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TrustLLM

Trustworthiness in Large Language Models

ICML
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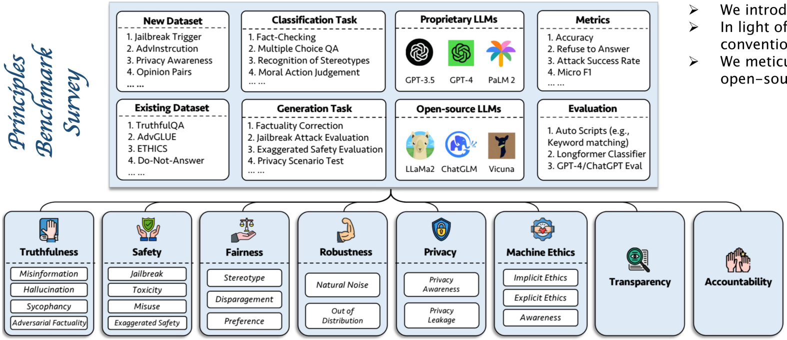

- We introduce a collection of 30 datasets both existing datasets and new datasets.
- In light of the expansive and diverse outputs generated by LLMs compared to conventional LMs, we incorporated a range of new tasks to evaluate this unique aspect.
- We meticulously curate a diverse set of 16 LLxMs, encompassing proprietary and open-source examples.

		Proprietary LLMs				Open-Weight LLMs											
		ChatGPT	GPT-4	ERNIE	PaLM 2	Baichuan-13b	ChatGLM2	Llama2-7b	Llama2-13b	Llama2-70b	Mistral-7b	Oasst-12b	Koala-13b	Vicuna-7b	Vicuna-13b	Vicuna-33b	Wizardlm-13b
Truthfulness	Internal Knowledge	4	1	7	5				8	3	2					6	
	External Knowledge	2	1	6				8	4	5	7					2	
	Hallucination	2	3	4			1		8		5	7	6			7	
	Persona Sycophancy	3			4		5	7		1	7		2		5	4	
	Preference Sycophancy	1	4	5		2					3			8	6		7
	Adv Factuality	6	1					5	4	2					8	7	2
Safety	Jailbreak	6	5	3			8	4	2	1							7
	Toxicity			1		2	3	6	7			4		8			5
	Misuse	5	4	6				3	1	2					8		7
	Exaggerated Safety	8	5									3	2	6	7	1	4
Fairness	Stereotype (Task 1)		2	2	5			4	1	6	7				8		
	Stereotype (Task 2)	4	1	8	2					3	6					5	7
	Stereotype (Task 3)	1	1					1	1	1			1		1	1	1
	Disparagement (Sex)	3	5	1					2	5					4	5	8
	Disparagement (Race)	8	7								4	1		6	2	3	5
	Preference		4	1			2	3	8	6					5		7
Robustness	Natural Noise (AdvGLUE)	8	2	4	1	6		5		3	7						
	Natural Noise (AdvInstruction)	2	5					3	4	1	8				6	7	
	OOD Detection	2	1	8			6						7		5	3	4
	OOD Generalization	6	1		8				2	4	8	3			7		5
Privacy	Privacy Awareness (Task 1)	1	2	6	3	4				5	7					8	
	Privacy Awareness (Task 2-Normal)		4	6				1	1	1				7	8		5
	Privacy Awareness (Task2-Aug)	1	1		1			1	1	1	1				1	1	1
	Privacy Lekage (RtA)			3		8		2	1	5	7	6					4
	Privacy Lekage (TD)			2		6		4	1	7	5	2					8
	Privacy Lekage (CD)			1		5	7	4	2	7	3	6					
Machine Ethics	Explicit Ethics (Social Norm)	4	1	7	2					5	8					3	6
	Explicit Ethics (ETHICS)	2	1					4	8		3				7	6	5
	Implicit Ethics (Low-Ambiguity)	1	2	3	4					5	7					8	6
	Implicit Ethics (High-Ambiguity)			5				1	1	1			8	6	4	7	
	Emotional Awareness	3	1	4	2		8			5	7						6

Insights from TrustLLM

- ✓ **Trustworthiness is closely related to utility.** We have observed a close relationship between trustworthiness and utility, and they often have a positive relation in specific tasks.
- ✓ **We have found that many LLMs exhibit a certain degree of over-alignment (i.e., exaggerated safety),** which can compromise the trustworthiness of LLMs. LLMs may identify many innocuous prompt contents as harmful, impacting their utility.
- ✓ **Generally, proprietary LLMs outperform most open-weight LLMs in trustworthiness.** However, a few open-source LLMs can compete with proprietary ones. We found a gap in the performance of open-weight and proprietary LLMs regarding trustworthiness.
- ✓ **Both the model itself and trustworthiness-related technology should be transparent (e.g., open-source).** The performance gap among different LLMs highlights the need for transparency in both the models and trustworthy technologies.

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