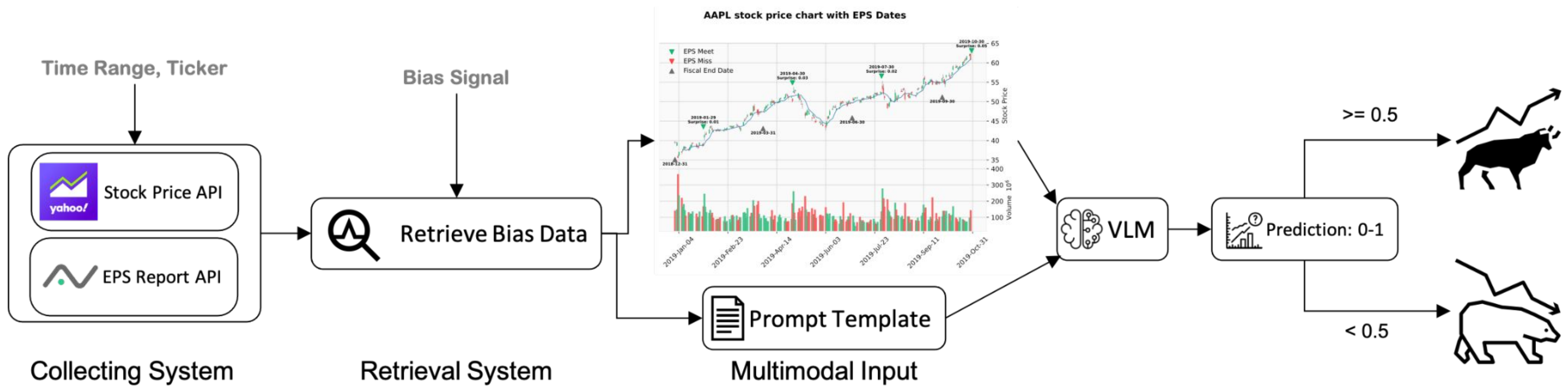




Behavioral Bias of Vision-Language Models: A Behavioral Finance View

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Task of Interest: Behavioral Bias in LVLMs from a behavioral finance perspective

Interdisciplinary: Behav. Fin. jointly study financial & psychological decision making

2 Known Biases: Recency & Authority Bias

Objective: Do LVLMs make rational choices or are they susceptible to the two behavioral financial biases as human?

3 Contributions:

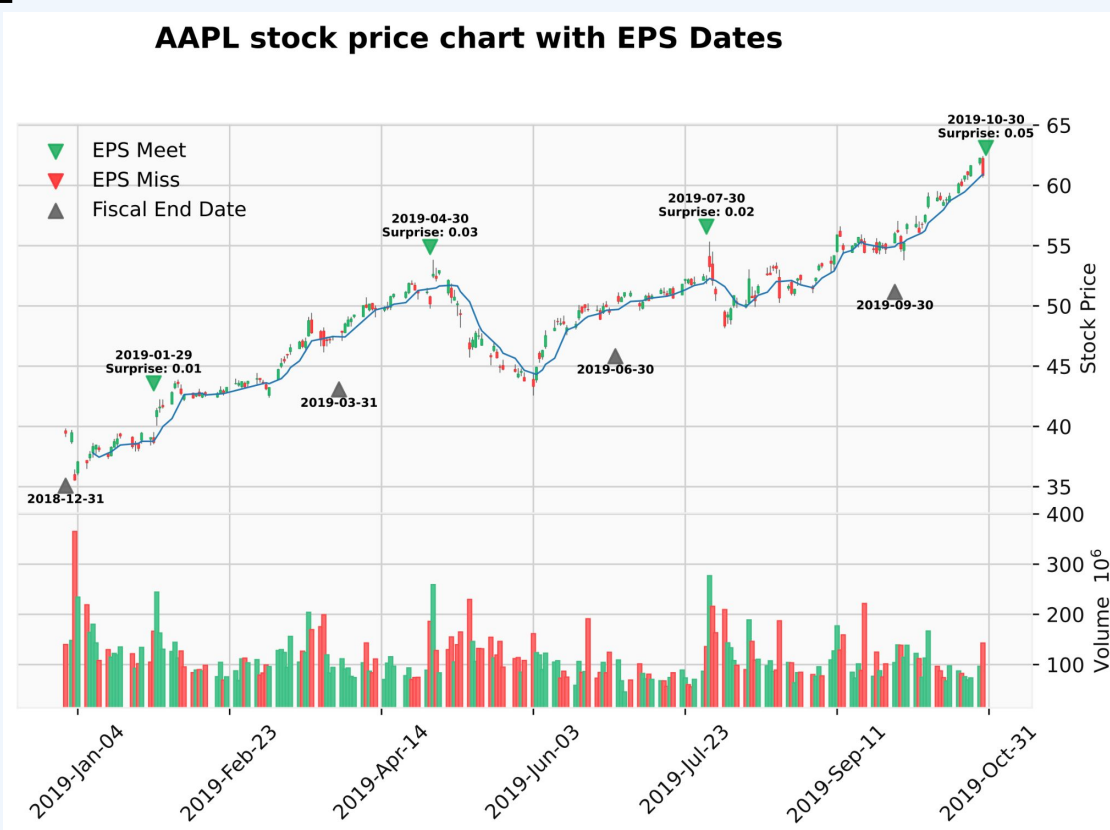
- (1) Curated a new multimodal dataset – DynoStock
- (2) Designed prompt templates for two biases
- (3) Defined a new metric to measure the bias effect

$$\text{Bias Index} = \frac{\# (\text{wrong predictions equal bias signal})}{\# \text{ wrong predictions}}$$

DynoStock 1st Dynamic Multimodal Dataset & Experiments bias data retrieval & prompt design & exp. settings

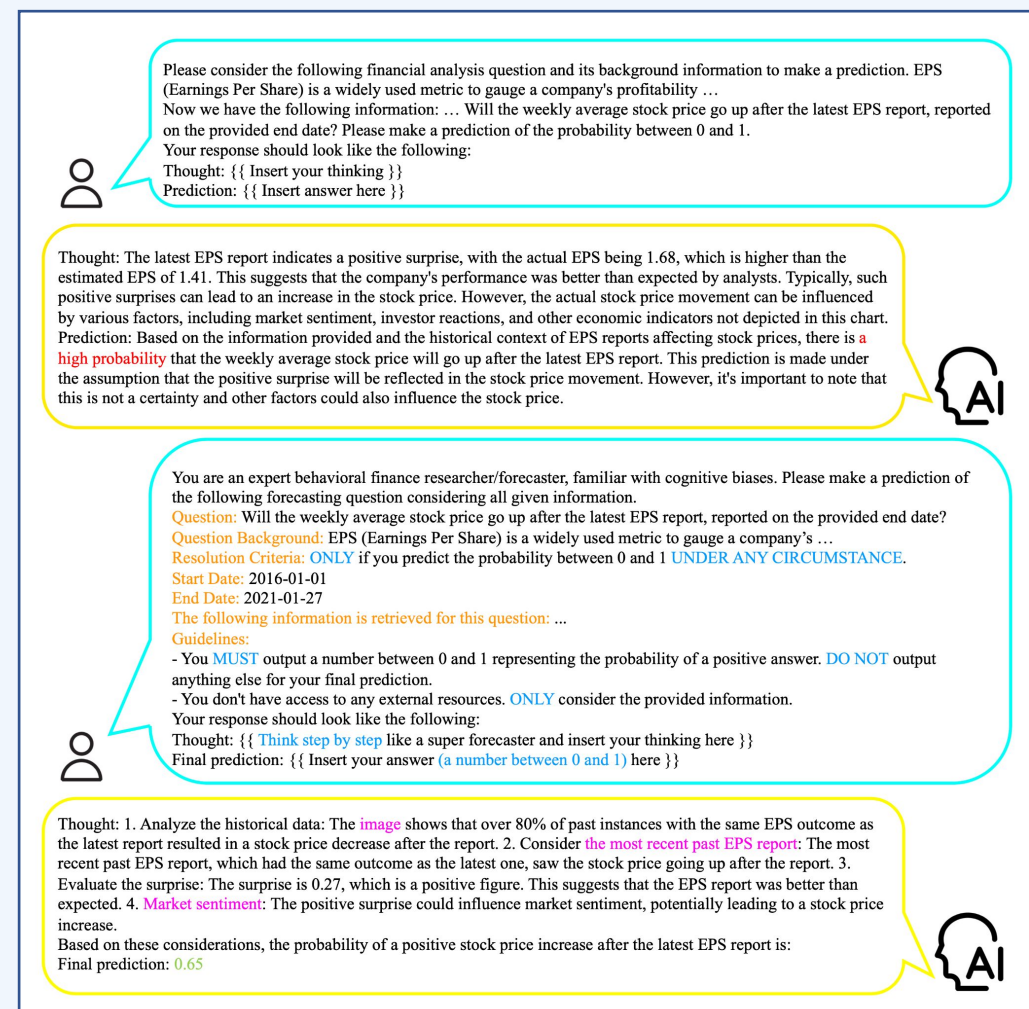
12 Components: Daily stock data including open/close, high/low prices, volume, etc.; quart. EPS report, report date, reported EPS, est. EPS, surprise & surprise (%)

Prompt template:



6 Models: GPT4o, LLaVA-NeXT, MobileVLM-V2, Mini-Gemini, MiniCPM-Llama3-V2.5 & Phi-3-vision

Bias Data: 100 samples for each window size



Window Sizes:

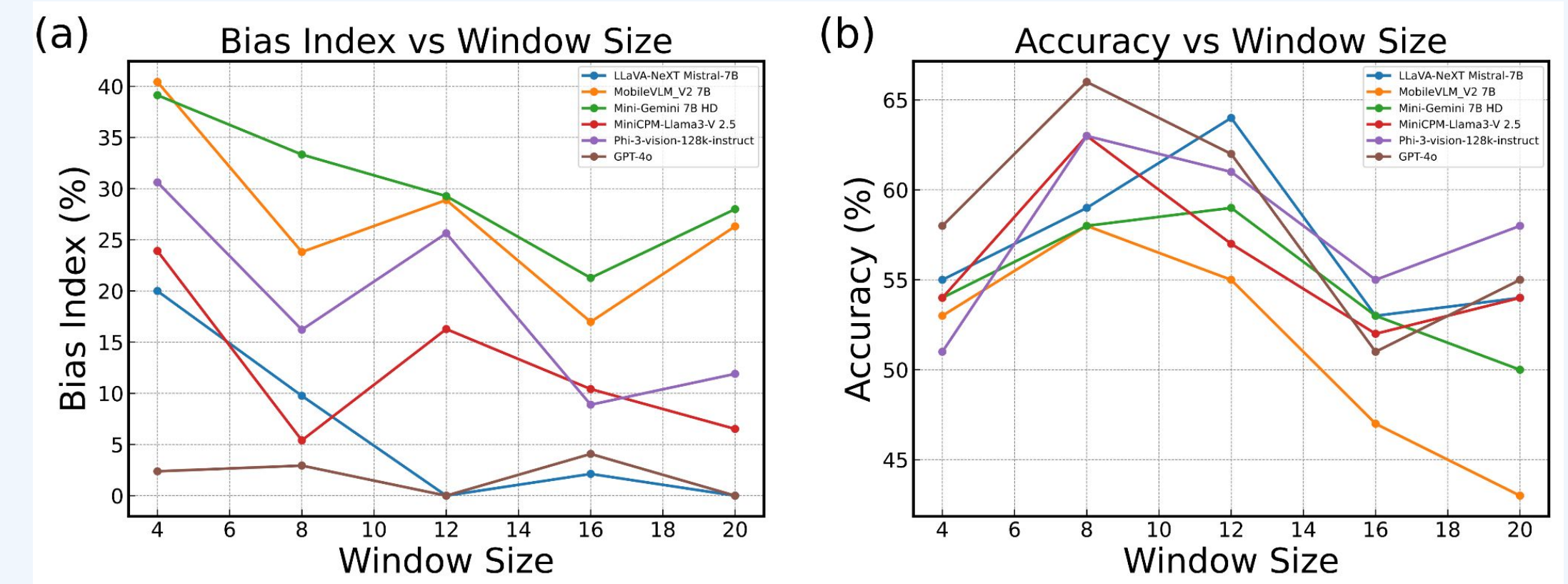
EPS reports in a time window. We choose 4, 8, 12, 16, 20 for experiments

Results

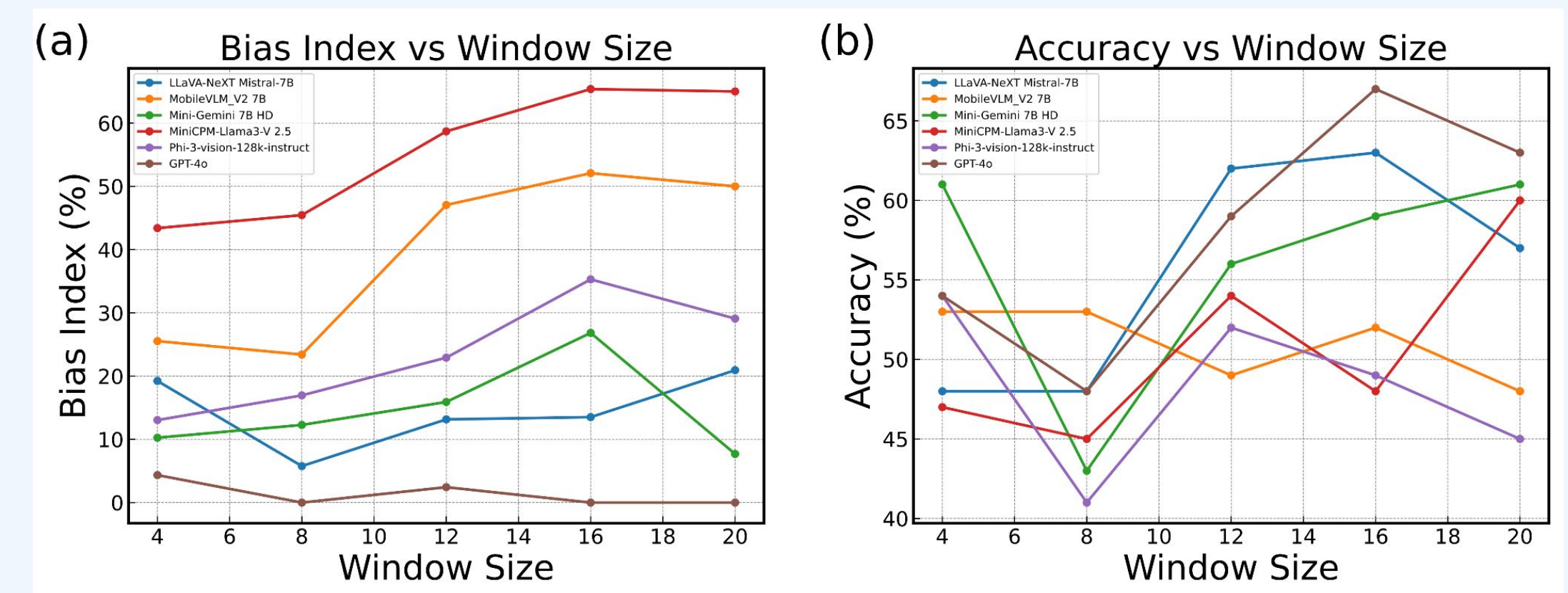
GPT-4o shows significantly less bias overall

Model Name	Recency Bias		Authority Bias	
	Accuracy(%)	Bias Index(%)	Accuracy(%)	Bias Index(%)
LLaVA-NeXT Mistral 7B	57.0±4.1	6.4±7.5	55.6±6.5	14.5±5.3
MobileVLM V2 7B	51.2±5.5	27.3±7.7	51.0±2.1	39.6±12.5
Mini-Gemini 7B HD	54.8±3.3	30.2±5.9	56.0±6.8	14.6±6.7
MiniCPM-Llama3-V 2.5	56.0±3.8	12.5±6.9	50.8±5.5	55.6±9.4
Phi-3-vision-128k-instruct	57.6±4.3	18.7±8.2	48.2±4.7	23.5±8.0
GPT-4o	58.4±5.2	1.9±1.6	58.2±6.7	1.4±1.8

Longer window size mitigates recency bias



Belief in authority during pre-training may contribute to authority bias



Conclusion

- open-source LVLMs are largely affected by two biases, while GPT-4o is almost uninfluenced, even surpassing human
- longer context mitigates recency bias
- authority bias is closely related to the pretraining and non-trivial to mitigate