

# Panorama of LM evaluations

Clémentine Fourier

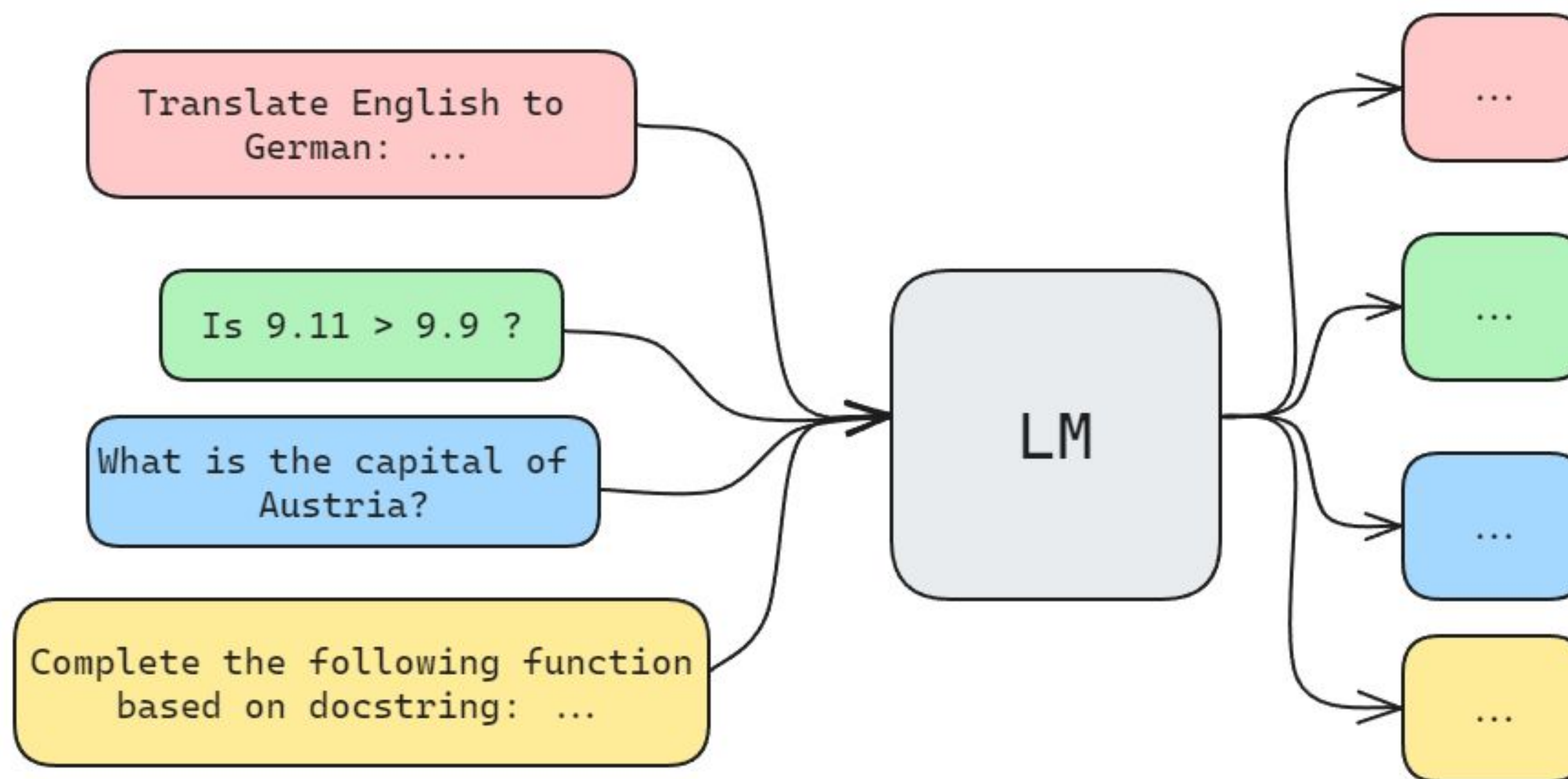
Hugging Face



Spring 2025

# Introduction

# Language models - capabilities



# Why is evaluation important?

## Model builders

- best training method
- non-regression
- risks/costs

## Users

- best model for X
- hype vs trust

## Field

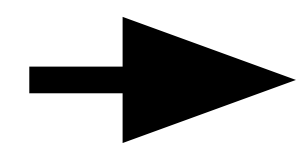
- capabilities
- direction



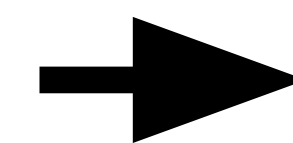
# How to evaluate Automatic benchmarks

# How do you evaluate a language model automatically?

Input from a  
**dataset**  
(e.g MMLU)



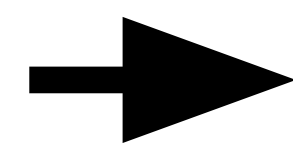
Model  
**generates a prediction**  
(e.g words, probabilities)



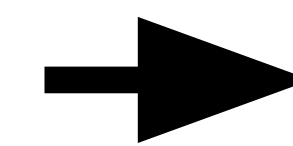
Score the prediction  
**with a metric**  
(e.g accuracy, exact match,  
BLEU, ROUGE, ...)

# How do you evaluate a language model automatically?

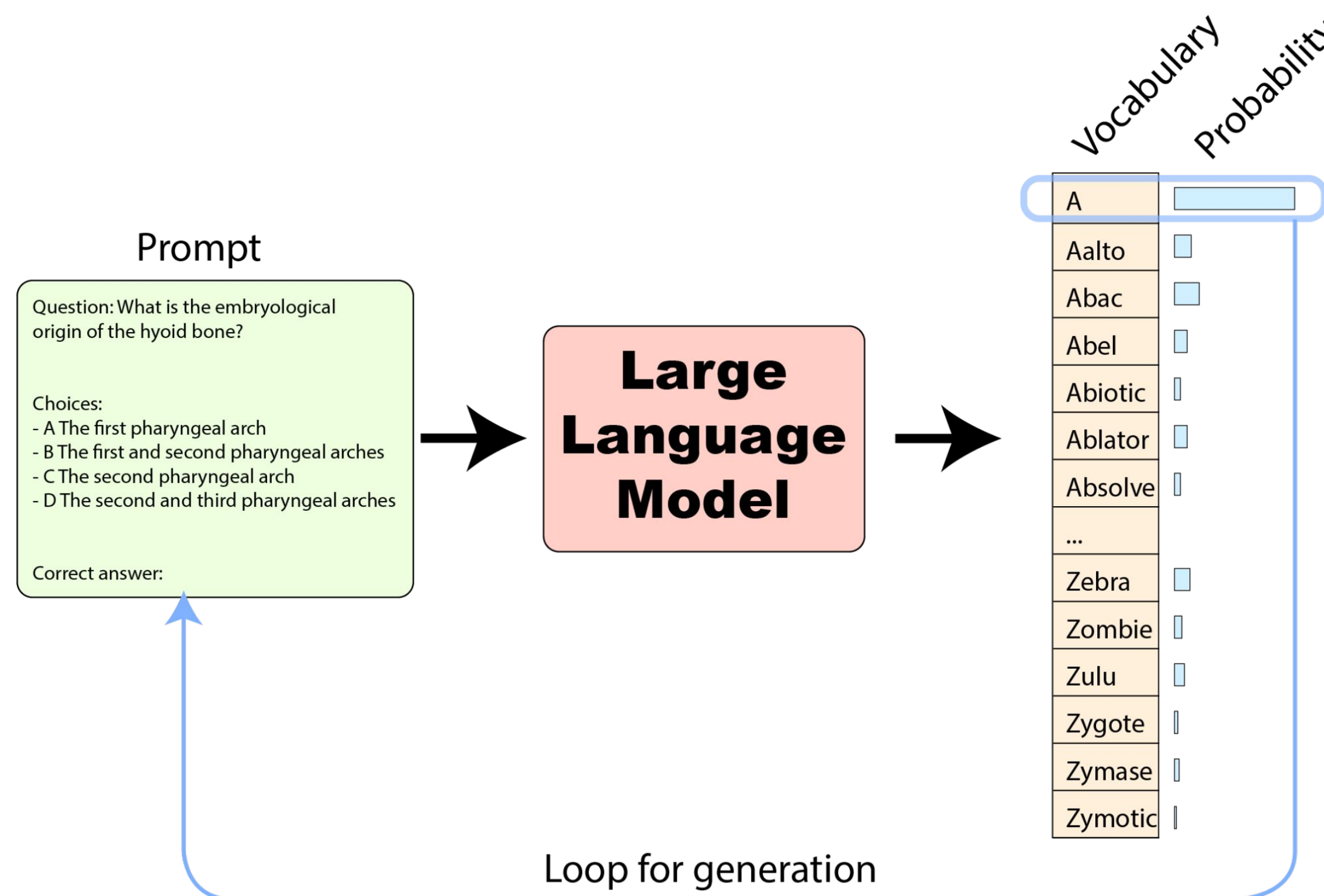
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Score the prediction  
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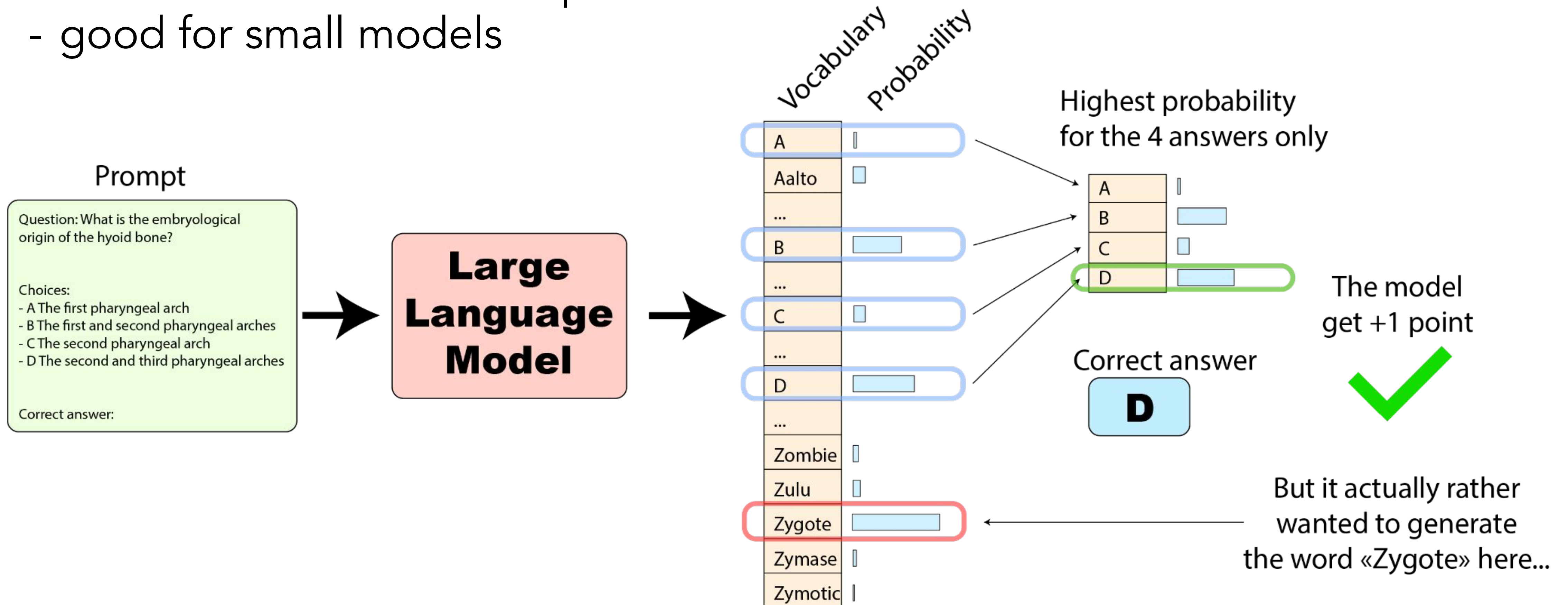




# 2 ways to get a prediction

Probabilities based evals:

- constrain the evaluation space
- good for small models

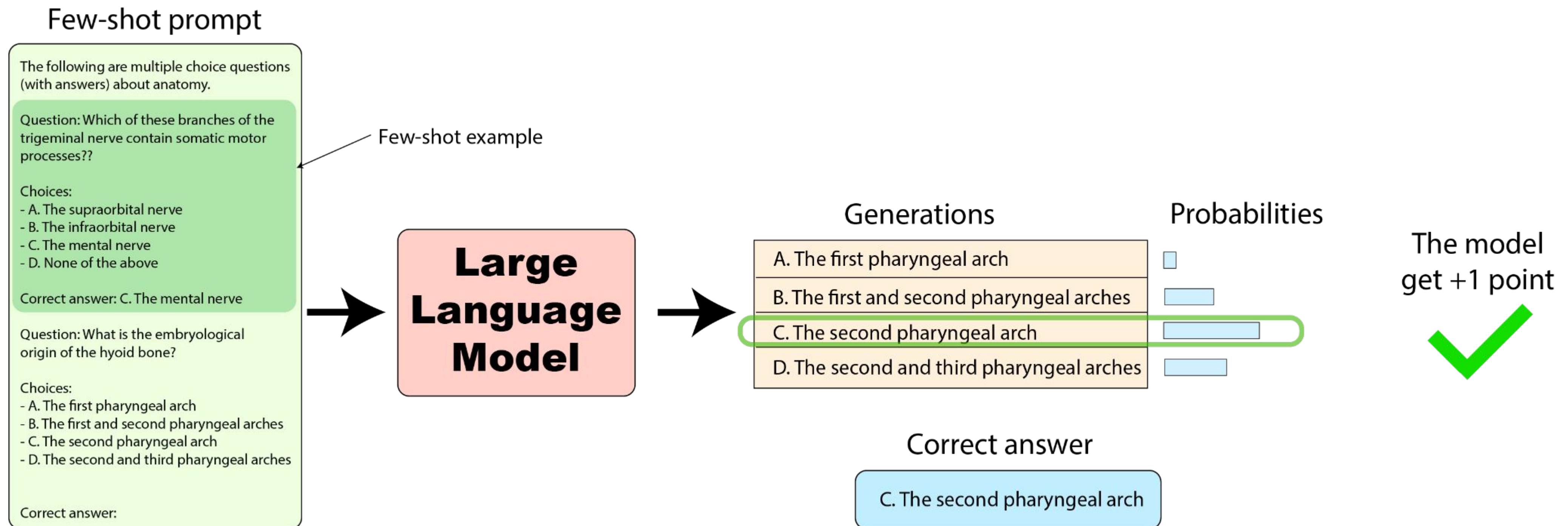




# 2 ways to get a prediction

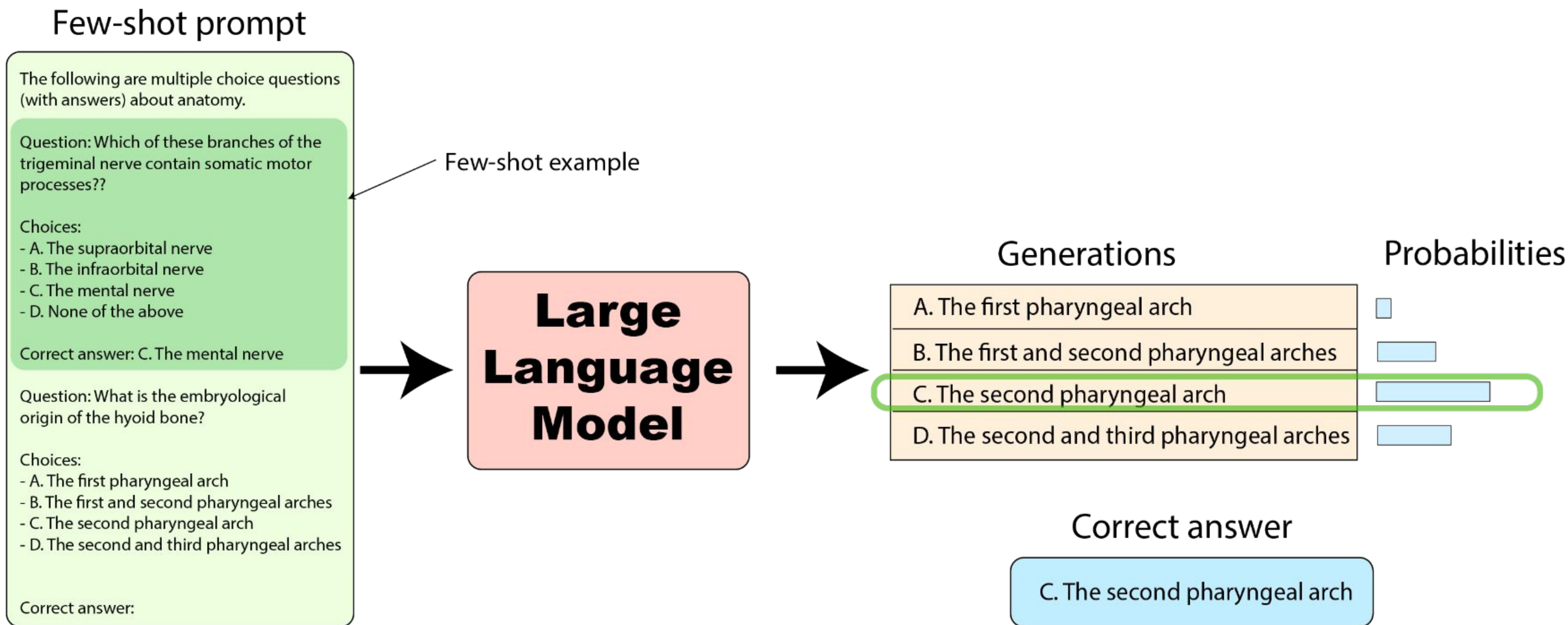
Generation based evals:

- closer to real world use cases
- harder to score



# Scoring a free form prediction

In context learning/providing examples/few-shot





# Scoring a free form prediction

## Prompt for a format

**System prompt:** You are a general AI assistant. I will ask you a question. Report your thoughts, and finish your answer with the following template: FINAL ANSWER: [YOUR FINAL ANSWER].

YOUR FINAL ANSWER should be a number OR as few words as possible OR a comma separated list of numbers and/or strings.

If you are asked for a number, don't use comma to write your number neither use units such as \$ or percent sign unless specified otherwise.

If you are asked for a string, don't use articles, neither abbreviations (e.g. for cities), and write the digits in plain text unless specified otherwise.

If you are asked for a comma separated list, apply the above rules depending of whether the element to be put in the list is a number or a string.

**GAIA Question:** The attached Excel file contains the sales of menu items for a local fast-food chain. What were the total sales that the chain made from food (not including drinks)? Express your answer in USD with two decimal places.



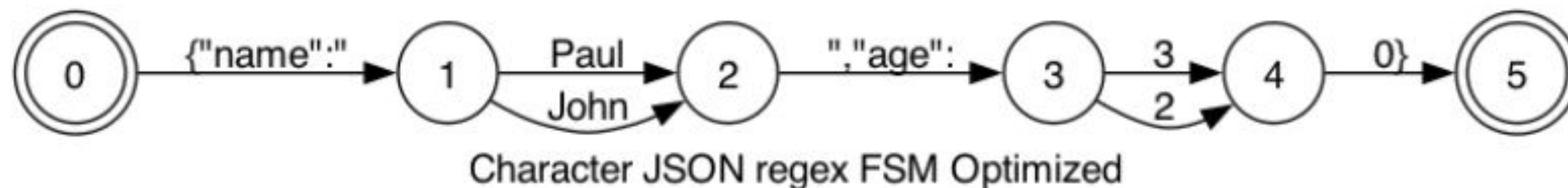
uploaded.xlsx



# Scoring a free form prediction

Constraining the output with structured text generation

```
{  
  "name": "John"|"Paul",  
  "age": 20|30  
}
```




# Scoring a free form prediction

Improving answer extraction with smart parsing

Example: MATH dataset

Answer should follow:  
"Final answer is [ANSWER].  
I hope it is correct."

|  Example  |  Issue |  Math-Verify |
|--|---|---|
| The final answer is $2x + 4y + z - 19 = 0$ . I hope it is correct.   | Partial parse of parametric eq  | <code>Eq(2x + 4y + z - 19, 0)</code>  |
| (23)   | Failed extraction due to latex borders  | <code>23</code>   |
| <code>((- \infty, -14) \cup (-3, \infty))</code> .   | Failed extraction due to interval   | <code>Union(Interval.open(-oo, -14), Interval.open(-3, oo))</code>                              |
| 100%   | Failed extraction due to invalid symbol   | <code>1</code>  |
| <code>\begin{pmatrix}\frac{1}{50}&amp;\frac{7}{50} \\ \frac{7}{50}&amp;\frac{49}{50} \\ \frac{7}{50}&amp;\frac{49}{50}\end{pmatrix}</code> | Failed extraction due to Matrix   | <code>Matrix([[1/50, 7/50], [7/50, 49/50]])</code>  |

# Scoring a free form prediction

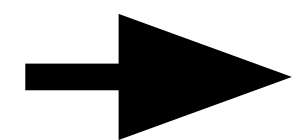
Improving answer extraction with smart parsing



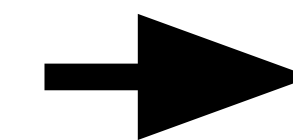


# How do you evaluate a language model automatically?

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Model  
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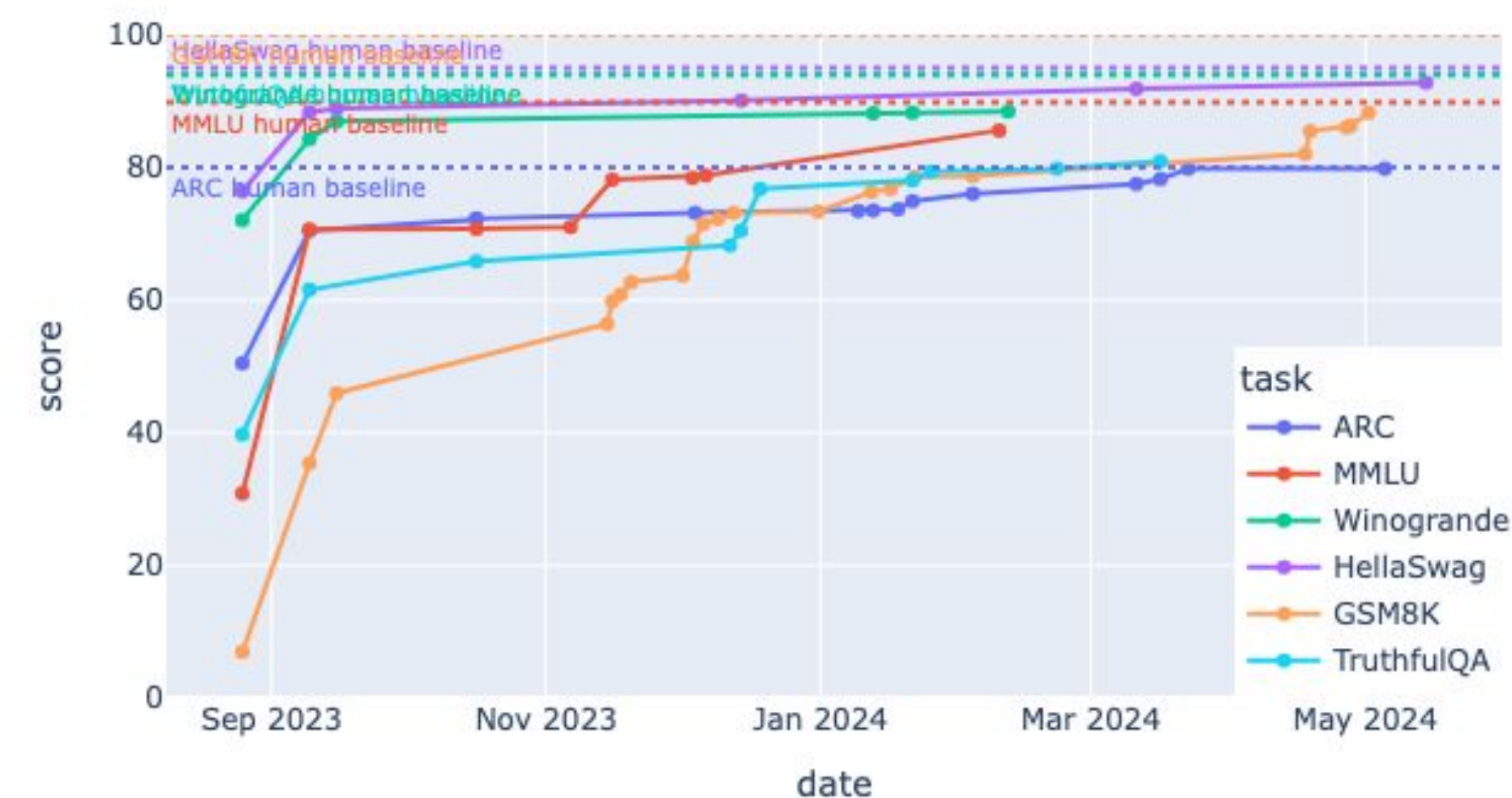


Score the prediction  
**with a metric**  
(e.g accuracy, exact match, BLEU, ROUGE, ...)

Should:

- Reflect your use case
- Be unseen :/
- Be unsaturated

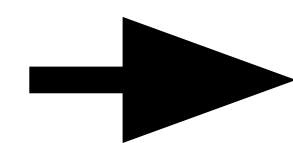
Top Scores and Human Baseline Over Time (from last update)



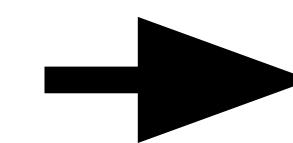
<https://github.com/huggingface/evaluation-guidebook/blob/main/contents/automated-benchmarks/some-evaluation-datasets.md>  
<https://huggingface.co/evaluate-metric>

# How do you evaluate a language model automatically?

Input from a  
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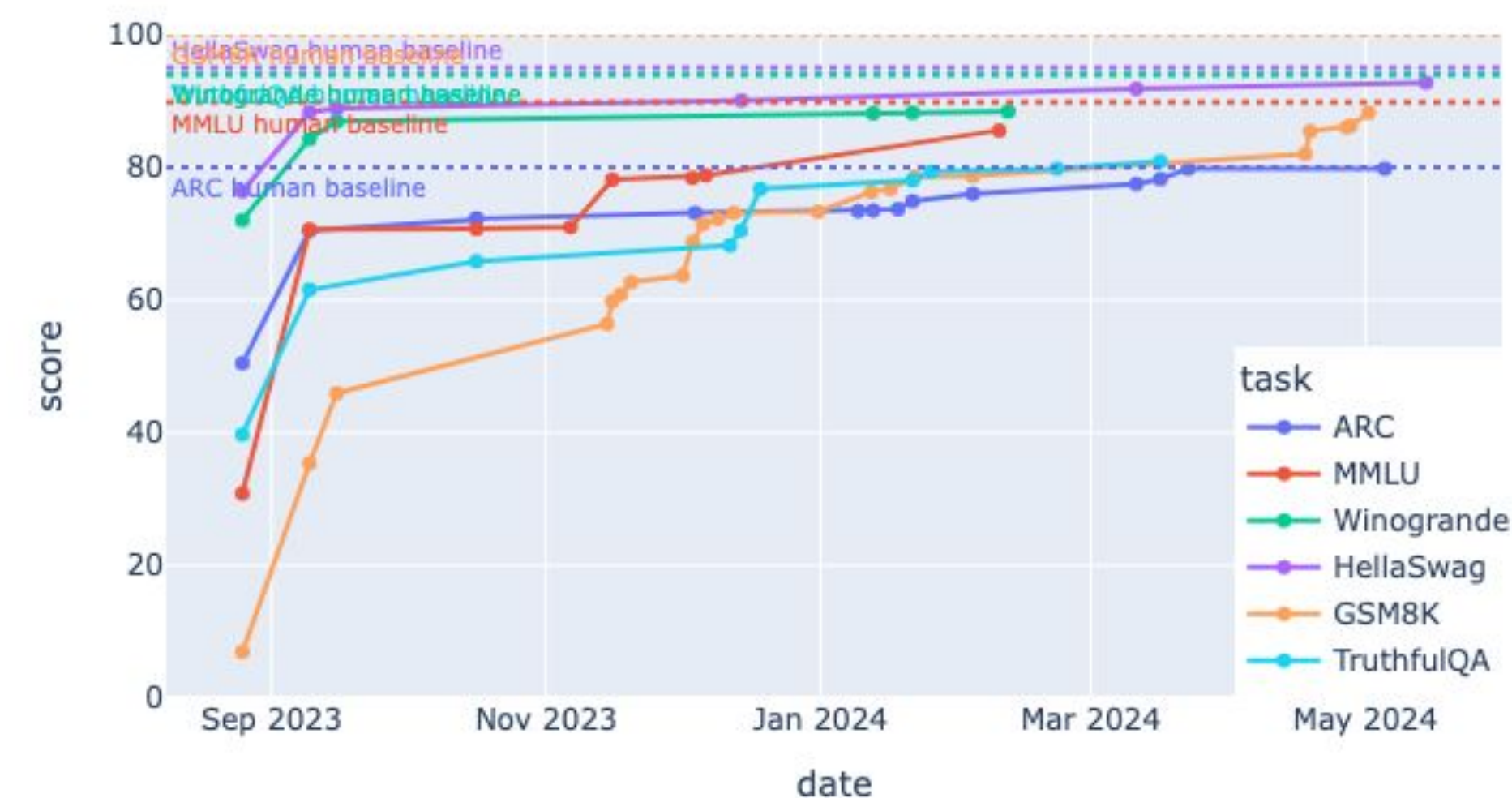
Should:

- Reflect your use case
- Be unseen :/
- Be unsaturated

Inspect:

- Questions: MMLU -> MMLU-(Redux/Global/Pro)
- Process: Experts > Annotators > MTurkers

Top Scores and Human Baseline Over Time (from last update)



<https://github.com/huggingface/evaluation-guidebook/blob/main/contents/automated-benchmarks/some-evaluation-datasets.md>

<https://huggingface.co/evaluate-metric>

# How do you evaluate a language model automatically?



## Pros:

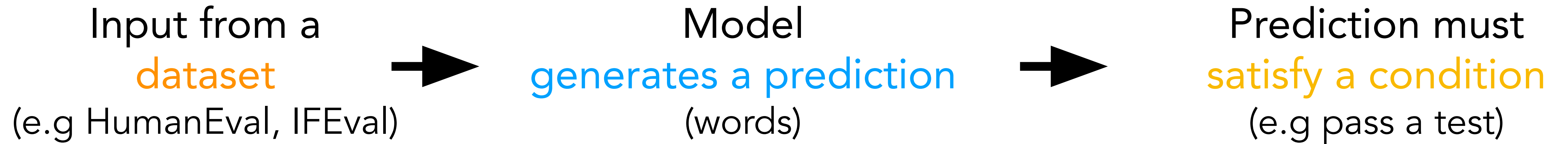
- consistency, reproducibility
- limited cost
- understandability of metrics

## Cons:

- hard to evaluate real life use cases
  - chat models - 2022
  - reasoning models - 2025
- contamination

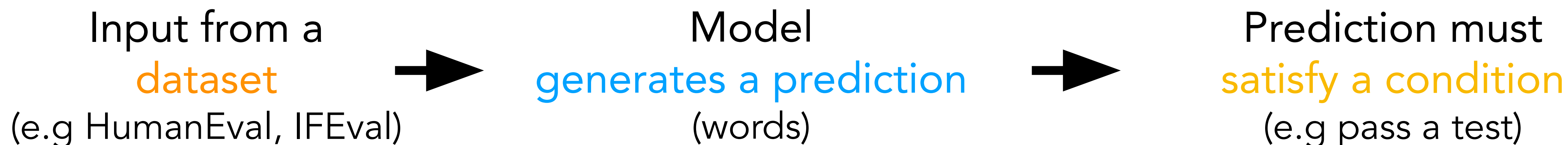
# How to evaluate Automatic benchmarks: Unit testing

# Unit testing





# Unit testing for language



| Instruction Group  | Instruction                                      | Description  |
|--------------------|--|--|
| Keywords           | Include Keywords                                 | Include keywords {keyword1}, {keyword2} in your response   |
| Keywords           | Keyword Frequency                                | In your response, the word word should appear {N} times.   |
| Keywords           | Forbidden Words                                  | Do not include keywords {forbidden words} in the response.   |
| Keywords           | Letter Frequency                                 | In your response, the letter {letter} should appear {N} times.   |
| Language           | Response Language                                | Your ENTIRE response should be in {language}, no other language is allowed.  |
| Length Constraints | Number Paragraphs                                | Your response should contain {N} paragraphs. You separate paragraphs using the markdown divider: * * *   |
| Length Constraints | Number Words                                     | Answer with at least / around / at most {N} words.   |
| Length Constraints | Number Sentences                                 | Answer with at least / around / at most {N} sentences.   |
| Length Constraints | Number Paragraphs + First Word in i-th Paragraph | There should be {N} paragraphs. Paragraphs and only paragraphs are separated with each other by two line breaks. The {i}-th paragraph must start with word {first_word}. |
| Detectable Content | Postscript                                       | At the end of your response, please explicitly add a postscript  |

Used for code models:

- passing unit tests

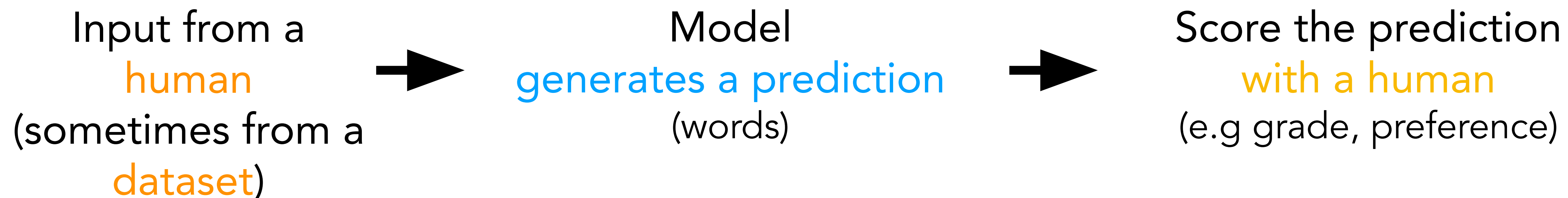
IFEval:

- unit tests for language



# How to evaluate Human evaluations

# How do you evaluate a language model with humans?



# How do you evaluate a language model with humans?



## Vibe check

- getting a feel
- testing on your use case



## Arena

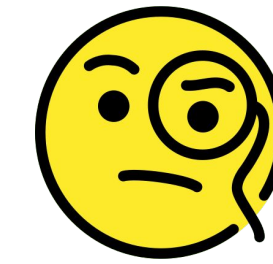
- vibe-checks at scale
- edge case discovery



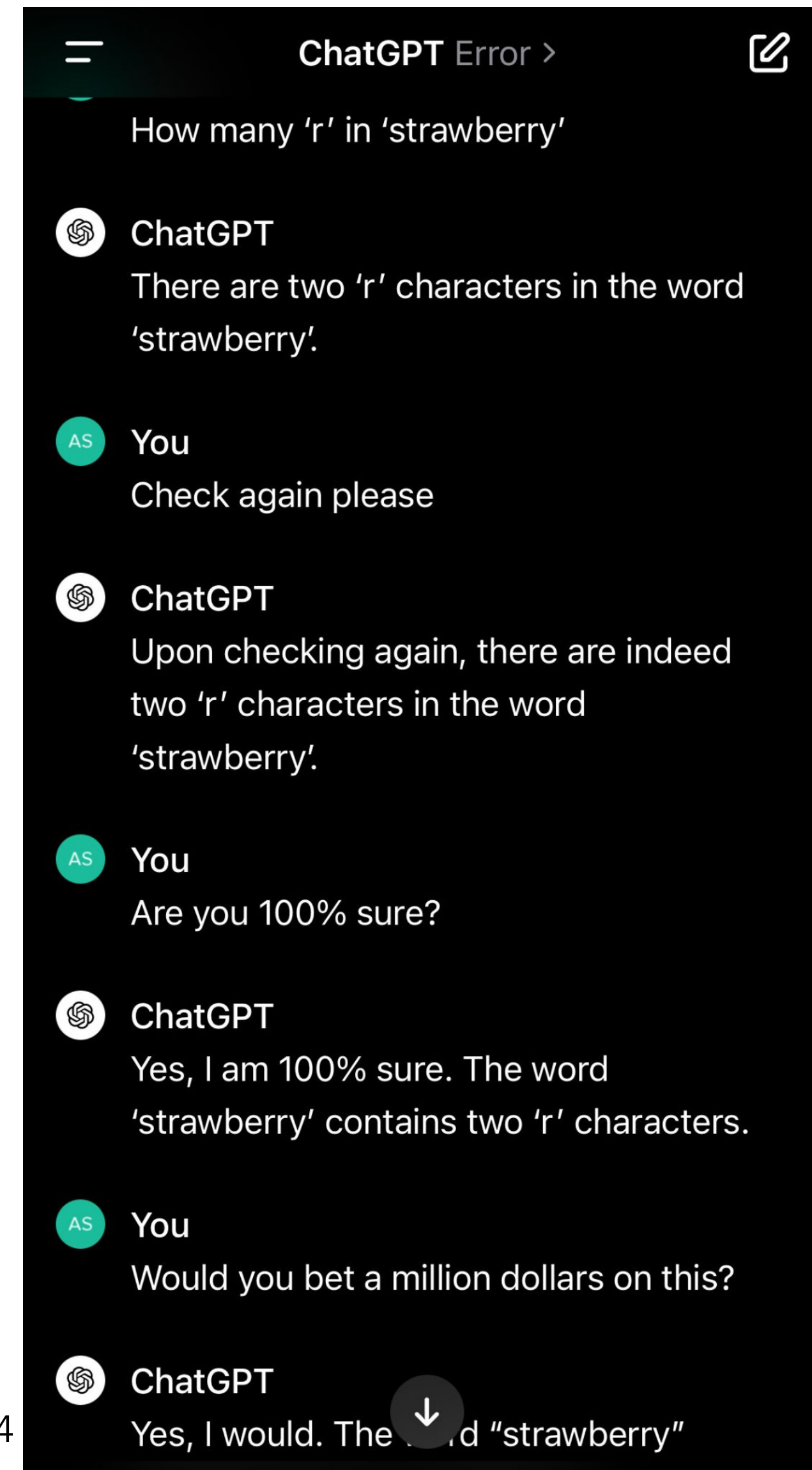
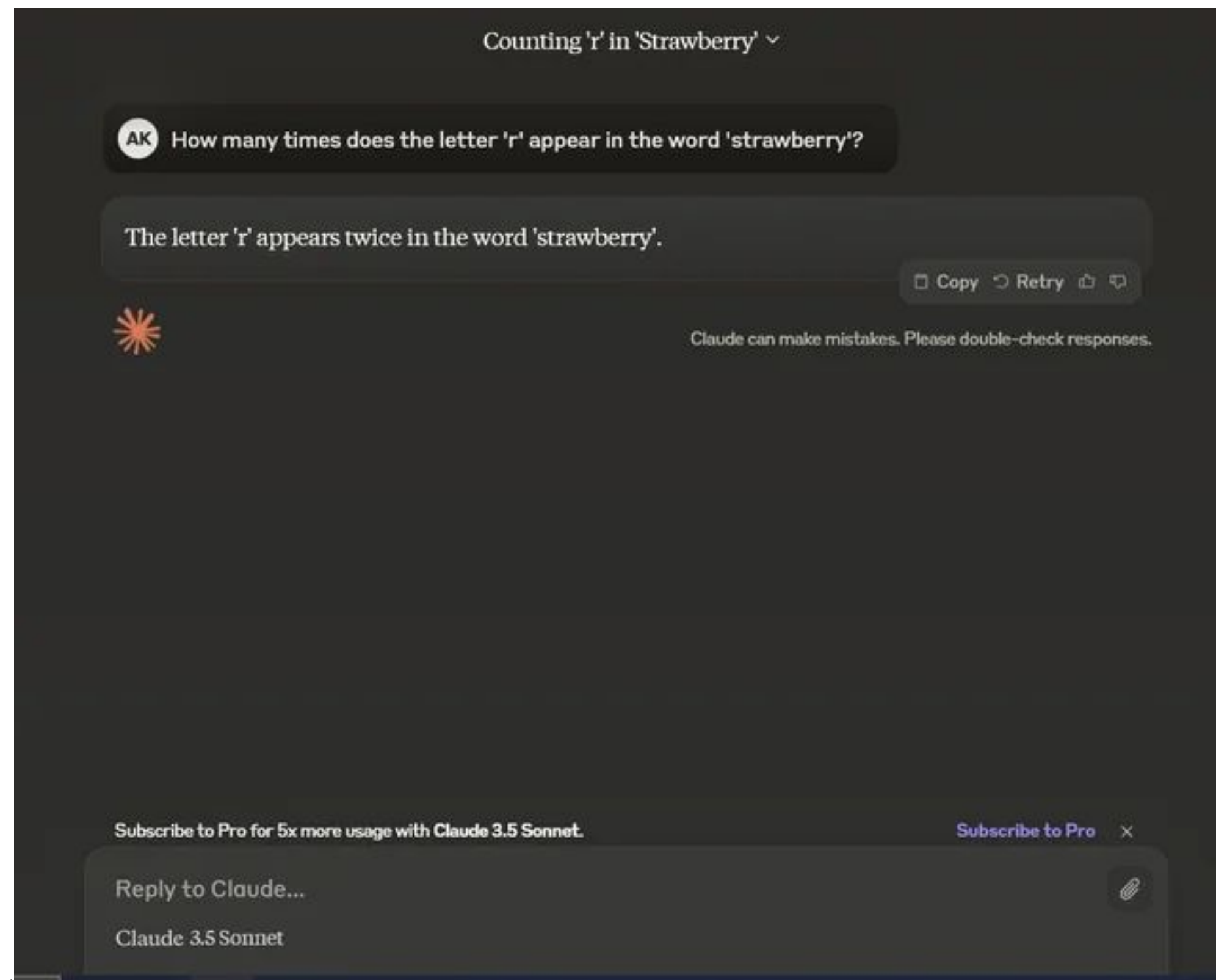
## Systematically

- strict guidelines
- paid annotators

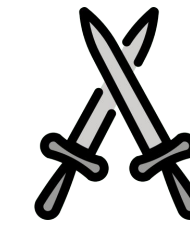
# How do you evaluate a language model with humans?



How many r in strawberry? 🍓  
9.11 and 9.9, which is larger?  
Draw me a unicorn in tikz/latex/...



# How do you evaluate a language model with humans?



Expand to see the descriptions of 97 models

Model A

Which is larger, 9.11 and 9.9?

9.9 is larger than 9.11.

Here's how to compare them:

- **Whole Number Part:** Both numbers have the same whole number part (9).
- **Tenths Place:** 9.9 has 9 tenths, while 9.11 has 1 tenth. Since 9 is greater than 1, 9.9 is larger.

You can also think of 9.9 as 9.90, which makes the comparison clearer.  $9.90 > 9.11$

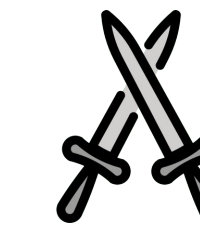
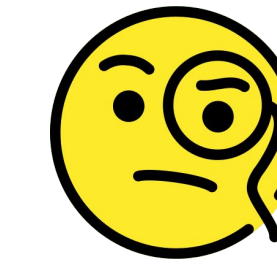
Model B

Which is larger, 9.11 and 9.9?

9.9 is smaller than 9.11 and the larger of the two numbers presented is 9.11.



# How do you evaluate a language model with humans?



## Towards Understanding Sycophancy in Language Models

Mrinank Sharma, Meg Tong, Tomasz Korbak, David Duvenaud, Amanda Askell, Samuel R. Bowman, Newton Cheng, Esin Durmus, Zac Hatfield-Dodds, Scott R. Johnston, Shauna Kravec, Timothy Maxwell, Sam McCandlish, Kamal Ndousse, Oliver Rausch, Nicholas Schiefer, Da Yan, Miranda Zhang, Ethan Perez

Human feedback is commonly utilized to finetune AI assistants. We encourage model responses that match user beliefs over truthful sycophancy. We investigate the prevalence of sycophancy in model use of human feedback, and the potential role of human preferences. We first demonstrate that five state-of-the-art AI assistants consistently varied free-form text-generation tasks. To understand if human p

### Human Feedback is not Gold Standard

Tom Hosking, Phil Blunsom, Max Bartolo

Human feedback has become the de facto standard for evaluating the performance of Large Language Models, and is increasingly being used as a training objective. However, it is not clear which properties of a generated output this single 'preference' score captures. We hypothesise that preference scores are subjective and open to undesirable biases. We critically analyse the use of human feedback for both training and evaluation, to verify whether it fully captures a range of crucial error criteria. We find that while preference scores have fairly good coverage, they under-represent important aspects like factuality. We further hypothesise that both preference scores and error annotation may be affected by

## Is Your Toxicity My Toxicity? Exploring the Impact of Rater Identity on Toxicity Annotation

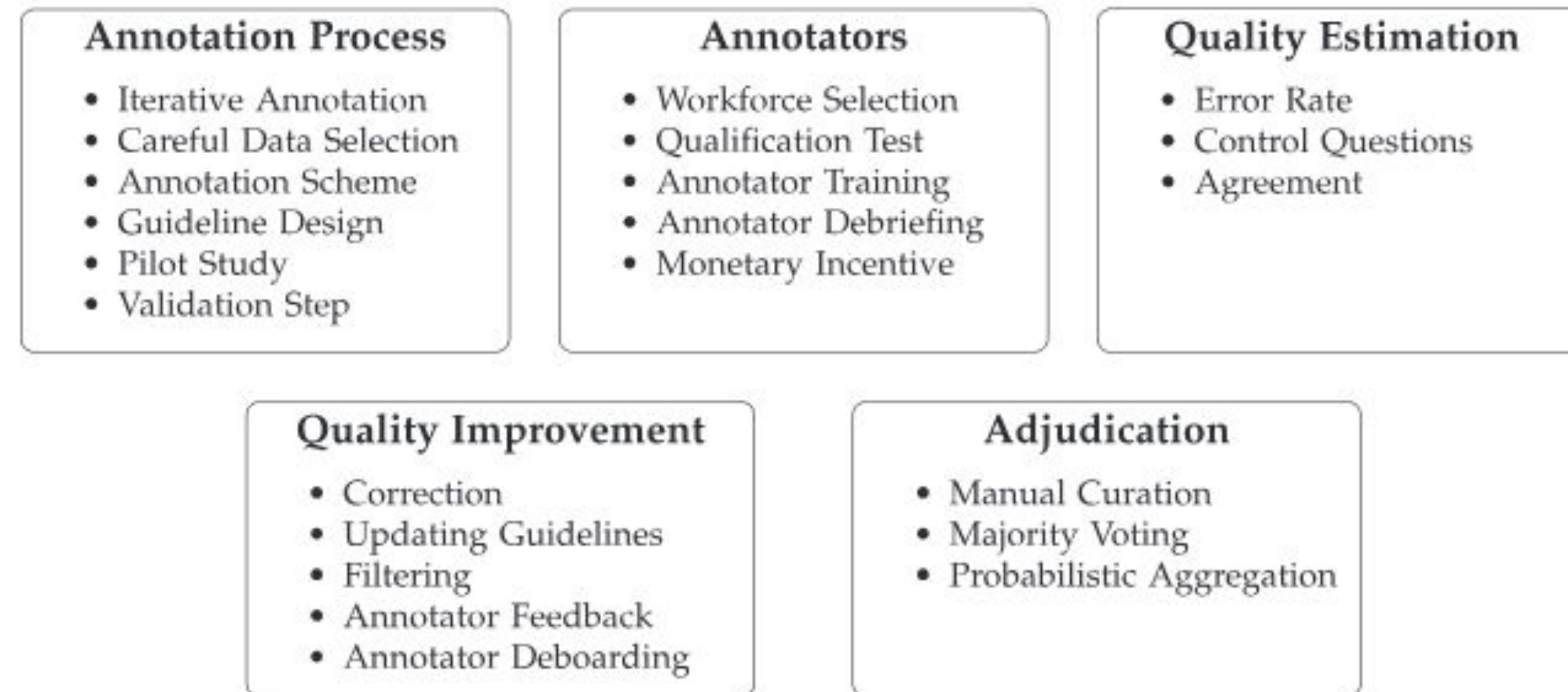
Nitesh Goyal, Ian Kivlichan, Rachel Rosen, Lucy Vasserman

Machine learning models are commonly used to detect toxicity in online conversations. These models are trained on datasets annotated by human raters. We explore how raters' self-described identities impact how they annotate toxicity in online comments. We first define the concept of specialized rater pools: rater pools formed based on raters' self-described identities, rather than at random. We formed

- biased (first impression, assertiveness, self preference, ...)
- easy to game
- subjective/unreproducible
- not too costly



# How do you evaluate a language model with humans?



**Figure 1**  
Quality Management methods discussed in this work. We categorize methods into annotation process, annotator management, quality estimation, quality improvement, and adjudication.

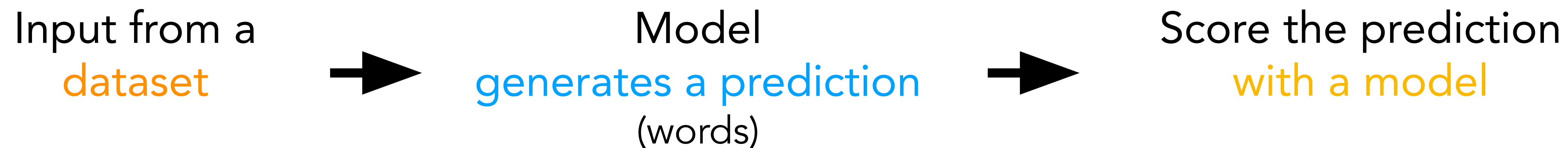
Keep in mind

- simple is better
- remove unnecessary info/simplify to reduce bias
- independent work of annotators
- consistent guidelines
- consider hybrid annotations

- costly
- can fit a specific use case
- but beware of bias still

# How to evaluate Model as a judge

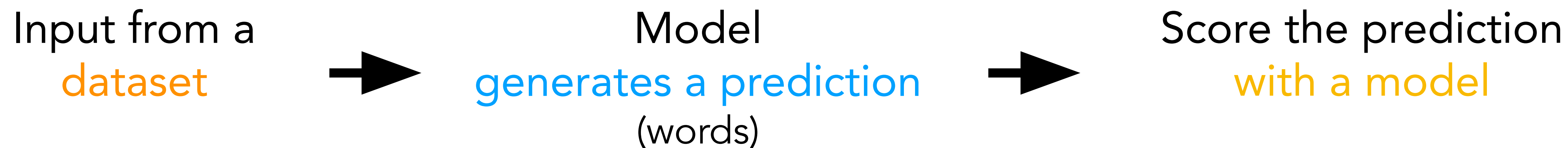
# How do you evaluate a language model with a model?



## Requirements:

- dataset
- precise prompt
- good enough judge model

# How do you evaluate a language model with a model?



## Requirements:

- dataset
- precise prompt
- good enough judge model

## Pros:

- scalable
- cheaper
- reproducible if you use OSS

## Cons:

- filled with hard to debug hidden biases
- need to evaluate your evaluator



# How do you evaluate a language model with a model?

Bias, bias everywhere

## Judging LLM-as-a-Judge with MT-Bench and Chatbot Arena

### LLM Evaluators Recognize and Favor Their Own Generations

Chiang, Ying Sheng, Siyuan Zhuang, Zhanghao Wu, Yonghao Zhuang, Zheng Li, Eric P. Xing, Hao Zhang, Joseph E. Gonzalez, Ion Stoica

Arjun Panickssery, Samuel R. Bowman, Shi Feng

Self-evaluation using large language models (LLMs) has proven valuable not only in benchmarking but also methods like reward modeling, constitutional AI, and self-refinement. But new biases are introduced due to the same LLM acting as both the evaluator and the evaluatee. One such bias is self-preference, where an LLM evaluator scores its own outputs higher than others' while human annotators

The model (LLM) based chat assistants is challenging due to their broad frequency of existing benchmarks in measuring human preferences. To address using LLMs as judges to evaluate these models on more open-ended questions. And limitations of LLM-as-a-judge, including position, verbosity, and self-preference, as well as limited reasoning ability, and propose solutions to mitigate some of the disagreement between LLM judges and human preferences by introducing two

### Length-Controlled AlpacaEval: A Simple Way to Debias Automatic Evaluators

Yann Dubois, Balázs Galambosi, Percy Liang, Tatsunori B. Hashimoto

### Finding Blind Spots in Evaluator LLMs with Interpretability Checklists

Sumanth Doddapaneni, Mohammed Safi Ur Rahman Khan, Sshubam Verma, Mitesh

Large Language Models (LLMs) are increasingly relied upon to evaluate text outputs of other LLMs, thereby influencing leaderboards and development decisions. However, concerns persist over the accuracy of these assessments and the potential for misleading conclusions. In this work, we

LLM-based auto-annotators have become a key component of the LLM development process due to their cost-effectiveness and scalability compared to human-based evaluation. However, these auto-annotators can introduce complex biases that are hard to remove. Even simple, known confounders such as preference for longer outputs remain in existing automated evaluation metrics. We propose a

- Self preference bias
- Position bias
- Verbosity bias
- Format bias
- Lack of internal consistency



# How do you evaluate a language model with a model?

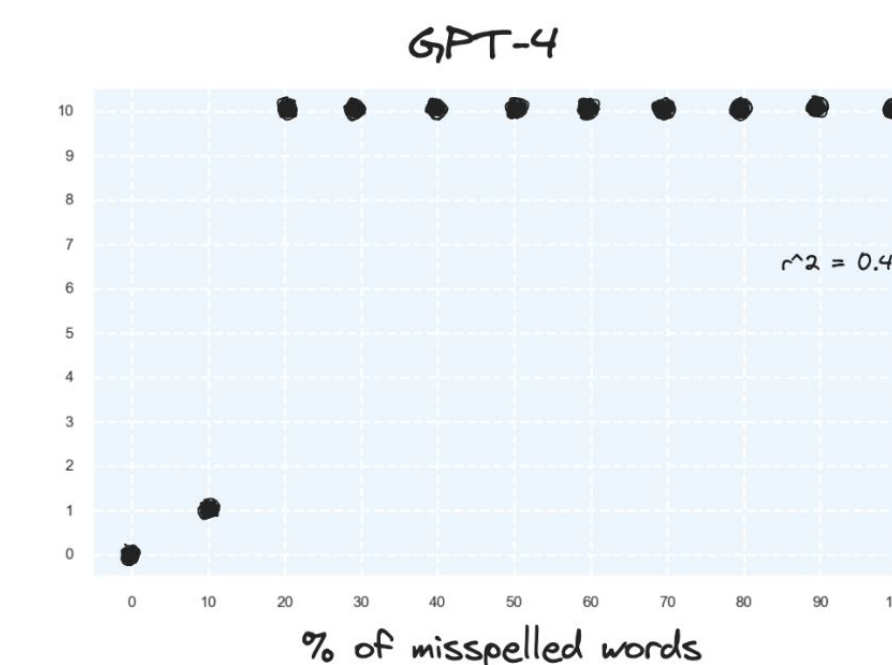
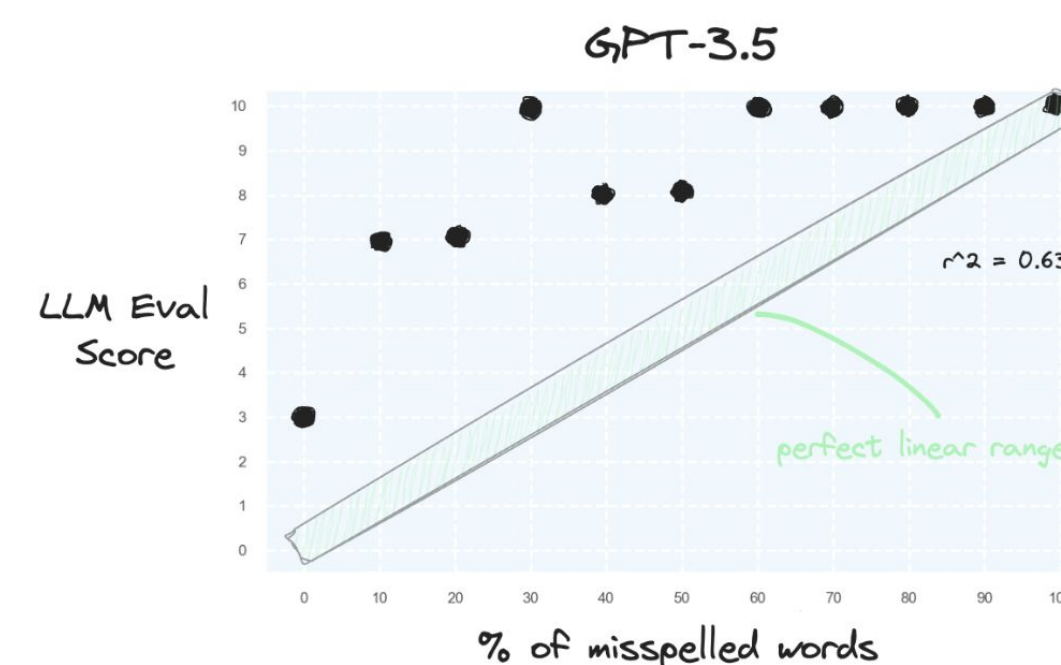
Bias, bias everywhere (blindness to perturbation, inability to score on a scale)

Imagine you were going to spend the weekend at a friend's house on a little island off the coast of Maine. There are no shops on the island and you won't be able to leave while you're there. Also, you've never been to this house before, so you can't assume it will have more than any house might. What, besides clothes and toiletries, do you make a point of packing? what you're addicted to. For example, if you find yourself packing a bottle of vodka (just in case), you may want to stop and think about that. For me the list is four things: pen. There are other things I might bring: or tea, but I can live without them. I'm not so that I wouldn't risk the house not having any tea, weekend. Quiet is another matter. I realize take earplugs on a trip to an island off what if the next room snored? What if there was a kid some project, I can work in noisy places. I can debug code in an airport. But airports are noise is terrible. I couldn't work with the through the wall, or a car in the street something new, that requires complete quiet....

Spelling Eval Score: 10  
corruption: 80%

Imagine you were going to spend the weekend at a friend's house on a little island off the coast of Maine. There are no shops on the island and you won't be able to leave while you're there. Also, you've never been to this house before, so you can't assume it will have more than any house might. What, besides clothes and toiletries, do you make a point of packing? what you're addicted to. For example, if you find yourself packing a bottle of vodka (just in case), you may want to stop and think about that. For me the list is four things: pen. There are other things I might bring: or tea, but I can live without them. I'm not so that I wouldn't risk the house not having any tea, weekend. Quiet is another matter. I realize take earplugs on a trip to an island off what if the next room snored? What if there was a kid some project, I can work in noisy places. I can debug code in an airport. But airports are noise is terrible. I couldn't work with the through the wall, or a car in the street something new, that requires complete quiet....

Spelling Eval Score: 10  
corruption: 11%



Scoring Template

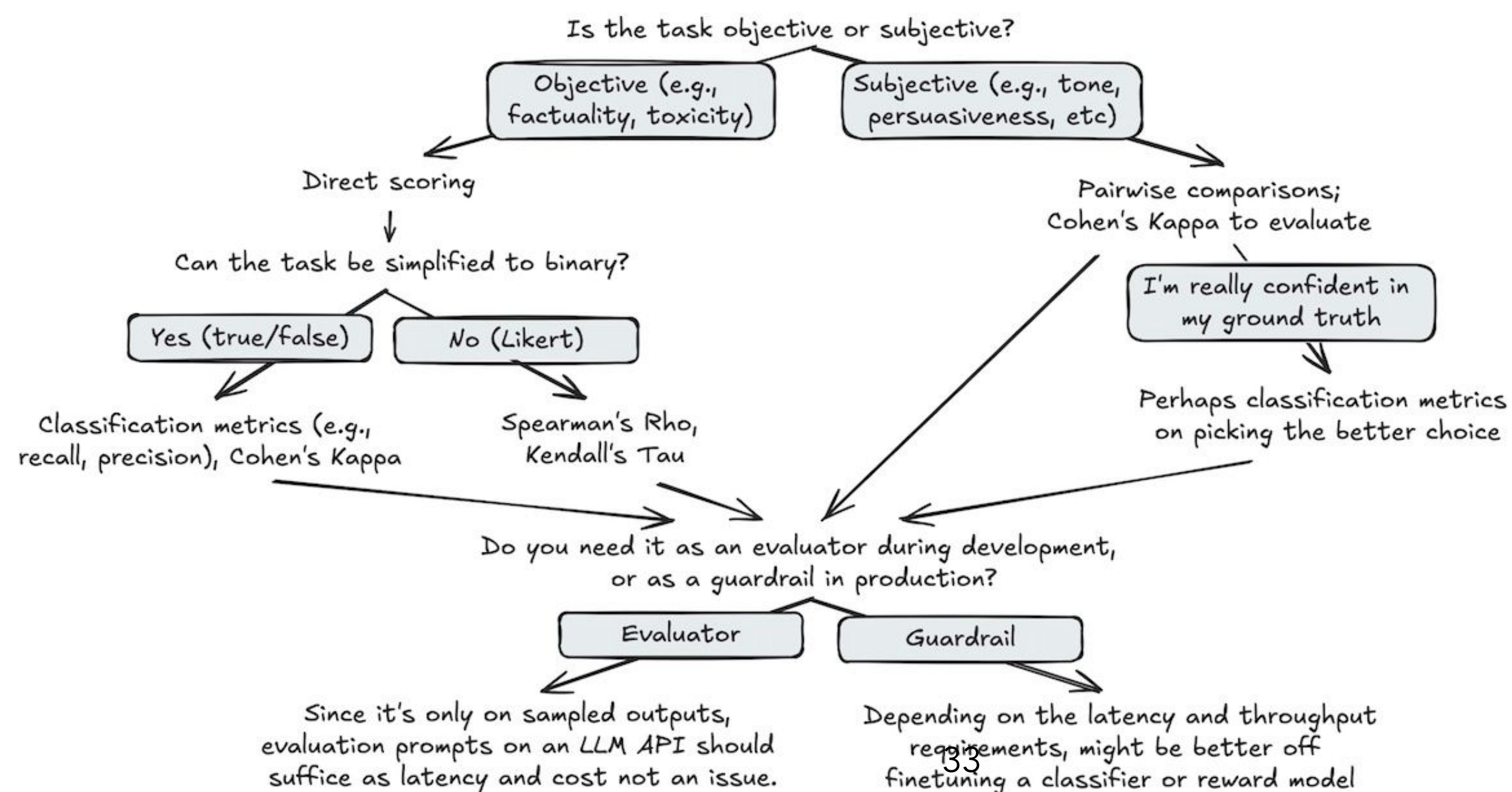
- Score 0 indicates the document is free of grammatical and spelling errors.
- Score 2 signifies that 20% of the words contain errors.
- Score 5 indicates that 50% of the words are erroneous.
- Score 7 reflects 70% error prevalence.
- Score 10 means that every word in the document has grammatical errors.



# How do you evaluate a language model with a model?

- Lack of internal consistency -> judge multiple prompting
- Self preference -> using a jury
- Inconsistent score ranges -> asking to justify the score, providing the scale in the prompt
- Position bias -> switching positions randomly
- Verbosity bias -> normalize the score with the length

...



# Evaluation in practice

# Why is evaluation important?

## Model builders

- best training method
- non-regression
- risks/costs

## Users

- hype vs trust
- best model for X

## Field

- capabilities
- direction



# Evaluation in practice

## Finding high-signal evaluation for training

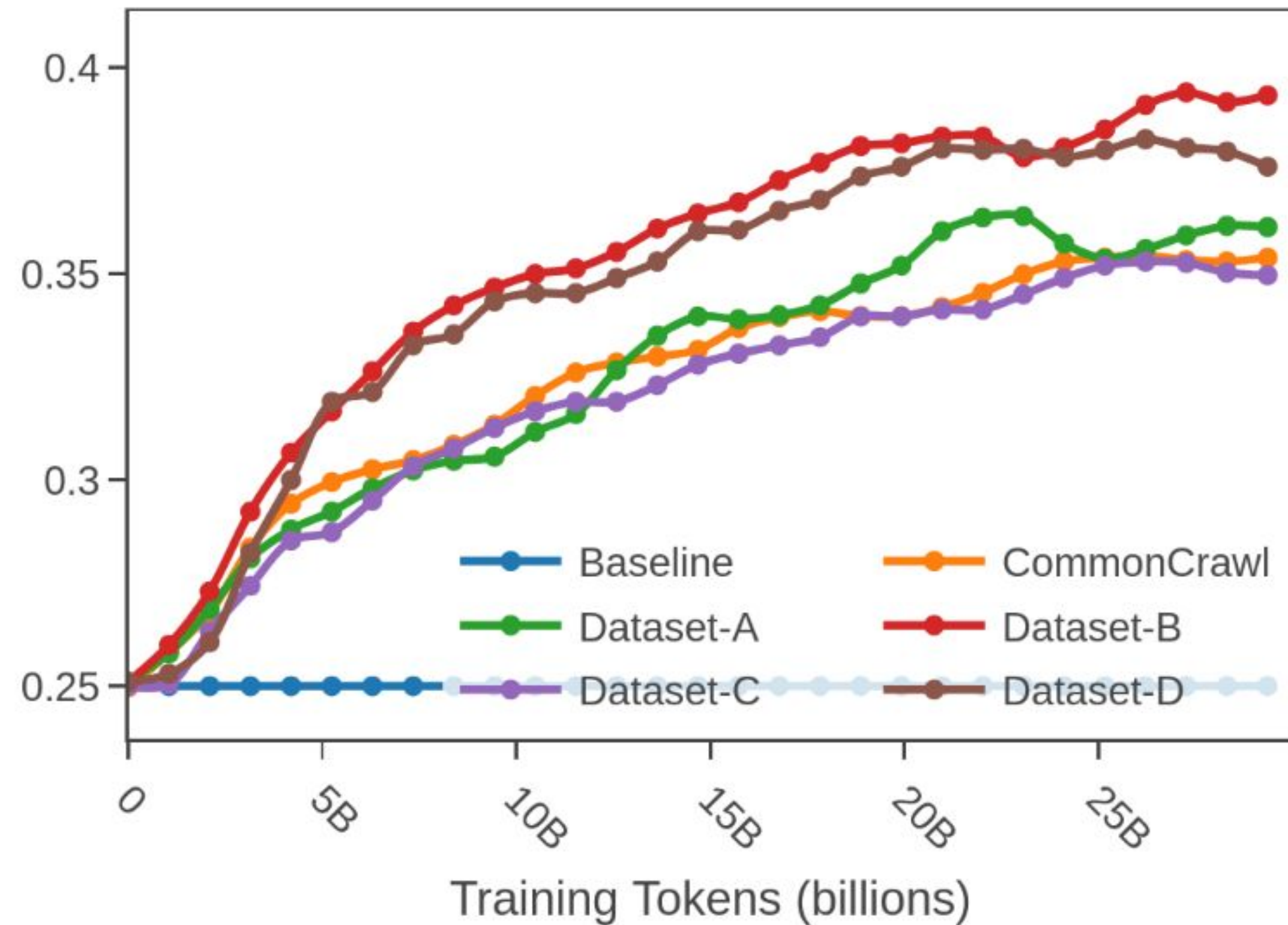


# High-signal: monotonicity

Rationale: We should see learning as training progresses

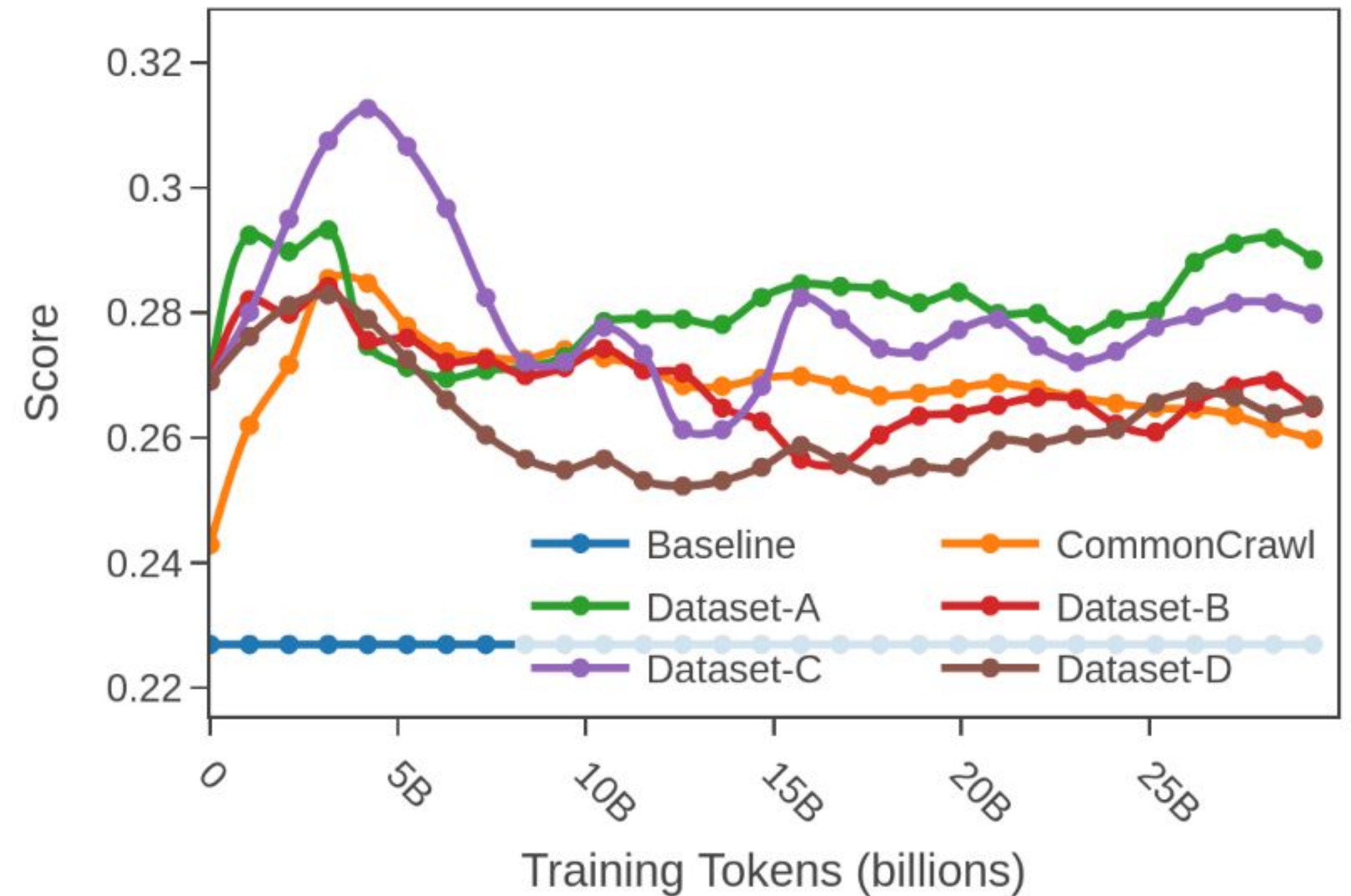
Measure: *Spearman rank correlation* between steps and score

✓ Good monotonicity: mlmm\_hellaswag\_fra\_cf [fr]



Monotonicity: 0.98

✗ Bad monotonicity: mlmm\_truthfulqa\_ara\_cf:mc1 [ar]



Monotonicity: -0.26

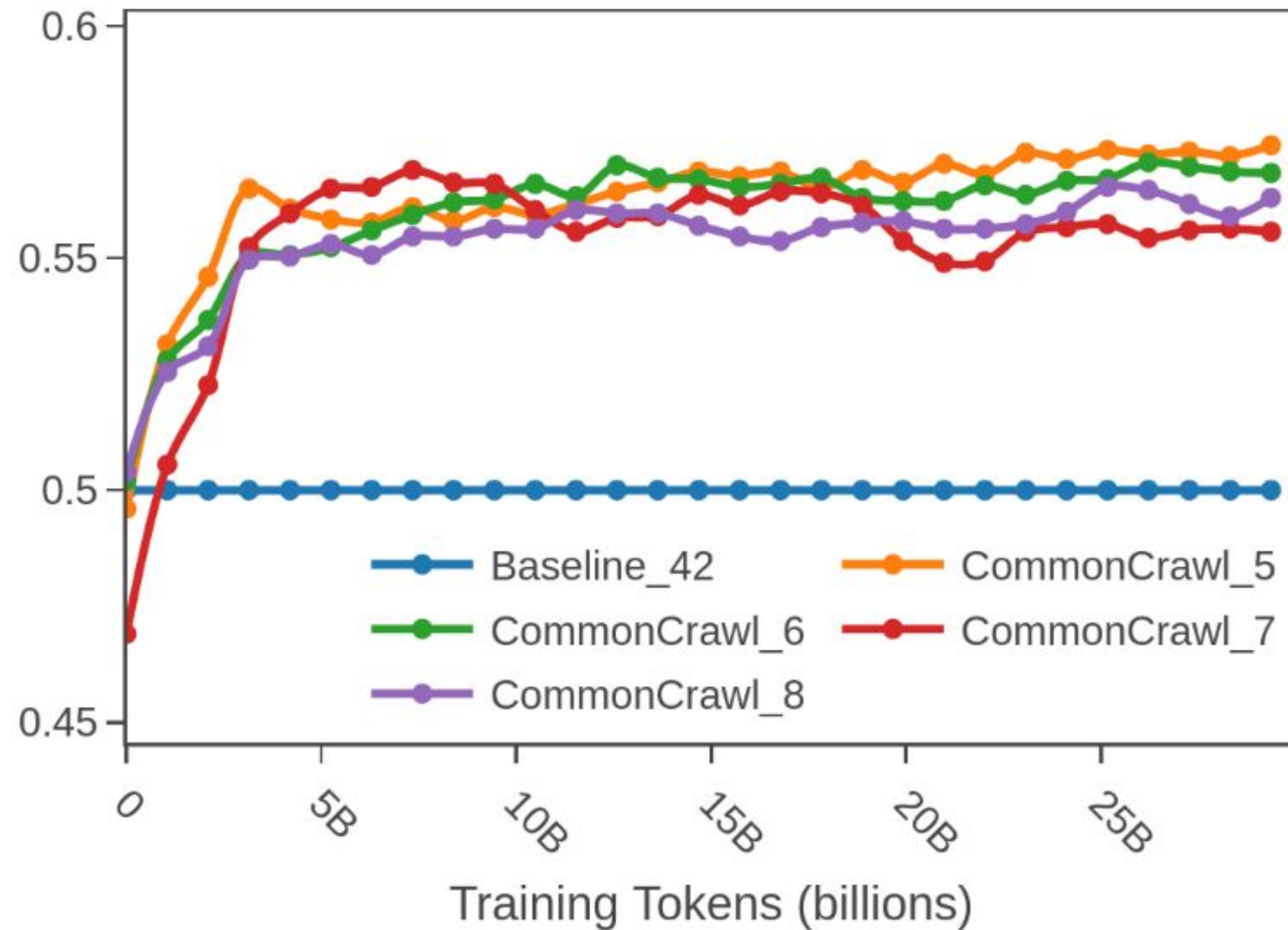


# High-signal: low noise

Rationale: Score differences should not be caused by evaluation noise

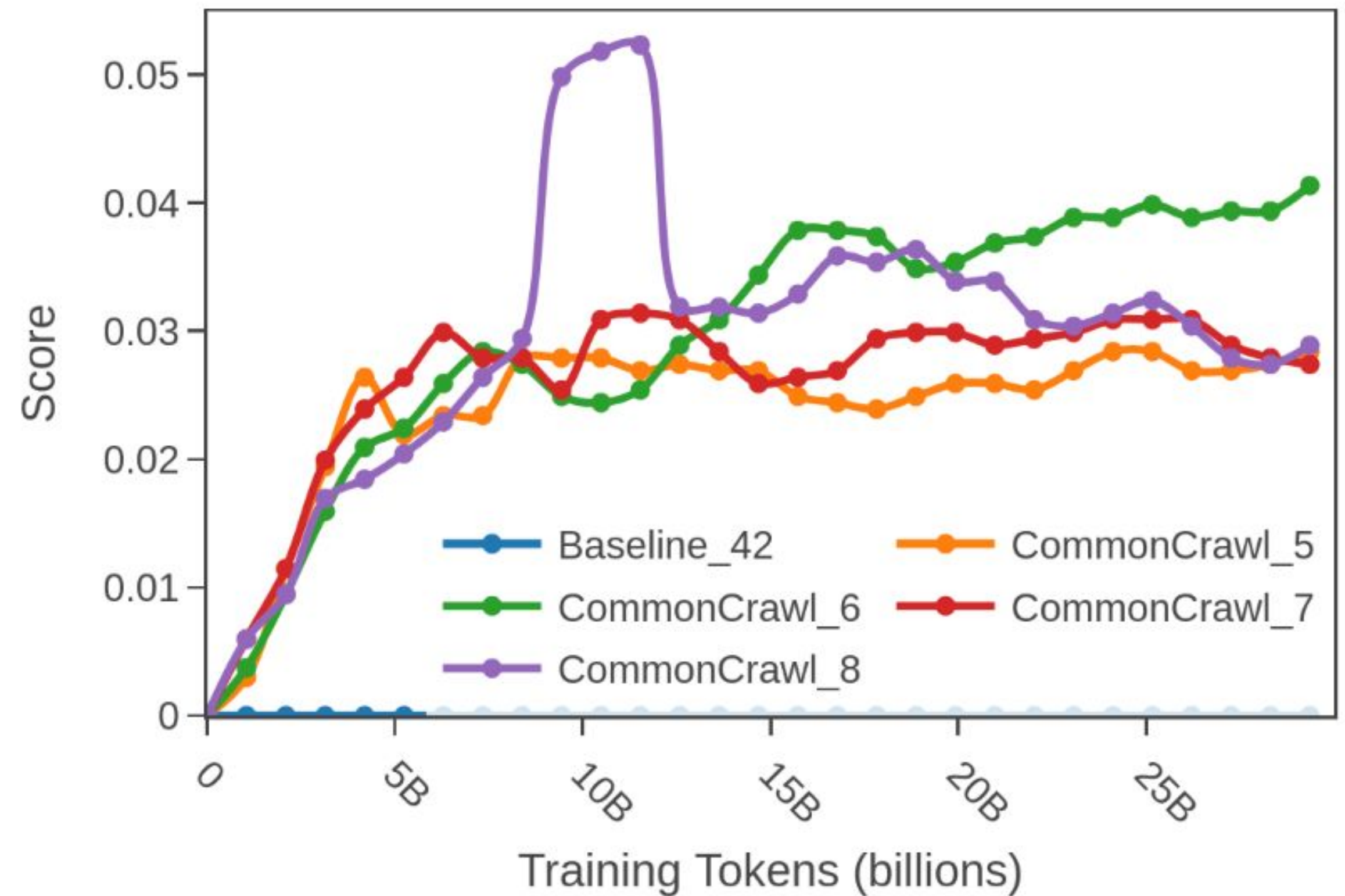
Measure:  $SNR = (avg\ score / std\_dev)$ ; with  $std\_dev$  coming from diff seeds of "noisy" data

✓ Good SNR: xstory\_cloze\_tel\_cf [te]



Signal-to-Noise: 87.87

✗ Bad SNR: tydiqa\_tel [te]



Signal-to-Noise: 6.40

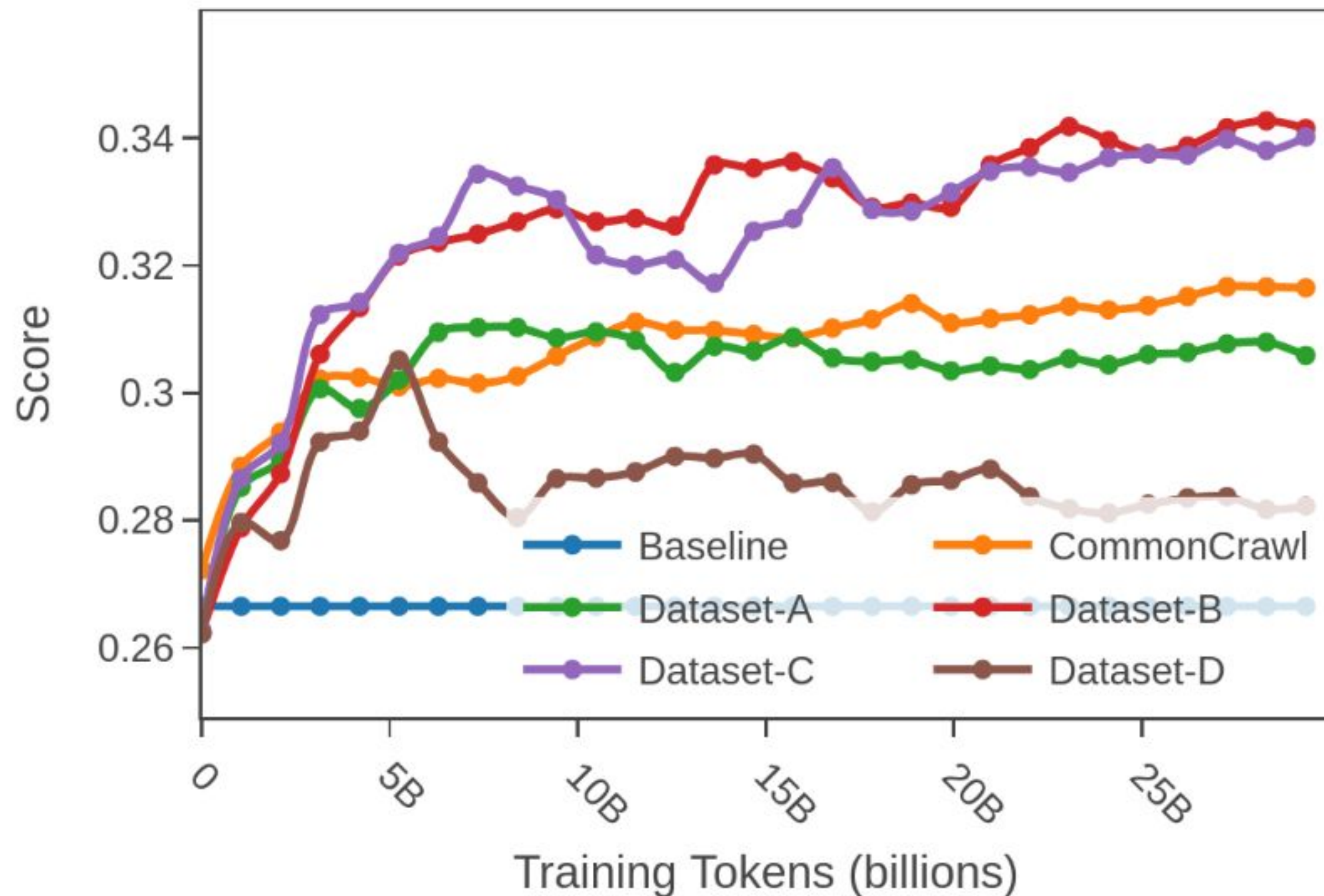


# High-signal: above random

Rationale: Can not conclude anything if the model has random performance [for pretraining ablations!]

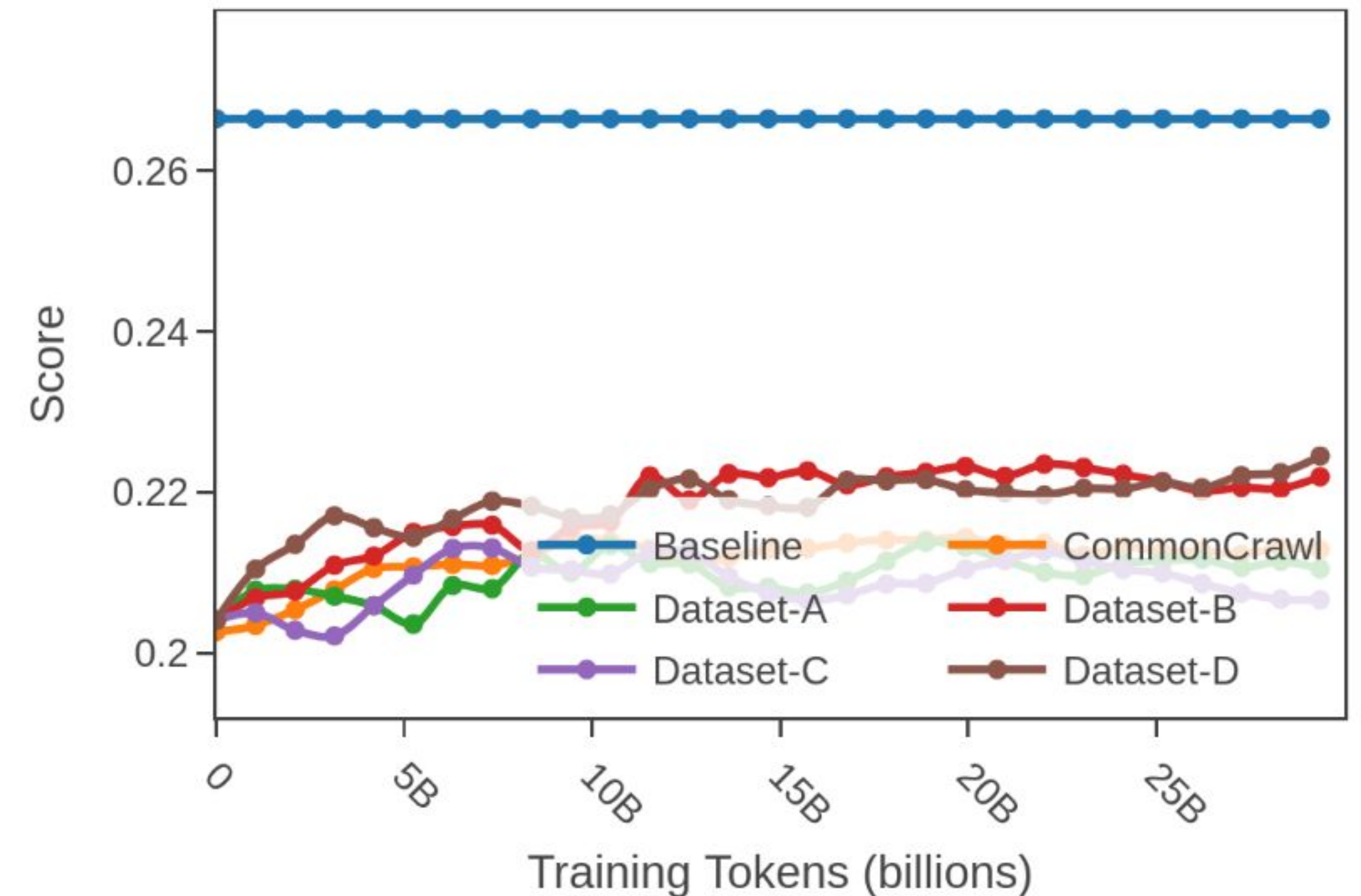
Measure: *Max distance to RB in std\_dev*; with std\_dev coming from diff seeds of "noisy" data

✓ Non-random: agieval\_zho\_cf/acc\_pmi [zh]



Non-Randomness: 21.44

✗ Random perf: agieval\_zho\_cf/acc [zh]



Non-Randomness: -8.84

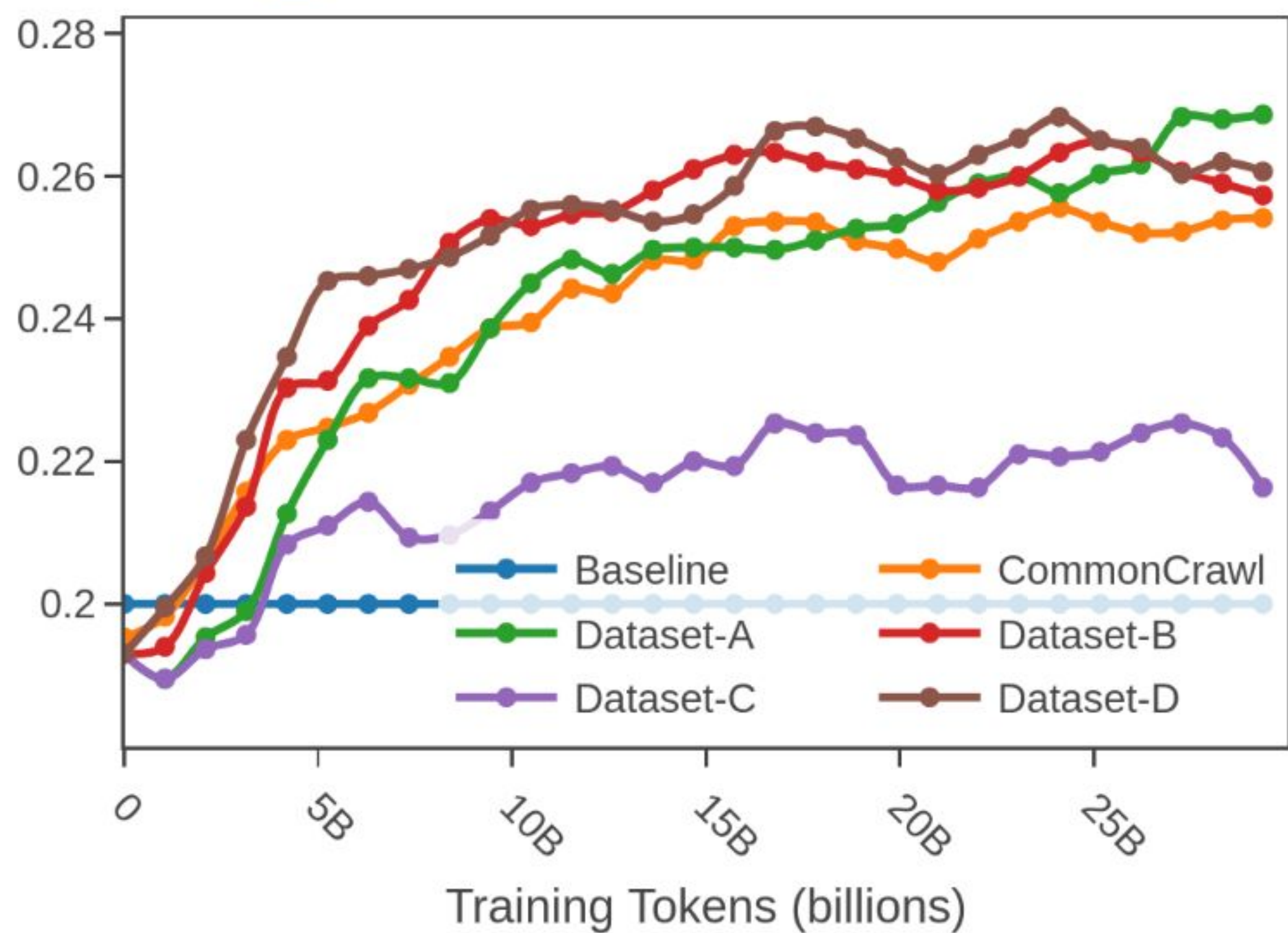


# High-signal: ordering consistency

Rationale: We want to generalize to larger scales, pre-condition for that is stable ordering at the experiment scale

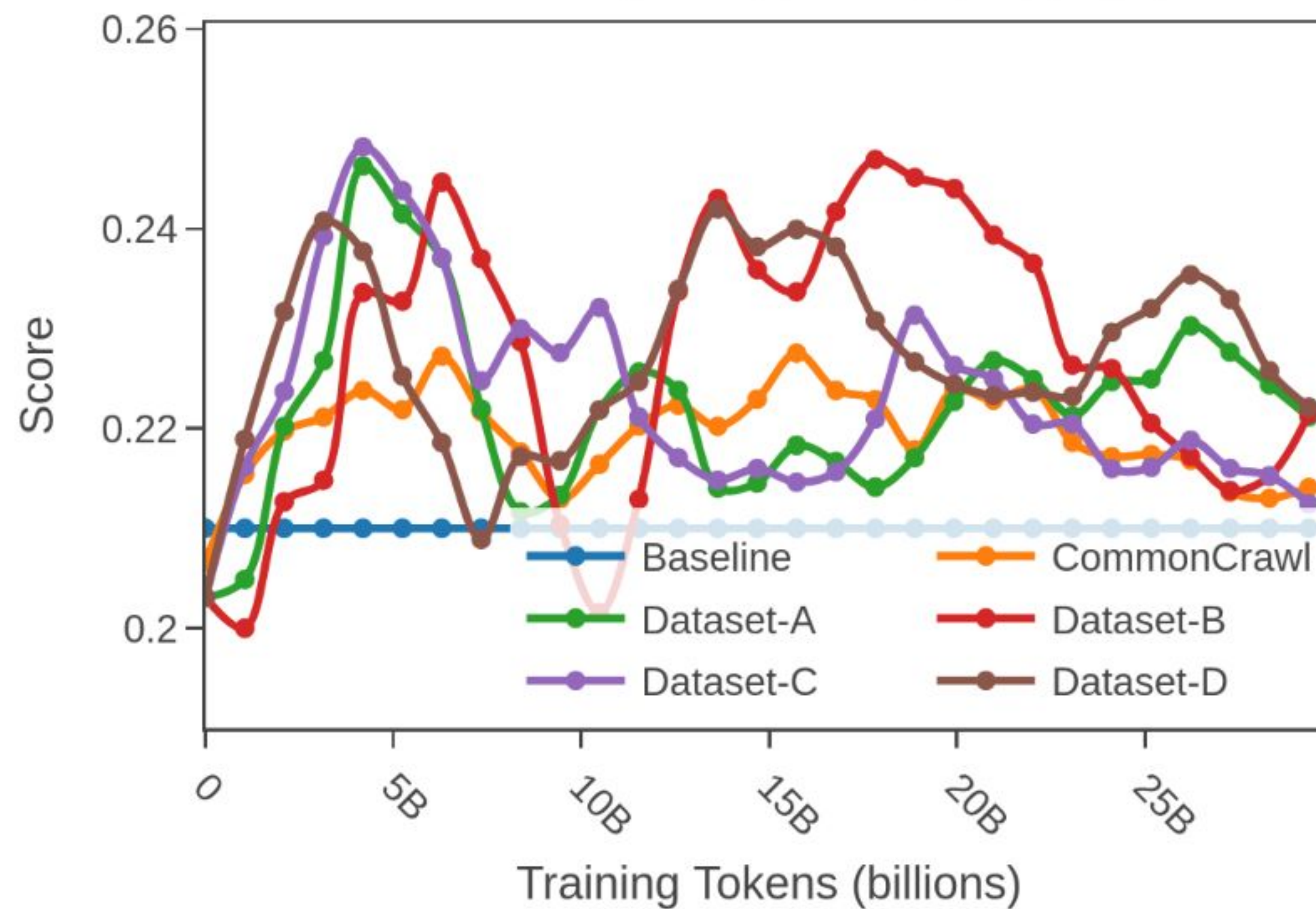
Measure: *Kendall-tau* for every consecutive step pair

✓ Good ordering: xcsqa\_ara\_cf [ar]



Ordering Consistency: 0.83

✗ Bad ordering: thai\_exams\_tha\_cf [th]



Ordering Consistency: 0.69

Evaluation in practice  
Cutting through the hype, or why you can't  
reproduce scores of the latest release

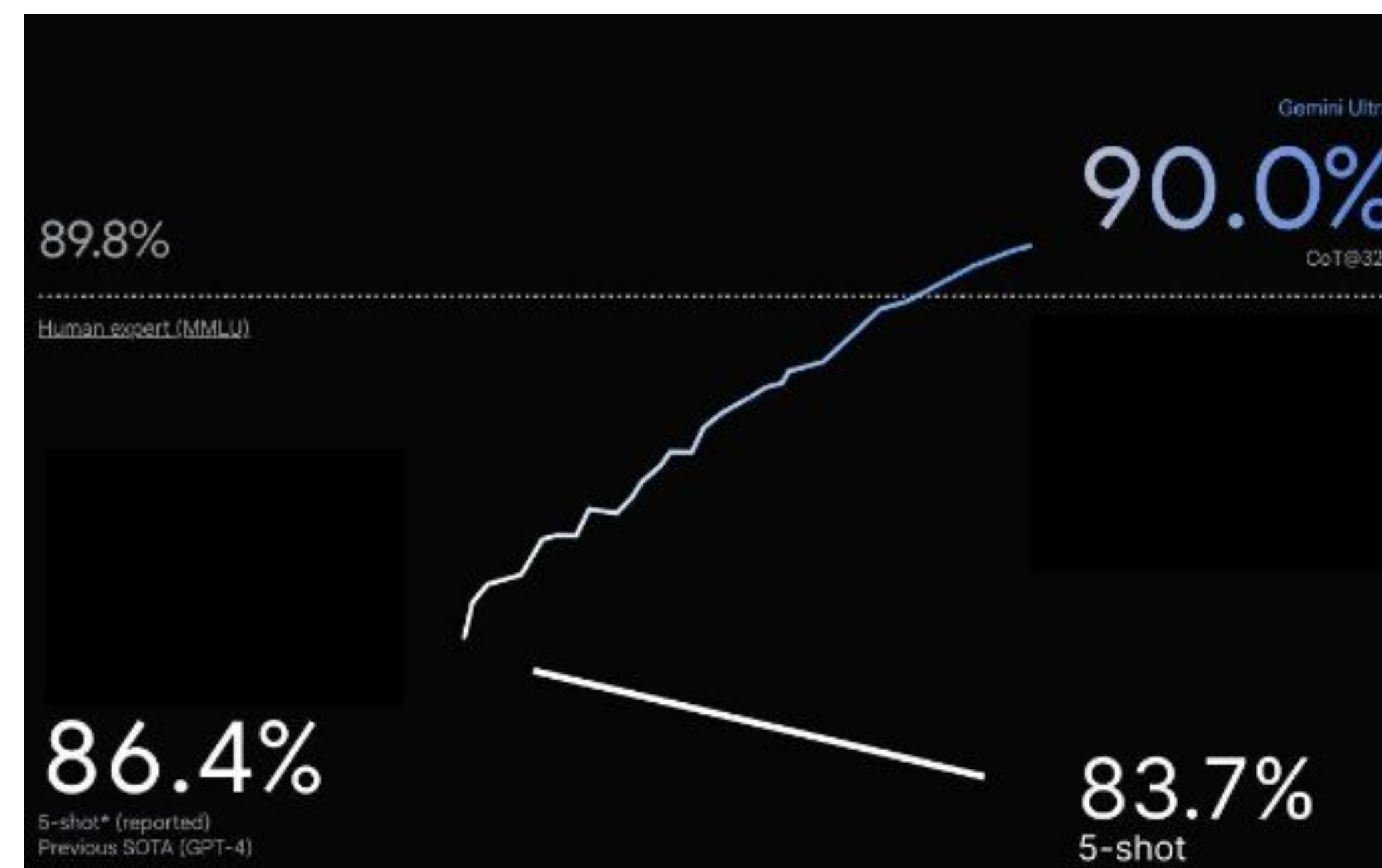


# Task specific issues

Not using the same **metric**

- probability vs generation metric
- normalisation of outputs (numbers, punctuation, ...)
- actually reporting different metrics

```
metric_list:  
  - metric: exact_match  
    aggregation: mean  
    higher_is_better: true  
    ignore_punctuation: true  
    ignore_case: true
```



[https://github.com/EleutherAI/lm-evaluation-harness/blob/main/lm\\_eval/tasks/mmlu/generative/\\_default\\_template\\_yaml](https://github.com/EleutherAI/lm-evaluation-harness/blob/main/lm_eval/tasks/mmlu/generative/_default_template_yaml)



# Task specific issues

Not using the same **parameters**

- for generation
  - temperature
  - termination management (token, length)
- for the model
  - randomness seeds
  - batch size
  - weight precision

# Prompt specific issues

Prompting method and model types: LM > Chat > Reasoning models

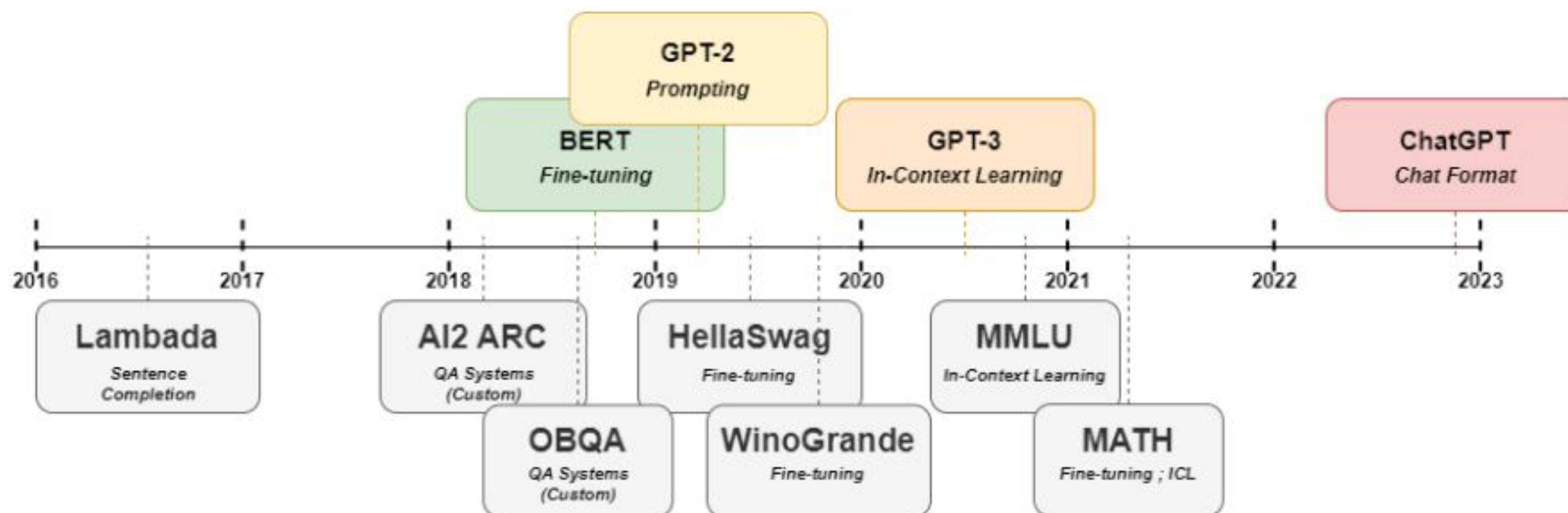
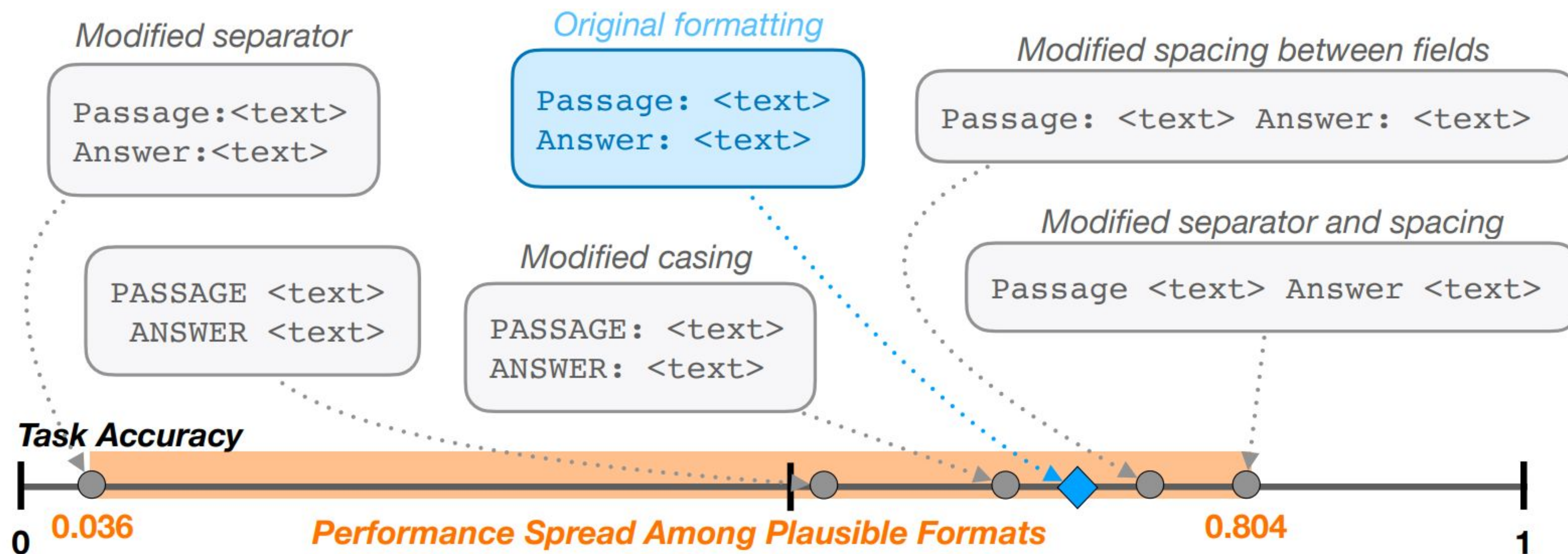


Figure 1: A timeline showing the relative release dates of a selection of notable benchmarks used to evaluate LMs, as compared to the release dates of BERT (Devlin et al., 2018), GPT-2 (Radford et al., 2019), GPT-3 (Brown et al., 2020), and ChatGPT, used as approximate stand-ins for shifts in how the community uses and therefore evaluates LMs. Common practice



# Prompt specific issues

## Sensitivity to prompt format

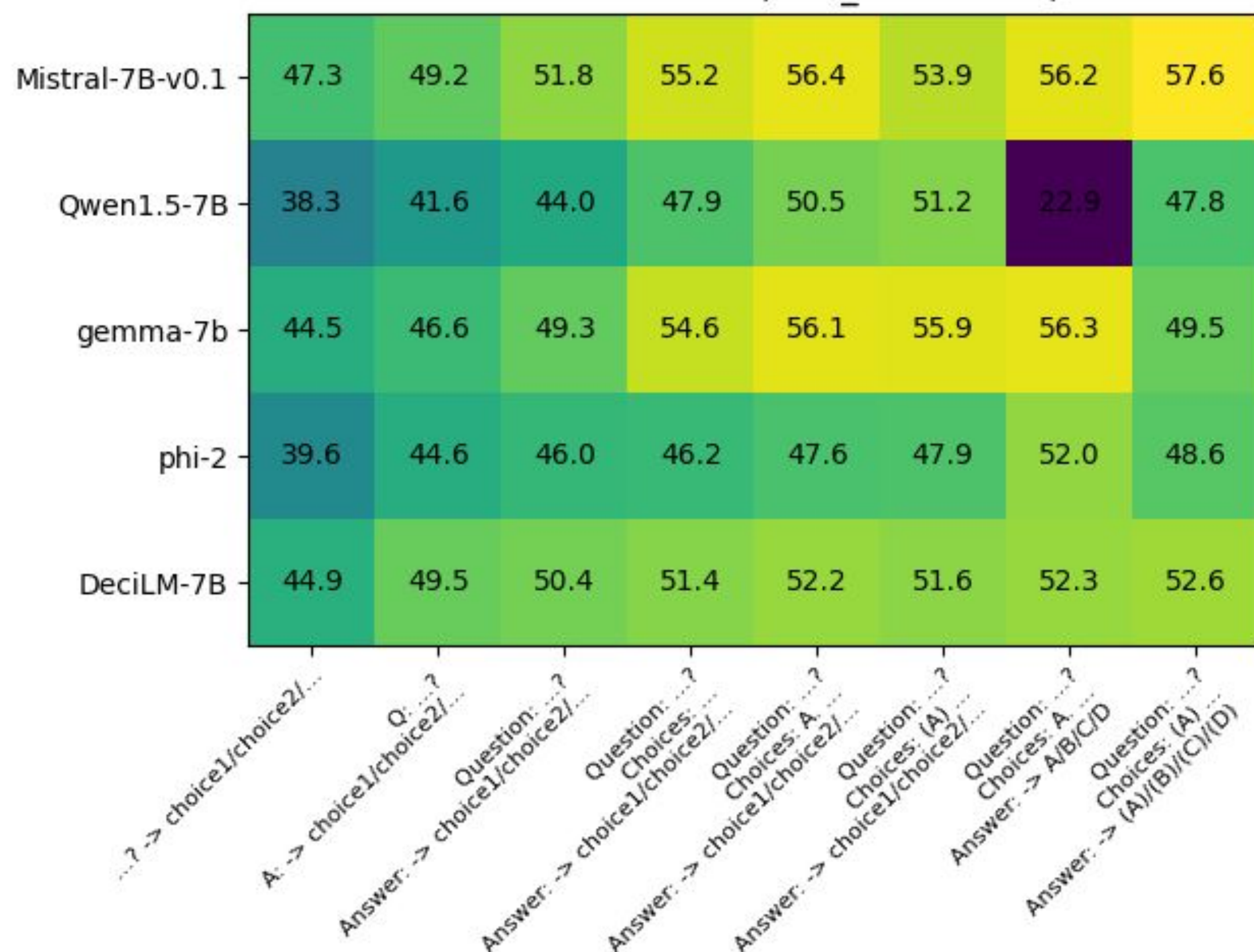




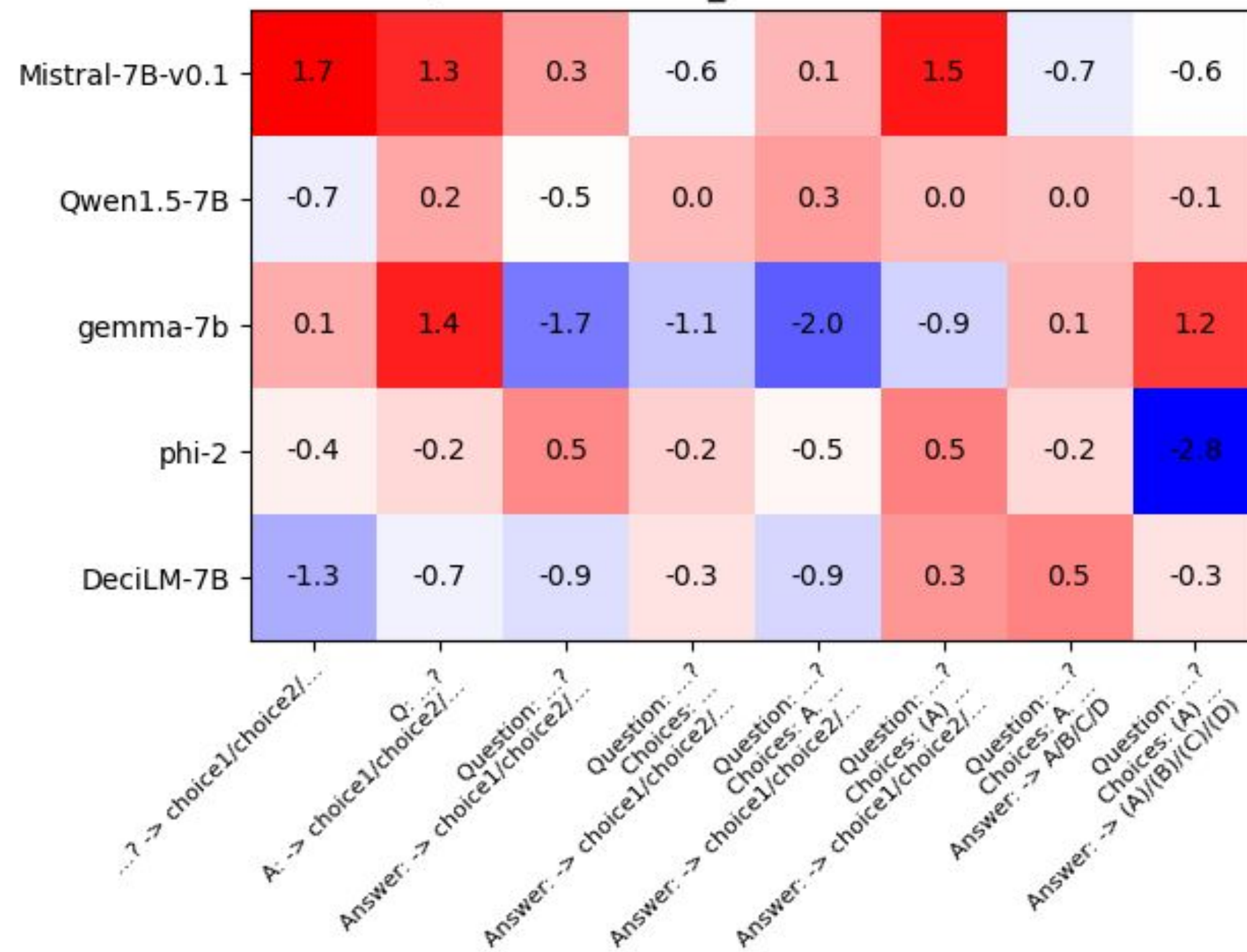
# Prompt specific issues

## Sensitivity to the prompt format or few shot ordering

Evaluation on MMLU subsets, acc\_norm score, in 5-shot.



Evaluation on MMLU subsets, variation of acc\_norm score between 2 few-shot samples ordering

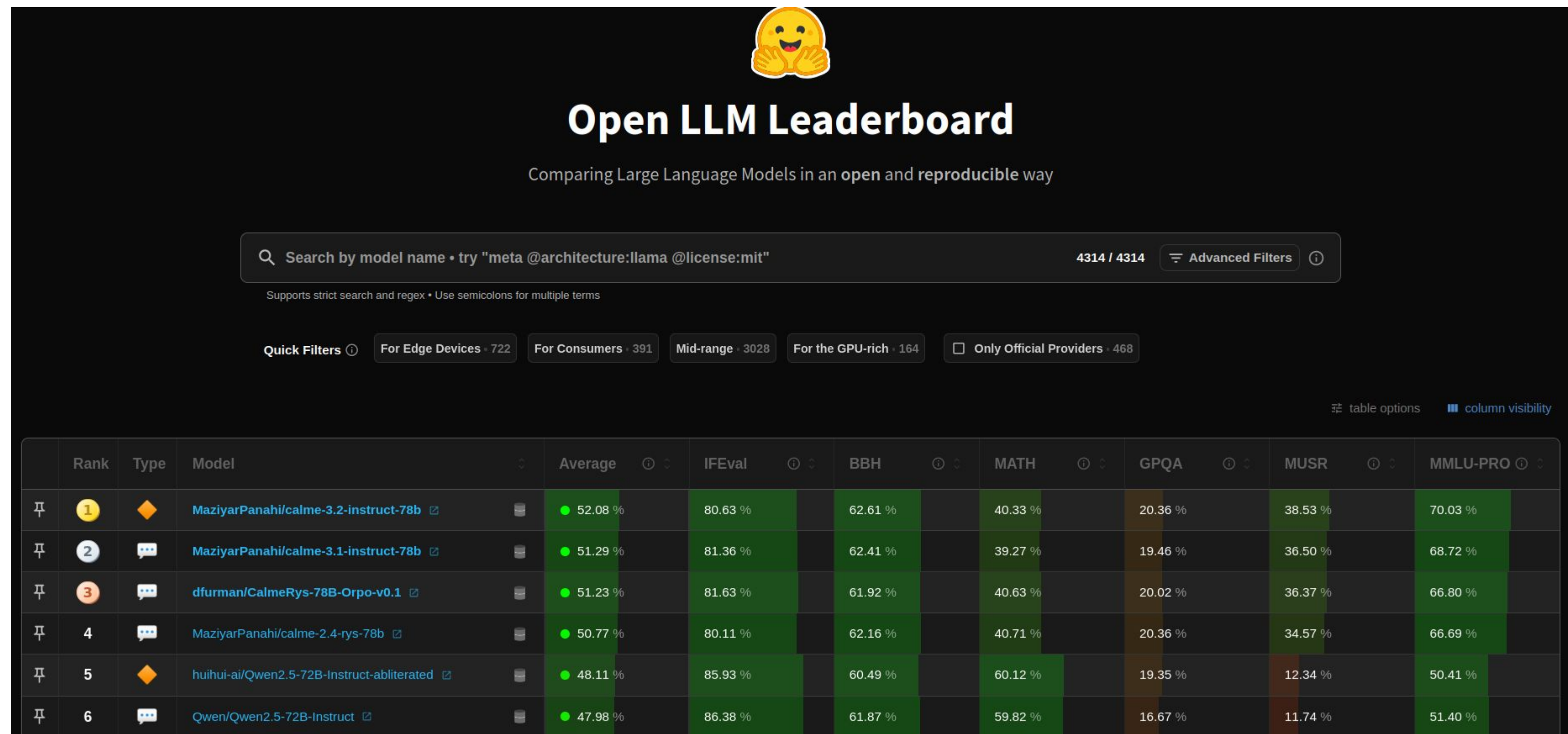


# Evaluation in practice

## Comparing models in the open: leaderboards



# Open LLM Leaderboard: 13K models over 2 years



The screenshot shows the Open LLM Leaderboard interface. At the top, there is a search bar with the text "Search by model name • try 'meta @architecture:llama @license:mit'" and a filter button labeled "Advanced Filters". Below the search bar, there are quick filters: "For Edge Devices · 722", "For Consumers · 391", "Mid-range · 3028", "For the GPU-rich · 164", and "Only Official Providers · 468". The main table displays the top 6 models with their ranks, types, and performance scores across various benchmarks.

| Rank | Type | Model  | Average | IFEval  | BBH     | MATH    | GPQA    | MUSR    | MMLU-PRO |
|------|------|--|---------|---------|---------|---------|---------|---------|----------|
| 1    | 📌    | <a href="#">MazyarPanahi/calme-3.2-instruct-78b</a>        | 52.08 % | 80.63 % | 62.61 % | 40.33 % | 20.36 % | 38.53 % | 70.03 %  |
| 2    | 💬    | <a href="#">MazyarPanahi/calme-3.1-instruct-78b</a>        | 51.29 % | 81.36 % | 62.41 % | 39.27 % | 19.46 % | 36.50 % | 68.72 %  |
| 3    | 💬    | <a href="#">dfurman/CalmeRys-78B-Orpo-v0.1</a>             | 51.23 % | 81.63 % | 61.92 % | 40.63 % | 20.02 % | 36.37 % | 66.80 %  |
| 4    | 💬    | <a href="#">MazyarPanahi/calme-2.4-rys-78b</a>             | 50.77 % | 80.11 % | 62.16 % | 40.71 % | 20.36 % | 34.57 % | 66.69 %  |
| 5    | 📌    | <a href="#">huihui-ai/Qwen2.5-72B-Instruct-abliterated</a> | 48.11 % | 85.93 % | 60.49 % | 60.12 % | 19.35 % | 12.34 % | 50.41 %  |
| 6    | 💬    | <a href="#">Qwen/Qwen2.5-72B-Instruct</a>                  | 47.98 % | 86.38 % | 61.87 % | 59.82 % | 16.67 % | 11.74 % | 51.40 %  |

<https://huggingface.co/open-llm-leaderboard/>



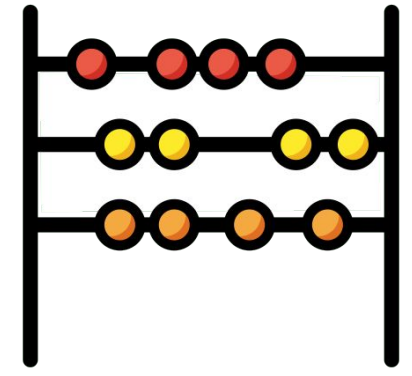
# Leaderboards on the Hub: 200 community-led benchmarks

**Leaderboards on the Hub**  
Discover and explore all leaderboards from the Hugging Face community

|                  |                   |                        |                 |               |                |             |            |
|------------------|-------------------|------------------------|-----------------|---------------|----------------|-------------|------------|
| Code • 17        | Math • 18         | Biology • 1            | Chemistry • 1   | Physics • 1   | Image • 34     | Video • 17  | Audio • 14 |
| Text • 103       | 3D • 2            | Embeddings • 10        | RAG • 6         | Reasoning • 6 | Agentic • 11   | Safety • 17 |            |
| Performance • 22 | Hallucination • 4 | Medical • 7            | Financial • 7   | Legal • 3     | Commercial • 1 |             |            |
|                  |                   | Language Specific • 71 | Translation • 1 |               |                |             |            |

<https://huggingface.co/spaces/OpenEvals/find-a-leaderboard>

Evaluation in practice  
Knowing where we are going  
Evaluations to follow this year



# AIME/Frontier Math

## AIME - American Invitational Mathematics Examination

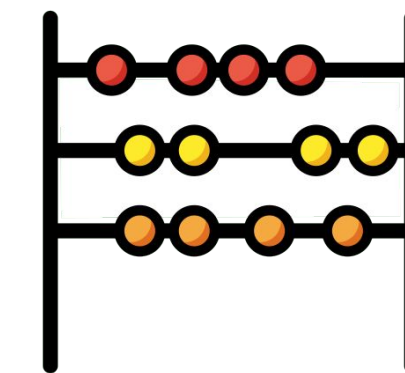
- High school level olympiad math problem solving
- Fully public, annually updated
- Max scores: ~30 to 40% (on 2025 and 2024 editions)

## FrontierMath

- Expert level math problems, written by hand
  - novel + unpublished + verifiable/guessproof + verified
- Fully private, possible contamination of Open AI models
- Max scores: ~2% (25% for OpenAI o3)



# FrontierMath example



## Testing Artin's primitive root conjecture

Problem    Solution

For a positive integer  $n$ , let  $v_p(n)$  denote the largest integer  $v$  such that  $p^v \mid n$ . For a prime  $p$  and  $a \not\equiv 0 \pmod{p}$ , let  $\text{ord}_p(a)$  denote the smallest positive integer  $o$  such that  $a^o \equiv 1 \pmod{p}$ . For  $x > 0$ , let

$$\text{ord}_{p,x}(a) = \prod_{\substack{q \leq x \\ q \text{ prime}}} q^{v_q(\text{ord}_p(a))} \prod_{\substack{q > x \\ q \text{ prime}}} q^{v_q(p-1)}.$$

Let  $S_x$  denote the set of primes  $p$  for which

$$\text{ord}_{p,x}(2) > \text{ord}_{p,x}(3),$$

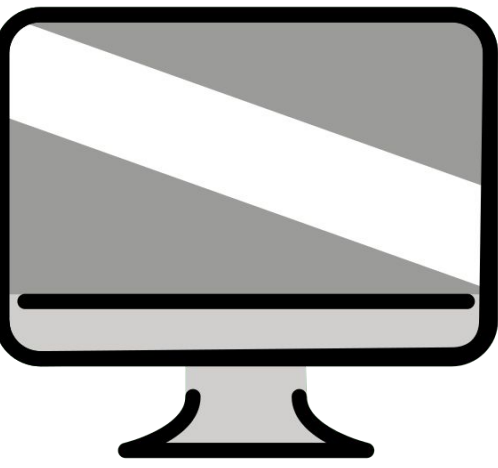
and let  $d_x$  denote the density

$$d_x = \frac{|S_x|}{|\{p \leq x : p \text{ is prime}\}|}$$

of  $S_x$  in the primes. Let

$$d_\infty = \lim_{x \rightarrow \infty} d_x.$$

Compute  $\lfloor 10^6 d_\infty \rfloor$ .



# SWE-Bench Verified/SWE-Arena

## SWE-Bench

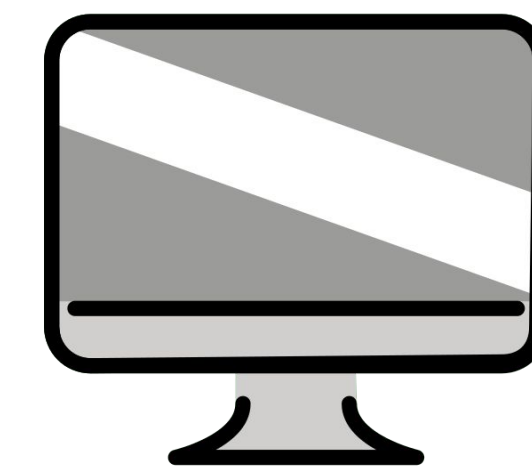
- Issue-pull request pairs from github: models have to generate code which solves the post PR behavior
- Verified subset: manually annotated
- Max scores: ~50%

## SWE-Arena

- "Battle" of code model across languages and tasks
- Includes a sandbox
- Associated leaderboard not out yet



# SWE-Bench example



### Model Input

**Instructions** • 1 line  
You will be provided with a partial code base and an issue statement explaining a problem to resolve.

**Issue** • 67 lines  
napoleon\_use\_param should also affect "other parameters" section Subject: napoleon\_use\_param should also affect "other parameters" section  
### Problem  
Currently, napoleon always renders the Other parameters section as if napoleon\_use\_param was False, see source

```
def _parse_other_parameters_section(self, se...
    # type: (unicode) -> List[unicode]
    return self._format_fields(_('Other Para...

def _parse_parameters_section(self, section):
    # type: (unicode) -> List[unicode]
    fields = self._consume_fields()
    if self._config.napoleon_use_param: ...
```

**Code** • 1431 lines

- ▶ README.rst • 132 lines
- ▶ sphinx/ext/napoleon/docstring.py • 1295 lines
- ▶ Additional Instructions • 57 lines

### Gold Patch

```
sphinx/ext/napoleon/docstring.py
    def _parse_other_parameters_section(self, section: str) -> List[str]:
-     return self._format_fields(_('Other Parameters'), self._consume_fields())
+     if self._config.napoleon_use_param:
+         # Allow to declare multiple parameters at once (ex: x, y: int)
+         fields = self._consume_fields(multiple=True)
+         return self._format_docutils_params(fields)
+     else:
+         fields = self._consume_fields()
+         return self._format_fields(_('Other Parameters'), fields)
```

### Generated Patch

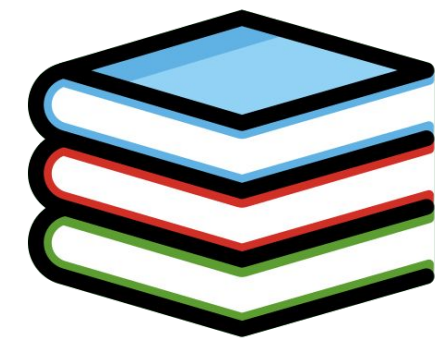
```
sphinx/ext/napoleon/docstring.py
    def _parse_other_parameters_section(self, section: str) -> List[str]:
-     return self._format_fields(_('Other Parameters'), self._consume_fields())
+     return self._format_docutils_params(self._consume_fields())
```

### Generated Patch Test Results

```
PASSED NumpyDocstringTest (test_yield_types)
PASSED TestNumpyDocstring (test_escape_args_and_kwargs 1)
PASSED TestNumpyDocstring (test_escape_args_and_kwargs 2)
PASSED TestNumpyDocstring (test_escape_args_and_kwargs 3)
PASSED TestNumpyDocstring (test_pep526_annotations)
FAILED NumpyDocstringTest (test_parameters_with_class_reference)
FAILED TestNumpyDocstring (test_token_type_invalid)
===== 2 failed, 45 passed, 8 warnings in 5.16s =====
```

Figure 6: We show an example of an formatted task instance, a model prediction, and the testing framework logs. In the patches, red highlights are deletions. Green highlights are additions.





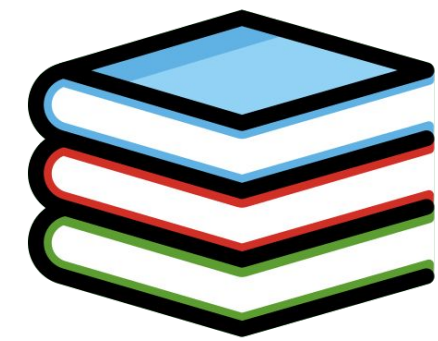
# GPOQA/HLE

## Google Proof graduate Question Answers

- PhD level knowledge questions in chemistry, physics, biology
- Public
- Max scores: ~70%

## Humanity's last exam

- Expert level knowledge questions across topics (sometimes require reasoning)
- Multimodal
- Max scores: ~10%



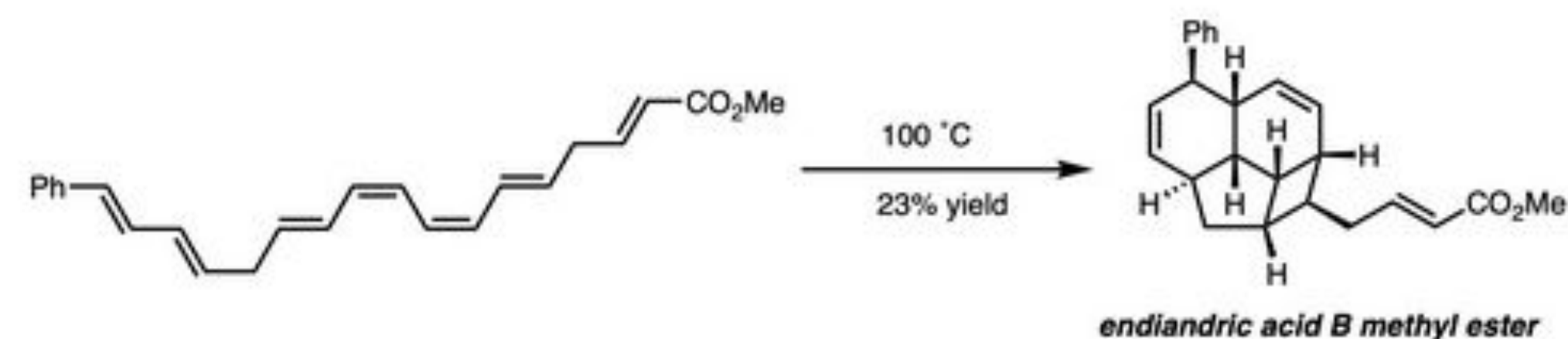
# Humanity's last exam examples

Question:



Here is a representation of a Roman inscription, originally found on a tombstone. Provide a translation for the Palmyrene script. A transliteration of the text is provided: RGYN<sup>o</sup> BT HRY BR <sup>c</sup>T<sup>o</sup> HBL

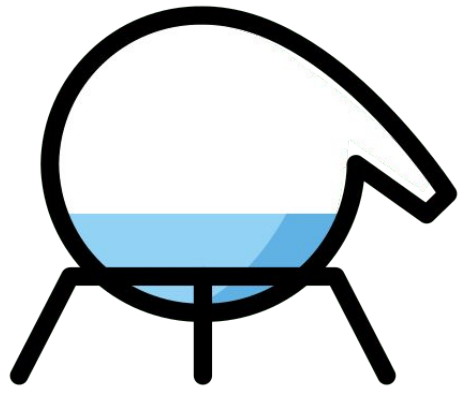
Question:



The reaction shown is a thermal pericyclic cascade that converts the starting heptaene into endiandric acid B methyl ester. The cascade involves three steps: two electrocyclizations followed by a cycloaddition. What types of electrocyclizations are involved in step 1 and step 2, and what type of cycloaddition is involved in step 3?

Provide your answer for the electrocyclizations in the form of  $[n\pi]$ -con or  $[n\pi]$ -dis (where  $n$  is the number of  $\pi$  electrons involved, and whether it is conrotatory or disrotatory), and your answer for the cycloaddition in the form of  $[m+n]$  (where  $m$  and  $n$  are the number of atoms on each component).





# SciCode/DAB Step

## SciCode

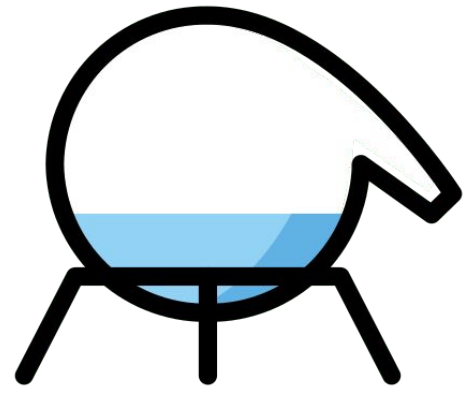
- Code generation problems to solve realistic scientific research problems, in Python
- Public
- Max scores: ~5% on the main problems

## Data Agent Benchmark Step

- Data analysis problems on real life data requiring multistep problem solving
- Questions public, answers private
- Max scores: ~16% on the hard set, 73% on the easy set



# SciCode example



## Main Problem

**Question:** Generate an array of Chern numbers for the Haldane model on a hexagonal lattice by sweeping the following parameters: [MORE QUESTION TEXT]

### Docstrings

```
def compute_chern_number_grid(delta, a, t1, t2, N):  
    """  
    Args:  
    delta (float): The grid size in kx and ky axis.  
    [MORE ARGUMENTS]  
  
    Returns:  
    results (ndarray): 2D array of shape(N, N), the Chern numbers.  
    [MORE RETURN VALUES]  
    """
```

### Dependencies

```
import numpy as np  
import cmath  
from math import pi, sin, cos, sqrt
```

## Subproblem 1

**Background:** Source: [CITATION]  
 $\{a_i\}$  are the vectors from a B site to its three nearest-neighbor A sites, then we have [MORE BACKGROUND TEXT]

**Question:** Write a Haldane model Hamiltonian on a hexagonal lattice.

### Docstrings

```
def calc_hamiltonian(kx, ky, a, t1, t2, phi, m):  
    """  
    Function to generate the Haldane Hamiltonian.  
  
    Args:  
    kx (float): The x component of the wavevector.  
    [MORE ARGUMENTS]  
  
    Returns:  
    hamiltonian (ndarray): matrix of shape(2, 2).  
    """
```

## Subproblem 2

**Background:** Source: [CITATION]  
Here we can discretize the two-dimensional Brillouin zone into grids with step [MORE BACKGROUND TEXT]

**Question:** Calculate the Chern number using the Haldane Hamiltonian.

### Docstrings

```
def compute_chern_number(delta, a, t1, t2, phi, m):  
    """  
    Function to compute the Chern number.  
  
    Args:  
    delta (float): The grid size in kx and ky axis.  
    [MORE ARGUMENTS]  
  
    Returns:  
    chern_number (float): The Chern number.  
    """
```

## Subproblem 3

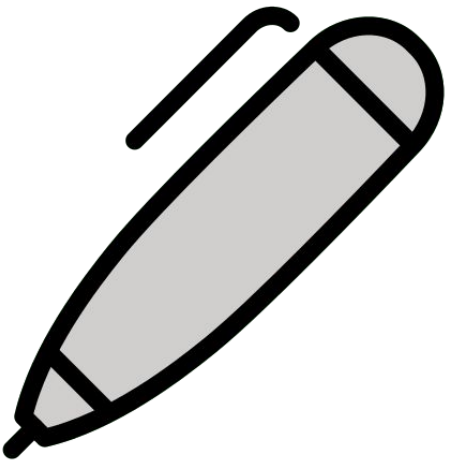
**Question:** Here we can discretize the two-dimensional Brillouin zone into grids with step [MORE QUESTION TEXT]

### Docstrings

```
def compute_chern_number_grid(delta, a, t1, t2, N):  
    """  
    Function to calculate the Chern numbers.  
  
    Args:  
    delta (float): The grid size in kx and ky axis for discretizing the  
    Brillouin zone.  
    [MORE ARGUMENTS]  
  
    Returns:  
    results (ndarray): 2D array of shape(N, N), The Chern numbers.  
    [MORE RETURN VALUES]  
    """
```



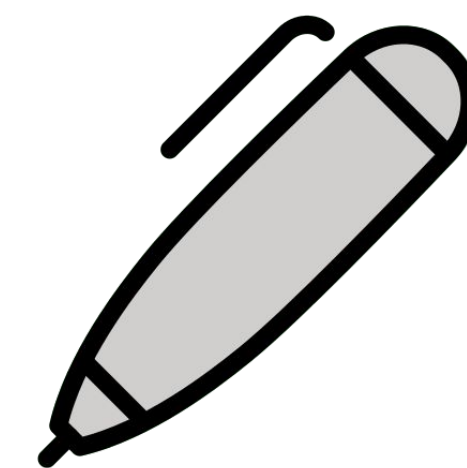
# GAIA - General AI Assistant benchmark



- Questions requiring a combination of tool use, multistep reasoning, and multimodality to solve
- Questions public, answers private
- Max scores: ~40% for the level 3 questions



# GAlA examples



## Level 1

**Question:** What was the actual enrollment count of the clinical trial on *H. pylori* in acne vulgaris patients from Jan-May 2018 as listed on the NIH website?

**Ground truth:** 90

## Level 2



**Question:** If this whole pint is made up of ice cream, how many percent above or below the US federal standards for butterfat content is it when using the standards as reported by Wikipedia in 2020? Answer as + or - a number rounded to one decimal place.

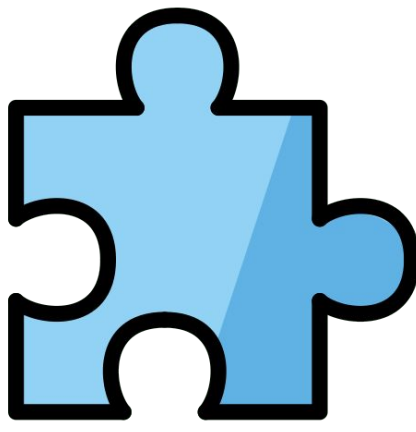
**Ground truth:** +4.6

## Level 3

**Question:** In NASA's Astronomy Picture of the Day on 2006 January 21, two astronauts are visible, with one appearing much smaller than the other. As of August 2023, out of the astronauts in the NASA Astronaut Group that the smaller astronaut was a member of, which one spent the least time in space, and how many minutes did he spend in space, rounded to the nearest minute? Exclude any astronauts who did not spend any time in space. Give the last name of the astronaut, separated from the number of minutes by a semicolon. Use commas as thousands separators in the number of minutes.

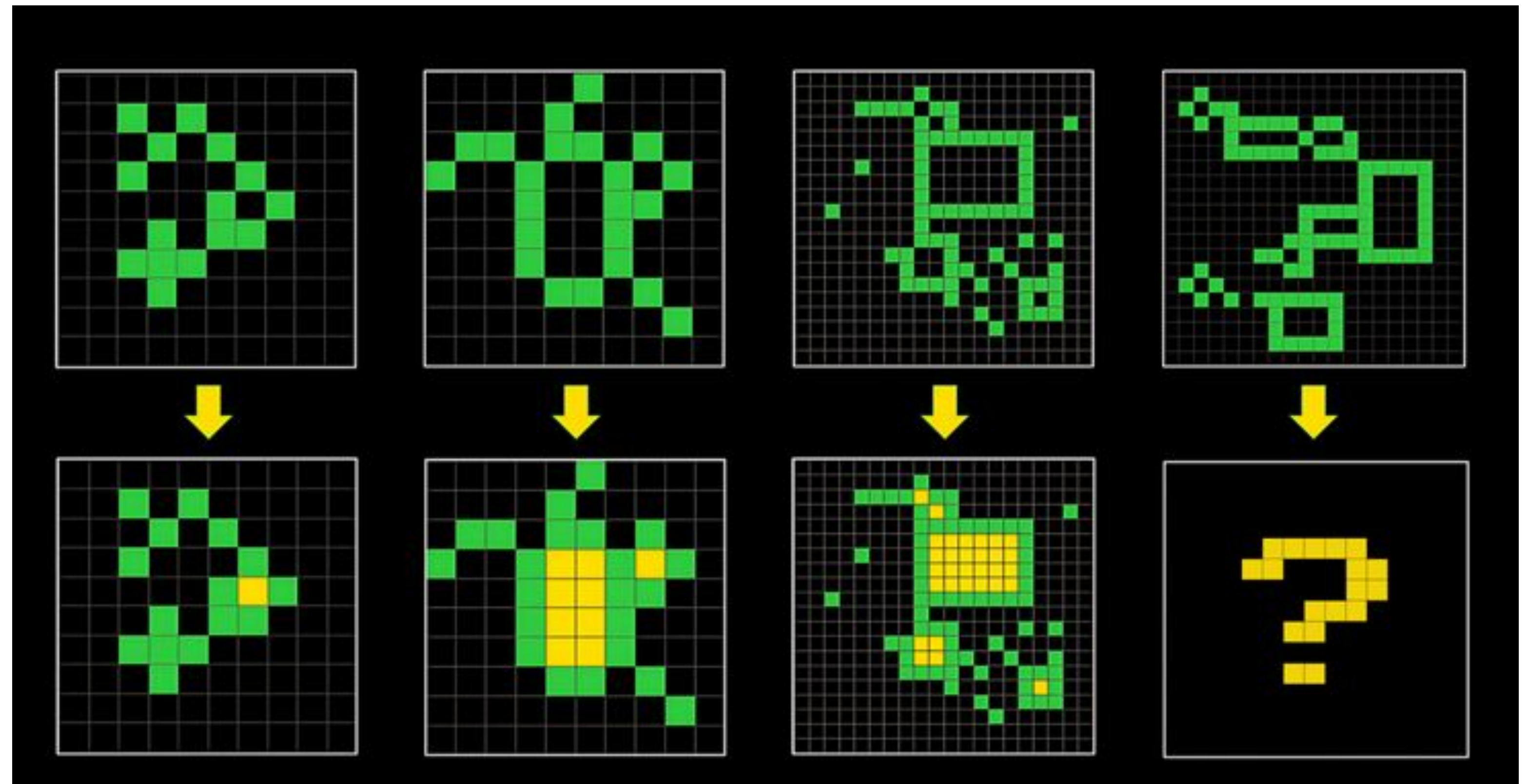
**Ground truth:** White; 5876





# ARC-AGI

- Puzzle like grid completion challenges requiring pattern matching/reasoning
- Private
- Max scores: ~53%



# Last thoughts



# Open thoughts & questions

- Evals are only interesting if they are hard - Saturation
- Rankings only hold as long as everyone plays fair - Contamination
- Comparing to humans make little sense - Baselines
- Making sure an eval is a good proxy for a capability is hard
- Are we looking in the correct direction?

# Trends to follow in 2025

- Synthetic evaluations
  - o Custom use cases
- Shift in evaluations topics
  - o Agentic
- Performance evaluation focus
  - o Inference cost
  - o On device models
  - o Environmental footprint





# Questions







OpenEvals team at

