fun-ai-talk

Starting soon

Let’s brainstorm how to train a better chabot than ChatGPT

Slides & Code
- github.com/hululuzhu/better-chatbot-than-chatgpt

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May 2023

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Disclaimer

- This talk is my personal voluntary effort, prepared and conducted during my personal time outside of working hours.

- All content is derived from publicly available sources, and the views expressed herein only represent my personal opinions, and do not reflect the positions of Google.

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May 2023

Agenda

First, get closer to ChatGPT

- Solid Pretrained models
- Mimic ChatGPT or Self-Align

Possibly Surpass ChatGPT in Selected Angle(s)?

- More knowledge in a subdomain
- More aligned to human preference
- Longer context, even longer than GPT4
- Lower cost of training and inference
- Better use or Reinforcement Learning (RL)
- More modalities (e.g. vision, audio) than GPT4?

Welcome interruptions and discussion any time

Split to 2 sessions with 5 mins break in the middle

Before we delve into details, any thoughts on agenda?

Get Closer first

- Pretrained models
- Mimic ChatGPT or Self-Align

Surpass?

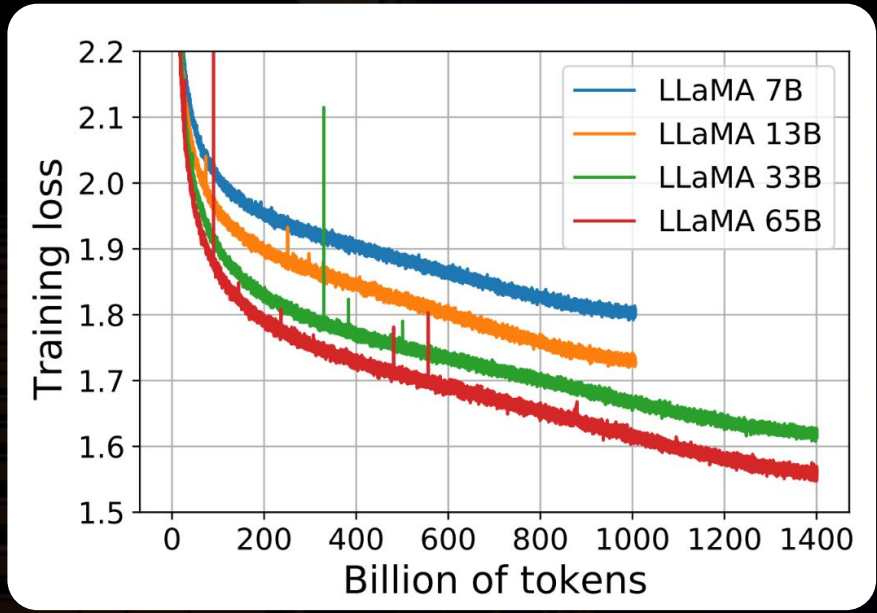
- Subdomain knowledge
- Human Preference Alignment
- Longer context
- Lower cost of training and inference
- Reinforcement Learning
- More modalities

Any thoughts? Open mic time

Get Closer to ChatGPT - Pretrained Models

LLaMa by Meta AI

- Released Feb 2023, **research only** use (in theory, cannot be used for commercial purposes)
- 7B, 13B, 33B & 65B, best **pretrained LLMs** of its size class until 05/20/2023
  - 65B LLaMa is better than GPT3 175B
- Best architectures
  - Pre-normalization [GPT3]
  - SwiGLU activation and RoPE [PaLM]
- 1T+ tokens for training!
- Max 2048 context length
  - 7B has 512 context length



Get Closer to ChatGPT - Pretrained Models

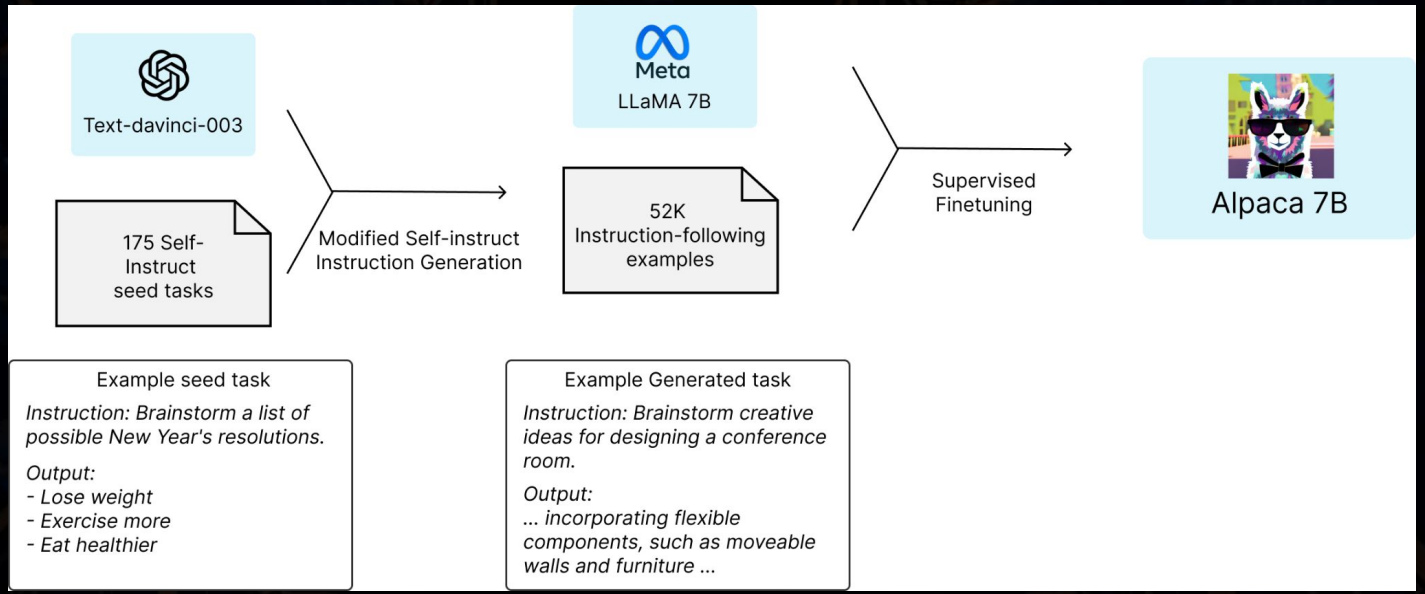
Other candidates

- ChatGLM-6B (finetuned GLM) by Tsinghua Univ, English+Chinese
  - Not for commercial
  - The most powerful GLM130B trained on 400 billion tokens (<=40% than LLaMa)
  - Mixed masked token predication and next token prediction training objectives
- MPT-7b by mosaicml.com
  - Commercial ok
  - Not best quality, but there is a 65k context length version! (2x context length than GPT4)
- RedPajama (reproduce LLaMa)
  - Commercial ok
  - Still training in progress, promising to be the best free candidate soon!
  - The preview one is close to LLaMa, 3b and 7b released here

Get Closer to ChatGPT - Mimic ChatGPT

Stanford Alpaca (~70% chatgpt)

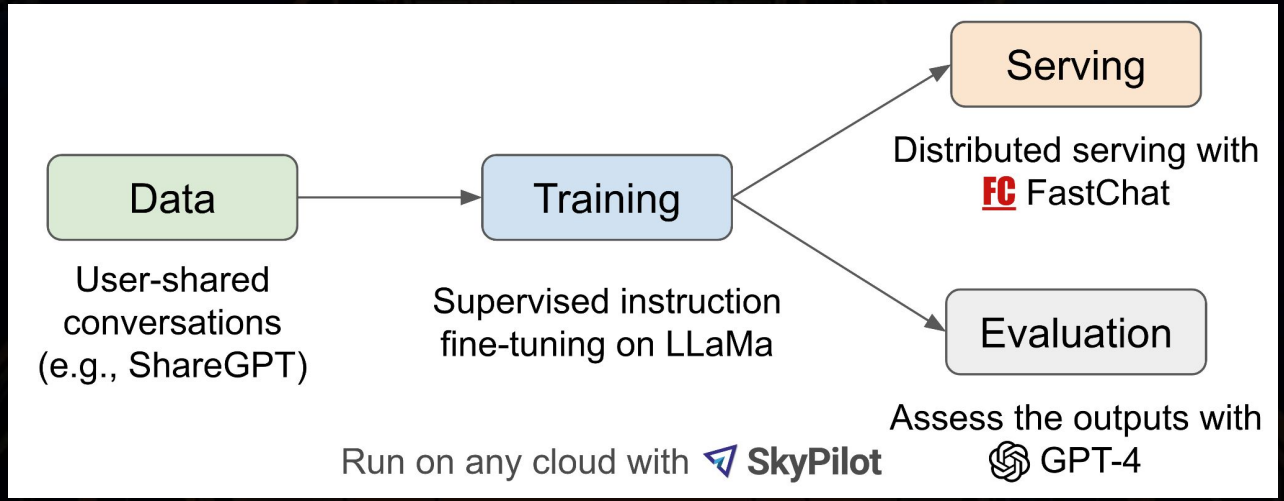
- Use GPT3.5 API as Oracle
- Sample questions (prompts) and sample answers
- Use the GPT3.5 data to finetune a 7B and 13B LLaMa
- Whole process only takes a couple of days and $600!



Get Closer to ChatGPT - Mimic ChatGPT

Berkeley Vicuna (92% chatGPT)

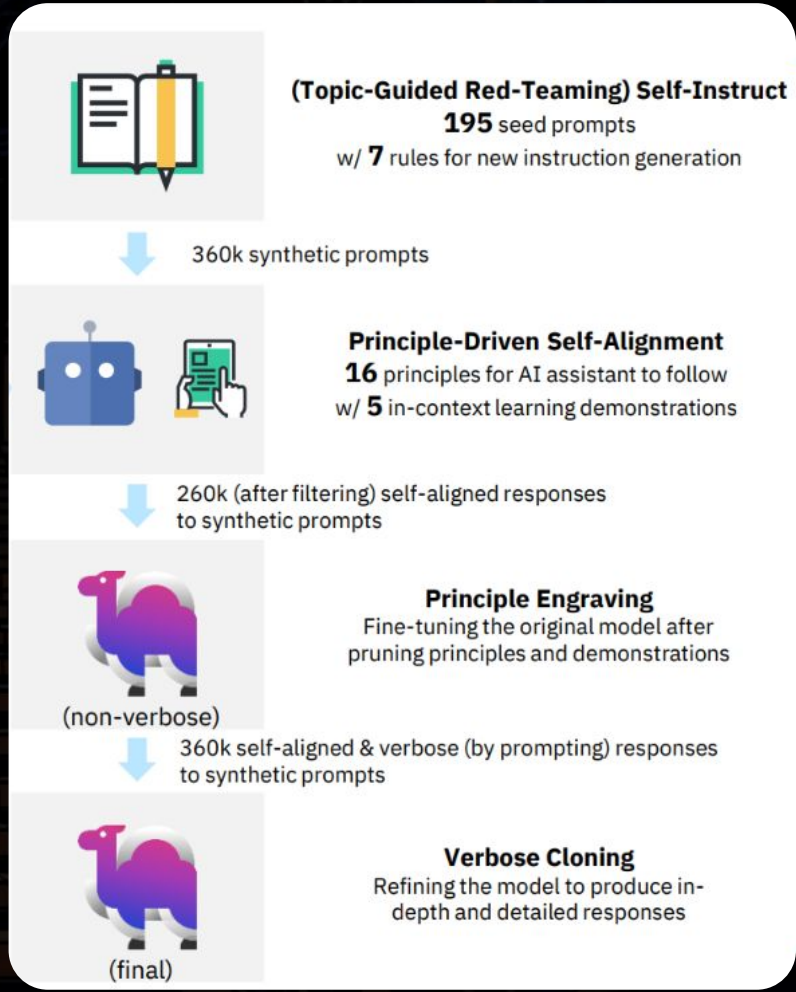
- Rely on user-shared (selected high quality) conversations (with ChatGPT)
- Evaluation is through GPT-4 (***treating GPT-4 as human labeler***)



Get Closer to ChatGPT - Self Align

Dromedary (Self-Align)

- **To be verified by industry and academia**
- No dependency on ChatGPT API or data
- Starts with LLaMA-65b
- Similar approach as Alpaca to do seed prompts
- Similar to Constitutional AI to apply “Principle” alignment with 5-shot prompt
- Finetune by pruning principles out
- Make reponses more verbose
- Claims on par with ChatGPT



More knowledgeable than ChatGPT - Domain Knowledge

Codex: Coding on top of GPT3

- **175GB** github code finetuned on GPT3 (various sizes)
  - No quality difference observed using pretrained GPT3 or from scratch, but pretrained helps converging faster
- Repeated sampling from the model is a surprisingly effective strategy for producing working solutions

Minerva: Math on top of PaLM

- **118GB** [...] scientific papers from arXiv [...] that contain mathematical expressions using LaTeX, MathJax
- few-shot prompting, chain of thought or scratchpad prompting, and majority voting, to achieve state-of-the-art performance

More knowledgeable than ChatGPT - Retrieval

Retrieval in LM training

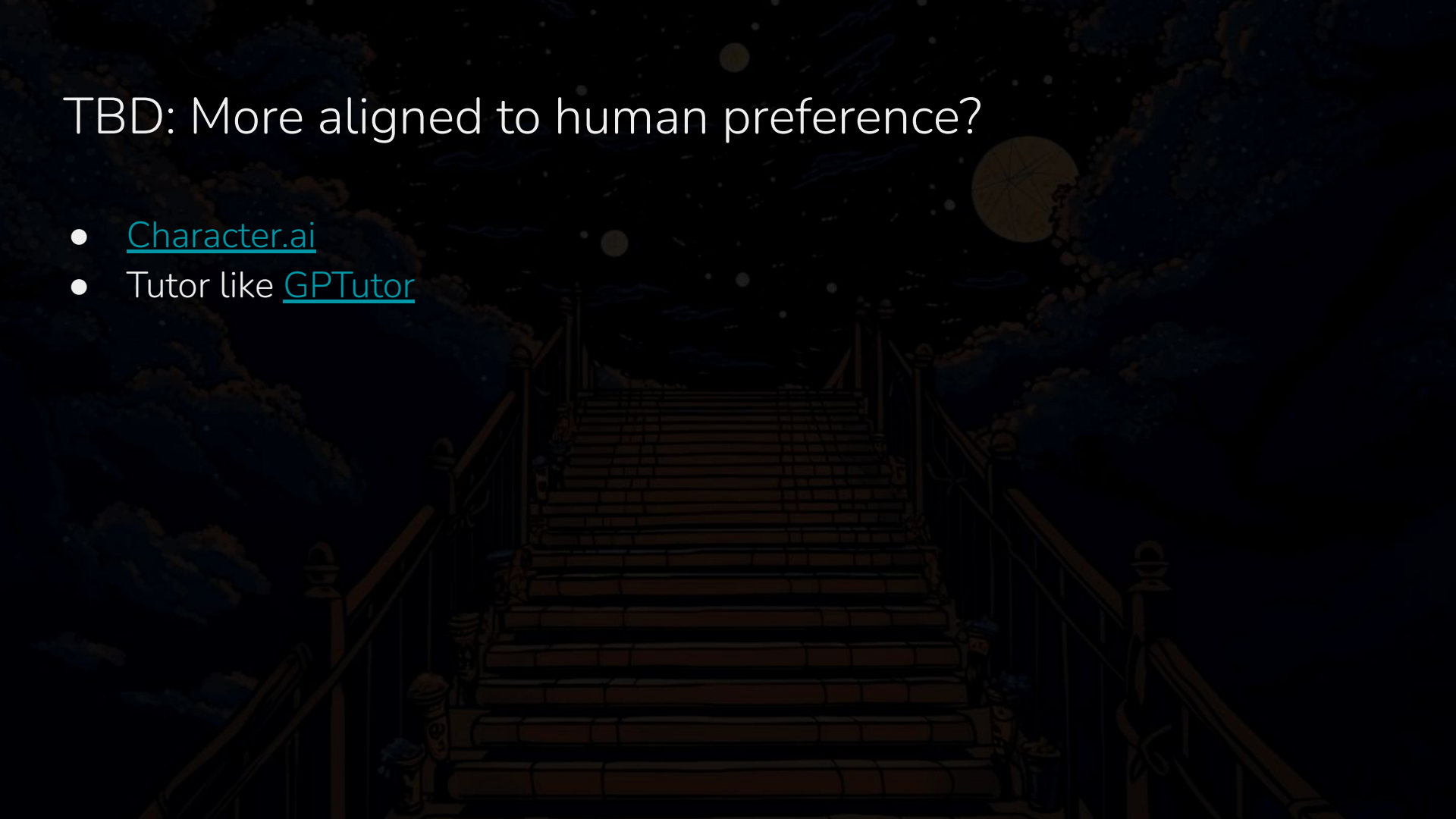
- WebGPT: “allows the model to search and navigate the web”
  - Behavior cloning (BC)
  - Reward modeling (RM, for ELO)
  - Reinforcement learning (RL)
  - Rejection sampling (best-of-n)
- Sparrow: “an information-seeking dialogue agent”
  - Search Results from Google and Reranker

Retrieval outside LM training

- Embedding similarity retrieval like LangChain
- But sometimes questions and answers may have different embedding spaces, DPR claimed better in Q&A (chatbot-like) scenarios

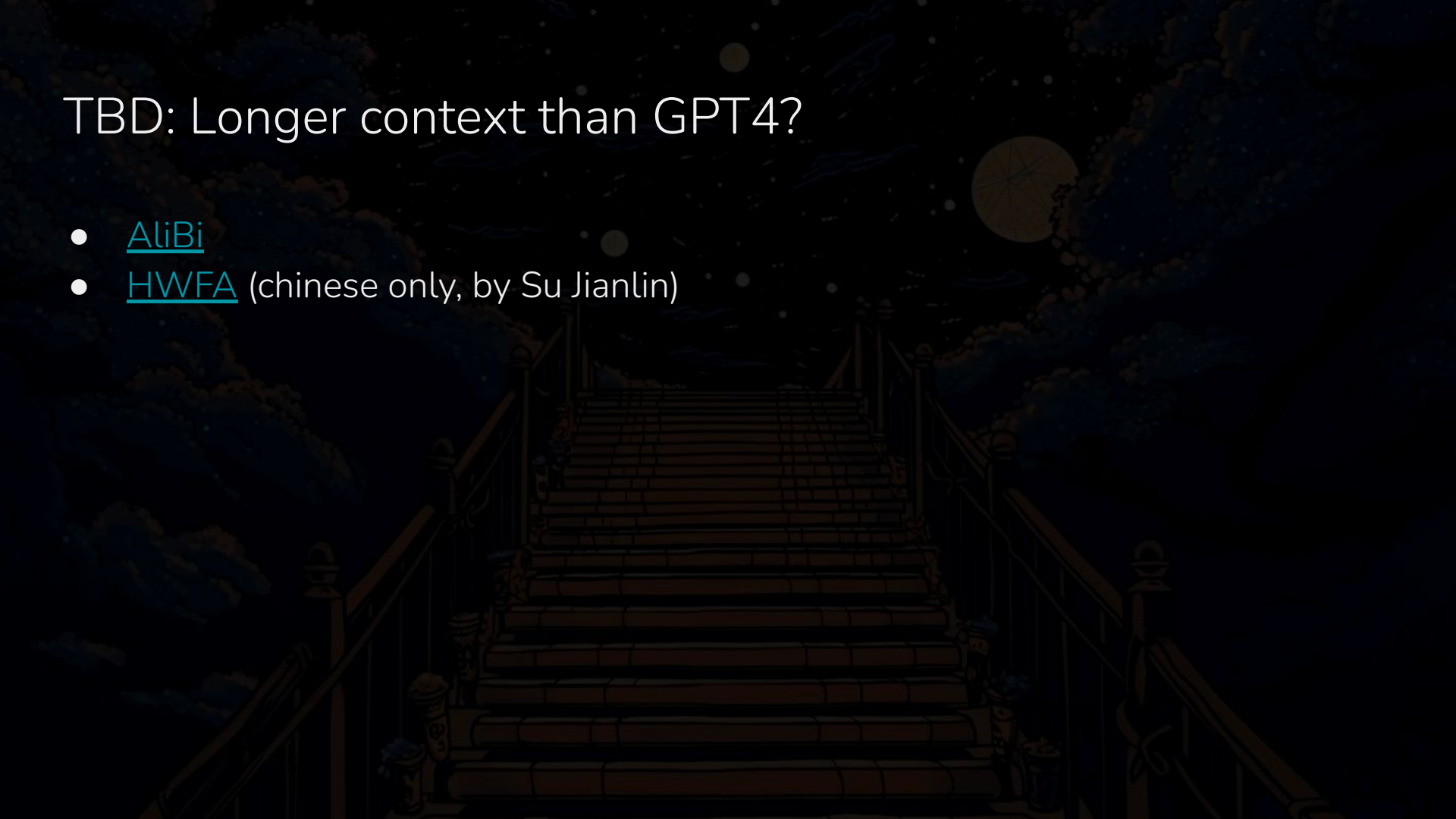
TBD: More aligned to human preference?

- Character.ai
- Tutor like GPTutor



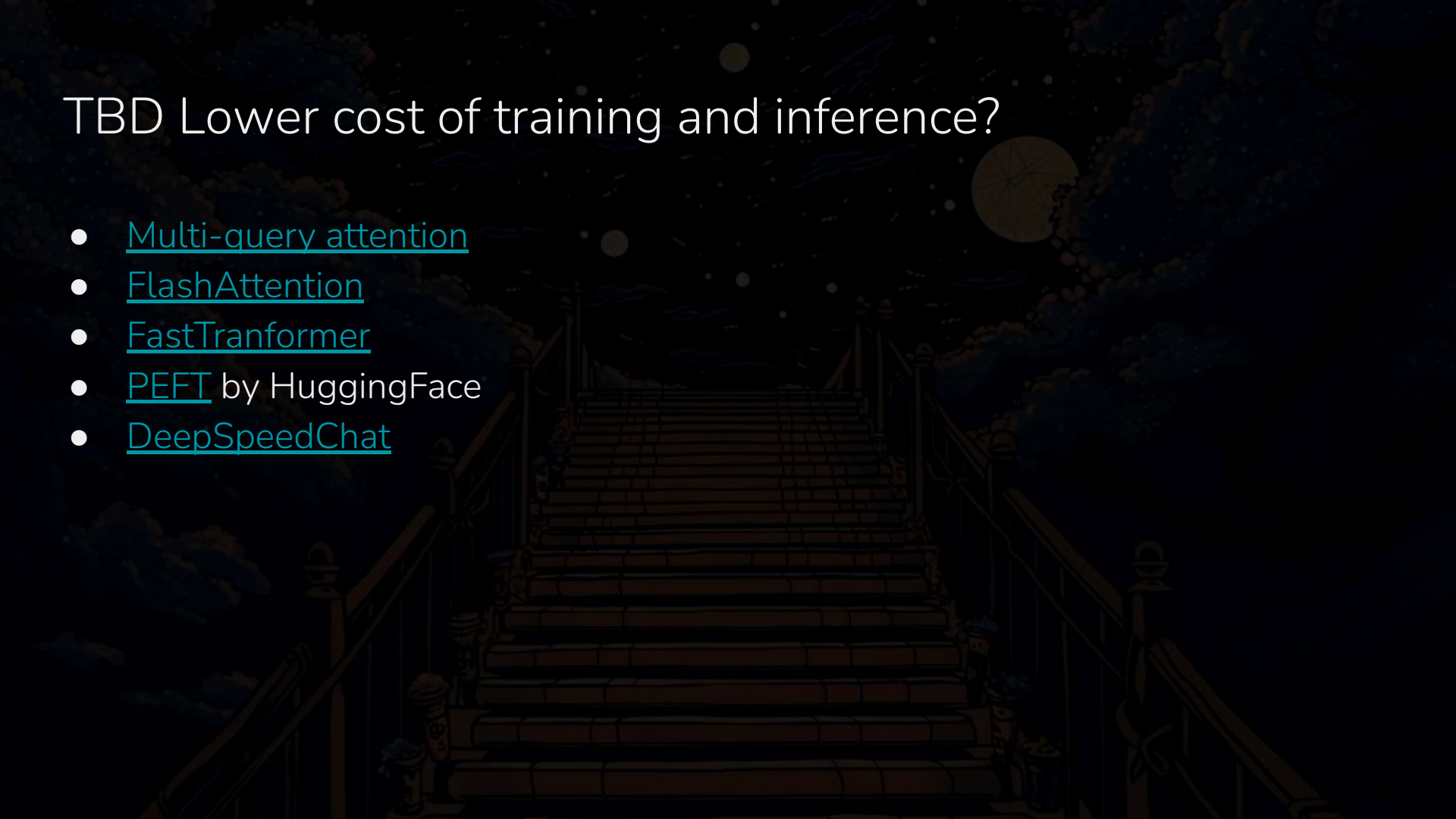
TBD: Longer context than GPT4?

- AliBi
- HWFA (chinese only, by Su Jianlin)



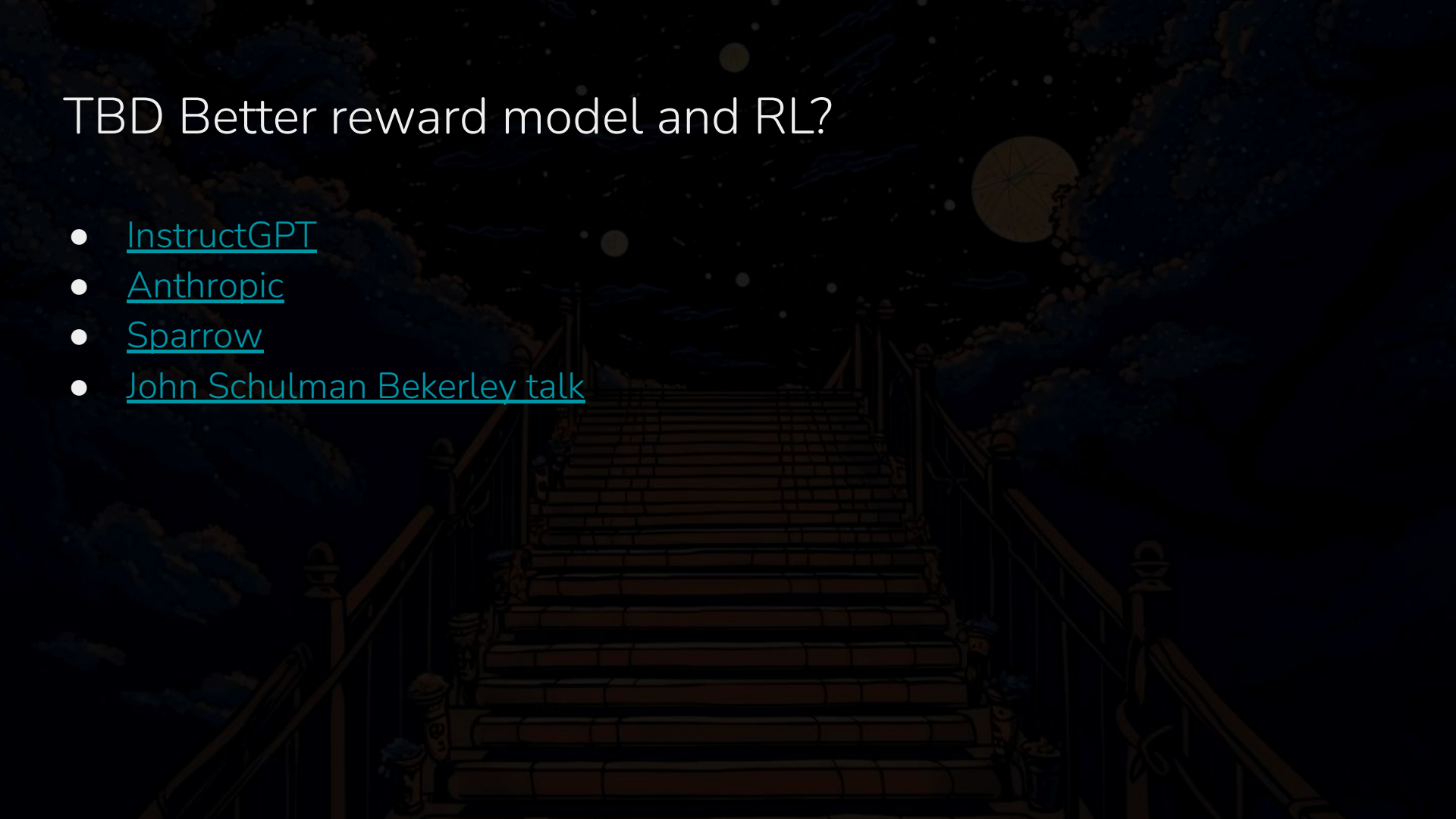
TBD Lower cost of training and inference?

- Multi-query attention
- FlashAttention
- FastTranformer
- PEFT by HuggingFace
- DeepSpeedChat



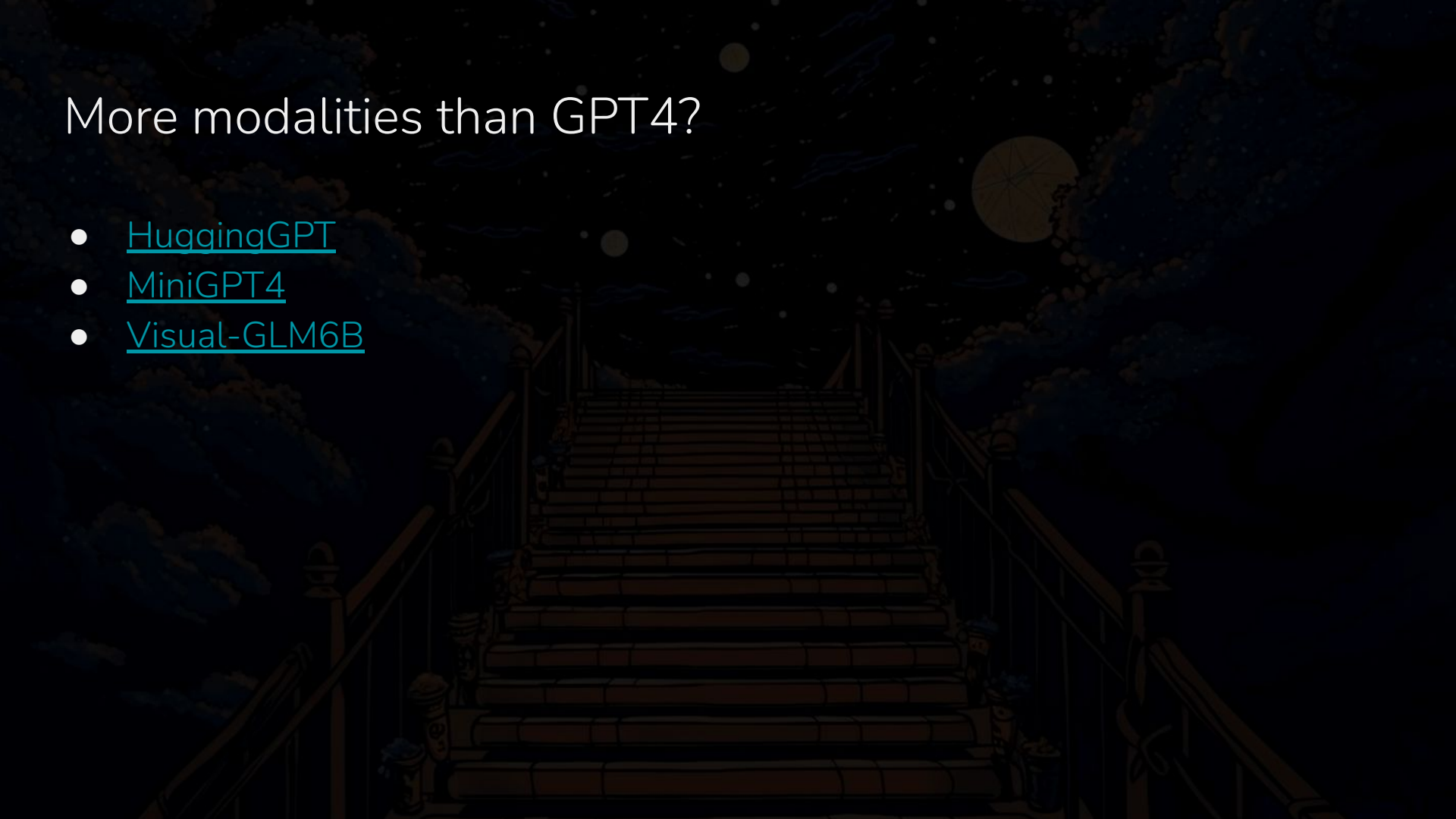
TBD Better reward model and RL?

- InstructGPT
- Anthropic
- Sparrow
- John Schulman Bekerley talk



More modalities than GPT4?

- HuggingGPT
- MiniGPT4
- Visual-GLM6B



Time for more discussion!

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