GEN AI PRESENTATION

INTRODUCTION

· Why should we care about generative AI?



Source: OpenAl

TOOLS

A curated list: <u>https://github.com/steven2358/awesome-generative-ai</u> Leaderboards:

- LMSYS Chatbot Arena Leaderboard
- LLM-Perf Leaderboard

Text

- GPT4
 - 175 billion parameters
- <u>Llama 2</u> (Open source model by Meta)
 - 70 billion parameters
 - approx. 10TB of text
 - 6000 GPUs for 12 days, approx. \$2M
- Mistral Au Larg
 - · Launched two hours ago

- Tops some reasoning benchmarks
- Text-to-speech
 - Whispe
 - Eleven lab:

Image

- Dall E 2
- <u>Midjourney</u>

Video

- <u>runway</u>
- pika.ar
- Sora
- <u>D-ID</u>

Other

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 Search
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- <u>Perplexity</u>
- Research
- Coding
 - Copile

SAMPLE PROMPTS

1. a) Be so kind and please write a summary outlining the Forcing axioms.

b) Pretend to be a professor with expertise in mathematics and philosophy, specialising in set theory and write a summary outlining the Forcing axioms.

- 2 a) Prove that if a is irrational, then a square root of a is also irrational, assuming a>0. First assume the opposite of what we want to prove and then derive a contradiction from this assumption.
- b) Prove that if a is irrational, then a square root of a is also irrational, assuming a>0. Use a proof by contradiction.
- 3 a) Write a proof of the claim the if A is any inductive set, then A is a subset of natural numbers. After you write it, write an evaluation of your reasoning.
 - b) Write a proof of the claim the if A is any inductive set, then A is a subset of natural numbers.
- 4 a) Write a detailed account of Maddy's set-theoretic realism and mathematical naturalism. Use this to write a one paragraph summary of her main contributions.
 - b) Write a summary of Maddy's contributions to set-theoretic realism and mathematical naturalism.
- 5 a) Use the following example and complete it "begin{enumerate} \item (0) is a number."b) Write Peano axioms in latex notation.

PROMPTING

Basic prompt strategies

- 1. Write as clear instructions as possible
- 2. Ask the model to adapt a persona
- 3. Use delimiters to clearly indicate distinct parts of the input
- 4. Specify the steps to complete a task
- 5. Specify the length of the output
- 6. Provide reference text
- 7. Instruct the model to answer with citations
 - Use the following format for to cite relevant passages ({"citation": ...}).
- 8. Split complex tasks into simpler subtasks
- 9. Recursively revise outputs

Advanced prompt strategies

- 1. Few-shot prompts
 - provide a series of examples
 - Source: Chain-of-Thought Prompting Elicits Reasoning in Large Language Models
- 2. Chain-of-thought prompting
 - · Prompt the model to spell out the reasoning steps
 - Source: Large Language Models are Zero-Shot Reasoners
- 3. Self-consistency
 - sample multiple reasoning paths
 - · Source: Self-Consistency Improves Chain of Thought Reasoning in Language Models
- 4. Knowledge generation prompting
 - · First generate contextual knowledge and then ask a question
 - · Source: Generated Knowledge Prompting for Commonsense Reasoning

FINE TUNING

- · a lot cheaper than training of base models
- need training pairs
- · results in a model that is better in a particular domain
- · can be done on both on some private models and open source models

ADDITIONAL QUESTIONS

Failures

- Hallucinations
- Biases
- · Harmful content

https://garymarcus.substack.com/p/chatgpt-has-gone-berserk

Future direction

- Augmented LMs
- · Acting / planning RL
- Multimodal prompting
- · Graph prompting
- Emergent abilities of LMs

Source



- 1. Definitional Obscurity
- 2. Falling for the Hype
- 3. Unproven Benefits
- 4. Contextlessness
- 5. Guru Authority
- 6. Operational Opacity
- 7. Curriculum Misinformation
- 8. Knowledge Gatekeeping
- 9. Irresponsible Development
- 10. Privacy and Protection Problems
- 11. Mental Diminishment
- 12. Commercialization and Infrastructuralization
- 13. Value Generation
- 14. Business Fragility
- 15. Individualization
- 16. Replacing Labour
- 17. Standardized Labour
- 18. Automated Administrative Progressivism
- 19. Outsourcing Responsibility
- 20. Bias and Discrimination
- 21. Environmental Impact

GEN AI IN LOGIC ?

- Limited research on limits of LLM capacity for formal logical reasoning
 Example: <u>Triggering Logical Reasoning Failures in Large Language Models</u>
- · Automated theorem proving applications
 - Example: Logic-LM: Empowering Large Language Models with Symbolic Solvers for Faithful Logical Reasoning
- · Are there other applications?

DISCUSSION

