini Pro Vision	29.29	15.42	22.31	20.09	26.64
Qwen-VL-Max	28.18	17.22	23.32	20.40	26.72
Claude3-Sonnet	27.35	18.01	22.83	21.02	25.82
LLaVA-NeXT-34B	24.85	13.77	20.35	16.95	23.21
Yi-34B-Chat	23.97	14.47	20.35	18.44	22.47
InternVL-Chat-V1.5	23.32	13.07	18.67	15.95	21.77
Internlm2-Chat-20B	23.04	13.97	19.51	16.48	21.52
Yi-VL-34B	16.89	9.63	13.93	12.41	15.24
Qwen-VL-Chat	10.37	5.39	7.98	6.90	9.38
Qwen-7B-Chat	4.72	2.69	4.42	4.10	4.75

understanding and processing symbolic information. However, GPT-4o outperforms Claude-3.5-Sonnet in Spatial Reasoning and Comparative Visualization, demonstrating its superiority in tasks that require understanding spatial relationships and comparing visual data.

#### Insight: Relationship between disciplines and reasoning abilities

1. Analyzing the correlation between performance across subjects and reasoning abilities, we can infer that mathematics and computer programming, which emphasize general complex deductive reasoning skills and the derivation of universal conclusions based on rules, tend to **rely less on extensive pre-existing knowledge**. In contrast, subjects like chemistry and biology often **require a substantial knowledge base** to make inferences based on known information about causality and phenomena. This suggests that while mathematical and coding abilities remain effective measures of a model’s reasoning capabilities, **other subjects better test a model’s ability to assist with reasoning and problem analysis based on its internal knowledge**.
2. Moreover, this analysis highlights the **importance of tailored training datasets that encompass a broad spectrum of knowledge domains**. For instance, to improve performance in knowledge-intensive subjects like chemistry and biology, models need extensive exposure to domain-specific data during training. Conversely, for disciplines requiring robust logical and deductive reasoning, such as mathematics and computer science, **models benefit from training that focuses on pure logical reasoning and novel reasoning frameworks**.
3. Additionally, **the distinction between reasoning abilities and knowledge application underscores the potential for interdisciplinary applications of these models**. For example, a model with strong deductive reasoning capabilities can assist in fields that require systematic problem-solving, such as scientific research and engineering. Meanwhile, a model with a rich knowledge base can be invaluable in disciplines that rely heavily on existing information, such as medicine and environmental science. Understanding these nuances not only aids in the development of more specialized and versatile models but also emphasizes the need for continuous evaluation and refinement of model architectures to better align with the diverse requirements of different academic and professional fields.

## 2.4 Fine-grained Analysis w.r.t Language Type

Table 5 presents a comparison of model performance across different languages. We find that most models have **higher accuracy in English compared to Chinese**, and this disparity is particularly significant among the top-ranked models. We speculate that there are several reasons for this:

1. These models are still primarily trained on English data, despite including some Chinese data and having cross-linguistic generalization capabilities.
2. The difficulty of Chinese problems is more challenging than that of English problems, especially in subjects like physics and chemistry where Chinese Olympiad problems are notoriously harder.
3. The models still have poor support for recognizing characters in multimodal images, which is more severe in Chinese.

However, we also find that some models either developed in China or fine-tuned on base models supporting Chinese **perform better in Chinese scenarios than in English ones**. Examples include Qwen1.5-32B-Chat, Qwen-VL-Max, Yi-34B-Chat, and Qwen-7B-Chat. Other models such as InternLM2-Chat-20B and Yi-VL-34B, although still performing better in English, show much smaller accuracy differences between English and Chinese scenarios compared to the top-ranked closed-source models. This indicates that **optimizing models for Chinese data, and for more languages worldwide, still requires significant attention**.

## 2.5 Fine-grained Analysis w.r.t Modality

As shown in Table 6, GPT-4o outperforms Claude-3.5-Sonnet in both text-only and multi-modal tasks, particularly excelling in text-only problems. The gap between the two models is slightly larger in text-only tasks compared to multi-modal ones. On the other hand, Gemini-1.5-Pro performs better over GPT-4V in both types of problems.

Table 5: Experimental results across different languages (English and Chinese) on OlympicArena benchmark, expressed as percentages, with the highest score bolded.

Model	EN	ZH
	Accuracy	Accuracy
GPT-4o	<b>44.16</b>	<b>34.59</b>
Claude-3.5-Sonnet	43.09	32.83
Gemini-1.5-Pro	38.58	29.27
GPT-4V	37.17	26.49
Claude-3-Sonnet	27.41	17.08
Qwen1.5-32B-Chat	23.80	25.29
Qwen-VL-Max	21.34	21.52
Gemini Pro Vision	22.48	18.58
LLaVA-NeXT-34B	19.00	16.76
Yi-34B-Chat	17.43	18.98
InternVL-Chat-V1.5	18.36	15.77
InternLM2-Chat-20B	17.82	16.52
Yi-VL-34B	15.20	14.86
Qwen-VL-Chat	8.32	5.69
Qwen-7B-Chat	4.20	4.57

Table 6: Experimental results across different modalities (text-only and multi-modal) on OlympicArena benchmark, expressed as percentages, with the highest score bolded.

Model	Text-only	Multi-modal
	Accuracy	Accuracy
GPT-4o	<b>41.79</b>	<b>39.03</b>
Claude-3.5-Sonnet	39.64	38.73
Gemini-1.5-Pro	35.77	34.23
GPT-4V	33.96	32.16
Claude-3-Sonnet	22.80	24.47
Qwen1.5-32B-Chat	23.57	25.35
Qwen-VL-Max	19.86	23.37
Gemini Pro Vision	19.38	23.10
LLaVA-NeXT-34B	16.39	20.41
Yi-34B-Chat	16.26	20.23
InternVL-Chat-V1.5	15.85	19.34
Internlm2-Chat-20B	15.76	19.32
Yi-VL-34B	16.48	13.29
Qwen-VL-Chat	6.52	8.38
Qwen-7B-Chat	4.62	3.98

These observations indicate that even **the most powerful models currently available achieve higher accuracy in text-only tasks compared to multi-modal ones**. Although the difference is not substantial, it suggests that there is still **considerable room for improvement in models’ ability to utilize multi-modal information** to tackle complex reasoning problems.

### 3 Conclusion

In this report, we primarily focus on the latest powerful models: Claude-3.5-Sonnet and Gemini-1.5-Pro, and compare them with OpenAI’s GPT-4o and GPT-4V. We have also designed a novel ranking system for large models, the OlympicArena Medal Table, which provides a clear and competitive framework for comparing different models. We find that GPT-4o, compared to its competitors, excels in subjects like mathematics and computer science, which correspond to complex deductive reasoning skills and the derivation of universal conclusions based on rules. On the other hand, Claude-3.5-Sonnet is better at making inferences based on known information about causality and phenomena. Additionally, we observe that these powerful models still perform better on English language problems and have significant room for improvement in their multi-modal capabilities. Understanding these nuances aids in developing more specialized and versatile models and highlights the importance of continuous evaluation and refinement of model architectures to better meet the diverse requirements of different academic and professional fields.



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