

fun-ai-talk @ 谷雨书苑

谷雨书苑+理想折射 ChatGPT

A Primer on ChatGPT

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Me: 10+ yoe @ Google



Disclaimer

- All content in this deck is based on public papers, shared codes/models, blog articles, social media discussions, and demos
- All opinions in this slide deck are of my personal own (hululu.zhu@gmail.com), and not those of Google

Agenda

- Large Language Models (LLM)
- Reinforcement Learning (RL)
- ChatGPT
- Frontier Applications
- Societal Impacts
- Q&A

LLM Foundation: Deep Learning and Transformer-based LLMs

AI, Machine Learning, and Deep learning

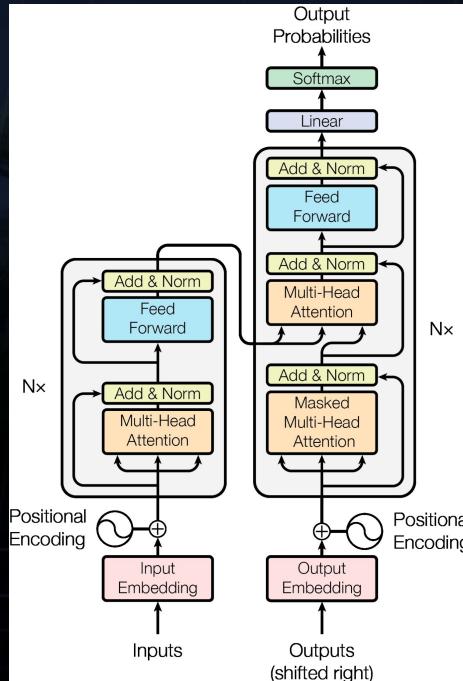
Artificial Intelligence

Machine Learning

Deep Learning

- LLM, deep RL, ChatGPT, diffusion models, all fit here 

Modern LLM building blocks: Transformer Architecture



Transformer as dominating architecture for NLP since 2018

- Multi-head attention
- Encoder-Decoder
- Embedding layers
- Positional encoding
- Cross-Attention in decoder layers
- Output Softmax

Note: Tokenization (e.g. wordpiece, sentencePiece, BPE) is needed (outside Transformer) to convert text to token ids

Note: Sometimes we call it XFormer since there are many variations to the original Transformer

Language Models (LM) and Large Language Models (LLM)

LM for understanding (e.g. BERT)

- Text in
- Embedding (numeric representation of understanding) out
 - The Embedding can be connected to other output heads for tasks like classification or regression

LM for generation (e.g. GPT or T5 or OpenAI ChatGPT or Google Bard)

- Text in
- Text out

* In most cases, **LLM** refers to **huge** (e.g. >1B params) Deep Learning LM for **generation**

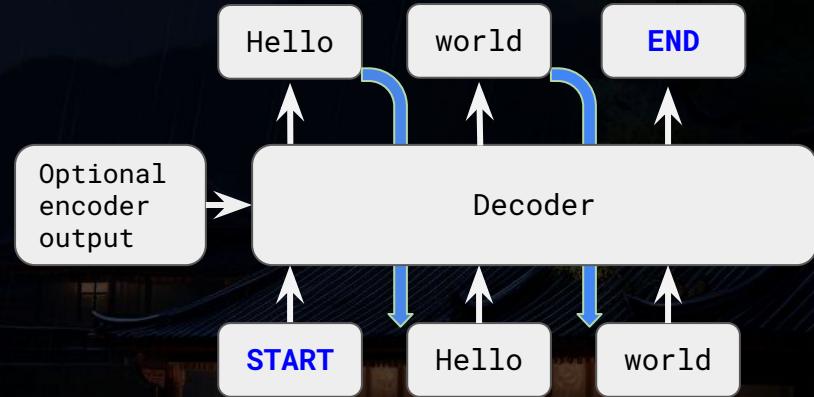
LLM Intro: Training Objectives for LLMs [in pretraining]?

- Fill the blanks (aka masks) for “Masked Language Models” (e.g. [BERT](#))
 - **Ground Truth:** “Paris is a beautiful city”
 - **X:** “Paris is a [MASK] city”
 - **Y:** “beautiful”
 - **Model:** “good”
 - **Optimize:** “good” “beautiful”
- Predict the next text given prompt, for “Generative Language Models” (e.g. [GPT](#))
 - **Aka Causal LM**
 - **Ground Truth:** “Paris is a | beautiful city”
 - **X:** “Paris is a”
 - **Y:** “beautiful”
 - **Model:** “good”
 - **Optimize:** “good” “beautiful”
 - **Ground Truth:** “Paris is a beautiful | city”
 - **X:** “Paris is a beautiful”
 - **Y:** “city”
 - **Model:** “place”
 - **Optimize:** “place” “city”
- The “[Self-supervised](#)” Learning Paradigm
 - It is supervised (given x, predict y)
 - It does NOT require expensive human labels (more precisely, this statement is only true for pre-training)

Decoding/Generating Algorithms in Generative LLMs

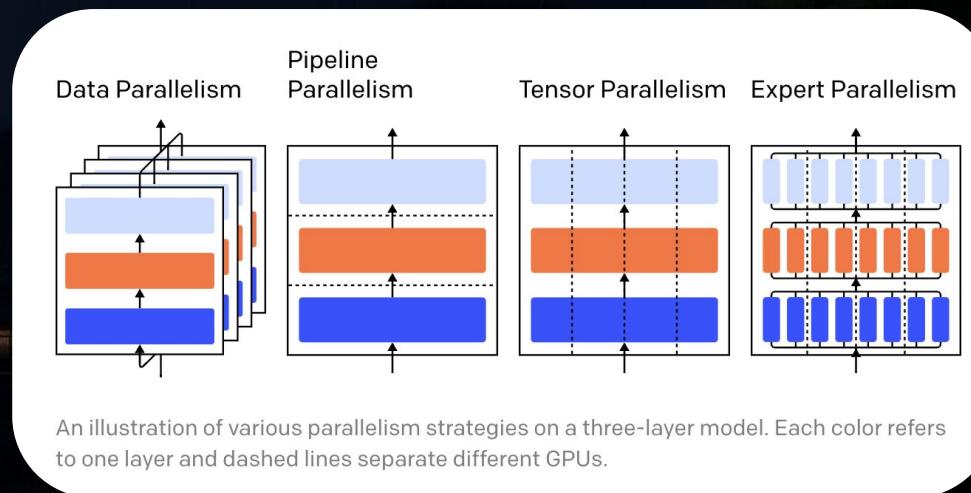
Decode **token** by **token**, left to right. A new output token is appended as next token's decoder input

- Beam Search
 - Maintain a max size of searching “beams (paths)” to get best overall best beam
- Sampling
 - Sampling based on probabilities
- Greedy
 - Select the argmax(prob) token at every position
- Top-k, Top-p and more

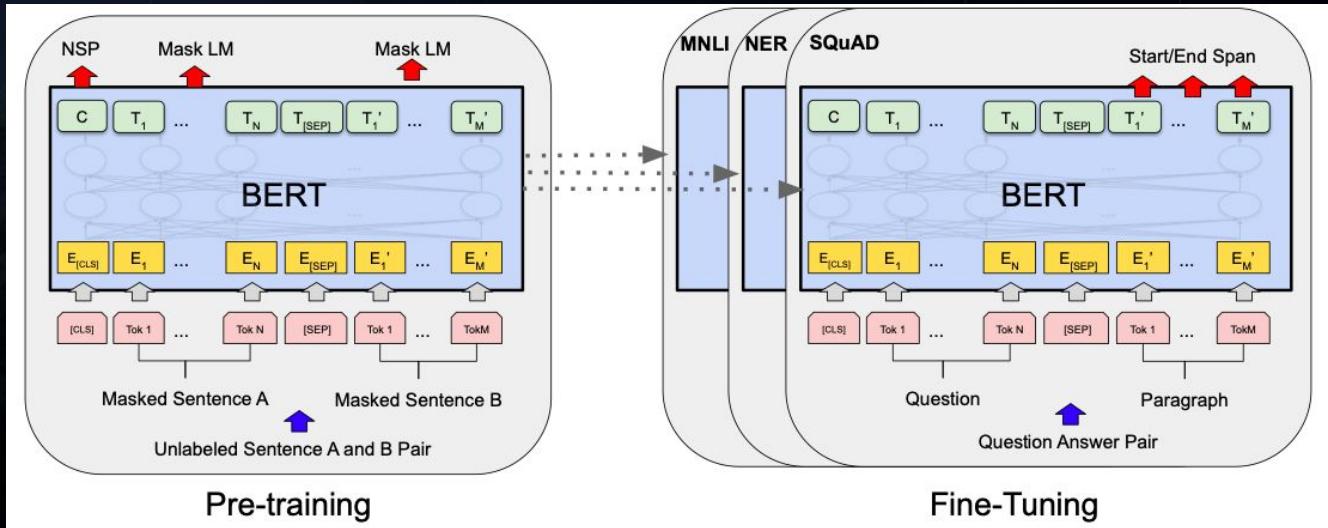


How to train LLM (in parallel)?

- Data Parallelism
 - different subsets of the batch on different GPU/TPUs
- Pipeline parallelism
 - different layers of the model on different TPU/GPUs
- Tensor Parallelism
 - Break up tensor operation (e.g. matrix multiplication) to different TPU/GPUs
- Mixture of Experts (sparse)
 - Gated layer to only activate factions (one of few of all the experts) of the model



LLM example: BERT (encoder-only LLM)



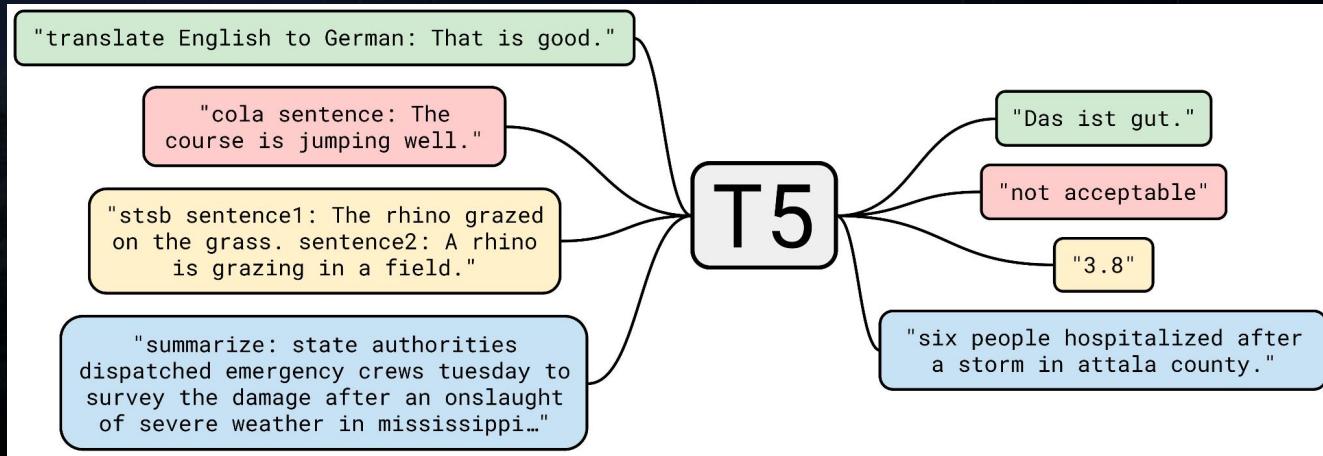
Pretraining:

- Masked language training
- Next sentence prediction (NSP)

Fine-tuning:

- Connect to BERT output and work for many tasks

LLM example: T5 (encoder-decoder LLM)



T5: unified framework that converts all text-based language problems into a **text-to-text** format

- T5 works well on a variety of tasks out-of-the-box with “prompts”

[\[1910.10683\] Exploring the Limits of Transfer Learning with a Unified Text-to-Text Transformer](#)

LLM example: GPT (decoder-only LLM)

GPT often refers to a family of models (GPT, GPT2, GPT3...)

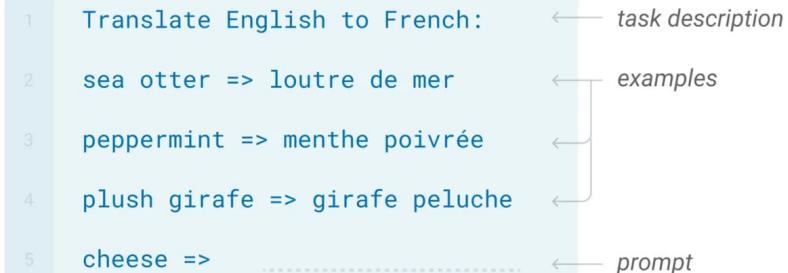
First influential decoder-only models

GPT creates the “Few/Zero shot Prompt”

OpenAI started to “un-share” models since GPT2

Few-shot

In addition to the task description, the model sees a few examples of the task. No gradient updates are performed.



[Improving Language Understanding by Generative Pre-Training](#), OpenAI says its text-generating algorithm GPT-2 is too dangerous to release, [What is GPT-3? Everything your business needs to know about OpenAI's breakthrough AI language program | ZDNET](#)

LLM Players: OpenAI and selected work

- [GPT-1](#) 2018
- [GPT-2](#), 2019
 - [OpenAI: Too dangerous to share](#), [How OpenAI Sold its Soul for \\$1 Billion](#)
- [GPT-3](#), 2020
 - 175B parameters! 100x larger
- [Codex](#) (powers [github copilot](#)), 2021
 - Text+Code pretrain
- [GPT-3.5](#), Q4 2021
 - Instruction finetune
- [InstructGPT](#), Q1 2022
 - RLHF (Reinforcement Learning Human Feedback)
- [ChatGPT](#), Dec 2022
 - Product launch
- [GPT 4](#), March 2023
 - 32k context length, vision added

LLM Players: Anthropic and selected work

- [Helpful and Harmless Assistant with RLHF](#)
 - 52B
- [Constitutional AI: Harmlessness from AI Feedback](#)
- [Claude chatbot](#)
 - 2nd and 3rd (instant) in [Berkeley chatbot leaderboard](#) as of 05/26
- [Claude-100k](#)

LLM Players: Google/DeepMind and selected work

- BERT, 2018
 - Completely changed the NLP research and industry
- T5, 2020
 - Consolidate all NLP task to text-to-text
- FLAN, 2021
 - Instruction Fine-Tuning (probably inspires GPT3.5)
- LaMDA, 2021
 - LaMDA and the Sentient AI Trap | WIRED
- Chinchilla, 2022
 - “Most LLMs are under-trained!”
- PaLM, 2022
 - 540B params, 3x GPT3 size
- Sparrow, 2022
 - Reinforcement-learning LLM, only paper, no public product
- PaLM 2, 2023
 - Little detail provided, selected benchmarks surpassed GPT4
- Gemini, end of 2023?

LLM Players: Facebook (aka Meta) and selected models

- RoBERTa, 2019
 - A more popular version of enhanced BERT for the industry
- BART, 2020
 - Pretraining sequence-to-sequence models
- OPT-175B, 2022
 - “Democratizing access to large-scale language models”
- BlenderBot3, 2022
 - Probably largest chatbot-specific LM
- Galactica (research purpose LLM), 2022
 - Taken down after 3 days after many harsh criticism like this
- LLaMA, Feb 2023
 - Best non-commercial open sources pretrained LLM in its class as of May 2023
- LIMA: Less Is More, May 2023
 - Finetune 1k high-quality data on 65B LLaMA to be close to GPT4!!

LLM Players: Other multinational companies

- Megatron-Turing by NVidia and Microsoft
 - 530B params on 2240 NVIDIA A100 GPUs
- CodeT5 and CodeRL by Salesforce
 - [probably] the most popular coding-assist base models
- BloombergGPT by Bloomberg
 - 50 billion params on 700 billion tokens
- *[Most likely missing many great work from other organizations, sorry]*

LLM Players: Large Chinese companies

- Pangu-alpha by Huawei, 2021
 - 200B params, *[I read from articles mentioning it was believed to be under-trained, lack reference]*
- Wudao 2.0 by BAAI, 2021
 - A **sparse** (*thus less powerful IMO*) multimodal model with 1.75 Trillion params
- Ernie 3.0 Titan by Baidu, 2021
 - 260B params, on top of PaddlePaddle (Baidu Deep learning framework), most likely the best Chinese LLM
- M6 by Alibaba & Tsinghua, 2021
 - 100B, Later 2021 a sparse version with 1 trillion+ params

There are a few LLM product launches from Chinese companies, but no LLM details provided afaik

LLM Players: Selected Institutes, Groups & Startups

- [together.xyz](#) ([V1 open source RedPajama models](#), commercial ok)
- [MosaicML](#) ([MPT 7b](#), commercial ok)
- [Allen Institute for AI \(AI2\)](#)
- [Tsinghua University](#) ([GLM 130B](#) 2022 public)
- [BigScience research workshop](#) ([bloom, 176B](#), 2022 public)
- [Eleuther AI](#) ([GPT-neox 20B](#) public, 2021)
- [Zhuiyi Technology](#) ([Su Jianlin](#) and [RoFormer](#) 2021)

The crazy family of LLaMA

Quite a few influential [**and cheap**] research on top of LLaMA

- [Alpaca by Stanford](#)
- [Vicuna by Berkeley](#)
- [Huatuo \(华驼\)](#) by Harbin Institute of Technology
- [ChatDoctor](#) by University of Texas Southwestern Medical Center
- And many more

All claimed to be close to ChatGPT or GPT4

But, here comes a paper 05/25

[The False Promise of Imitating Proprietary LLMs:](#)

“There is a substantial capabilities gap between open and closed LMs”

LLM Concepts: Foundational Models

- Brought up by [Researchers @ Stanford HAI](#)
- LLM is one of the foundational models
 - Vision
 - Speech
 - Diffusion
 - other



The slide features the Stanford University Human-Centered Artificial Intelligence (HAI) logo at the top right. The logo includes the Stanford University seal, the text "Stanford University", "Human-Centered", and "Artificial Intelligence". Below the logo, there is a navigation bar with links for "People" and "Report". The main content area contains a section titled "— WHAT IS A FOUNDATION MODEL?" followed by a detailed explanation of foundation models.

— WHAT IS A FOUNDATION MODEL?

In recent years, a new successful paradigm for building AI systems has emerged: Train one model on a huge amount of data and adapt it to many applications. We call such a model a foundation model.

LLM Concepts: Benchmarks

- GLUE: A Multi-Task Benchmark for NLP, 2018
 - Leaderboard: <https://gluebenchmark.com/leaderboard/>
- SuperGLUE, 2019
- BIG-bench, 2020
- GSM8K (math), 2021
- HELM by Stanford, 2023
- And more...

LLM Concepts: Pretraining, Finetuning & Prompt-Tuning

- Pretraining
 - Self-supervised training with Masked Language Prediction or Next Token Prediction objectives
- Finetuning
 - Take a pretraining model into a downstream use case
 - The parameters of pretraining model will often change
 - Some advanced fintuning may involve reinforcement learning, such as RLHF
- Parameter Efficient Tuning
 - Most of the model weights are unchanged and even quantized
 - Only a small portion of weights are introduced or set as tunable
 - Prompt tuning, LoRA and so on

* The whole concepts here also applied to vision domains and other modalities

LLM Concepts: Scaling Laws for LLM

OpenAI, 2020

- If you have 10x more budget, ~5x model size, ~2x data size

DeepMind, 2022

- If you have 10x more budget, ~3x model size, ~3x data size
- “Most LLMs are under-trained” [because oversized model, while lacking training data]
- But, karpathy: I can't exactly reproduce Chinchilla paper results
- LLaMA and RedPajama follows this scaling law, and favors on data side on smaller size models

LLM Concepts: Prompt Engineering (aka “In-context learning” or “hard prompt”)

“**Let’s think step by step**” to increase accuracy from 17.7% to 78.7!

- See [Zero-Shot Reasoners](#) for details

More prompt engineering guide, see [openai-cookbook/techniques_to_improve_reliability](#)

No.	Category	Template	Accuracy
1	instructive	Let’s think step by step. First, (*1)	78.7 77.3
2		Let’s think about this logically.	74.5
4		Let’s solve this problem by splitting it into steps. (*2)	72.2
5		Let’s be realistic and think step by step.	70.8
6		Let’s think like a detective step by step.	70.3
7		Let’s think	57.5
8		Before we dive into the answer,	55.7
9		The answer is after the proof.	45.7
10	misleading	Don’t think. Just feel.	18.8
11		Let’s think step by step but reach an incorrect answer.	18.7
12		Let’s count the number of "a" in the question.	16.7
13		By using the fact that the earth is round,	9.3
14	irrelevant	By the way, I found a good restaurant nearby.	17.5
15		Abrakadabra!	15.5
16		It’s a beautiful day.	13.1
-		(Zero-shot)	17.7

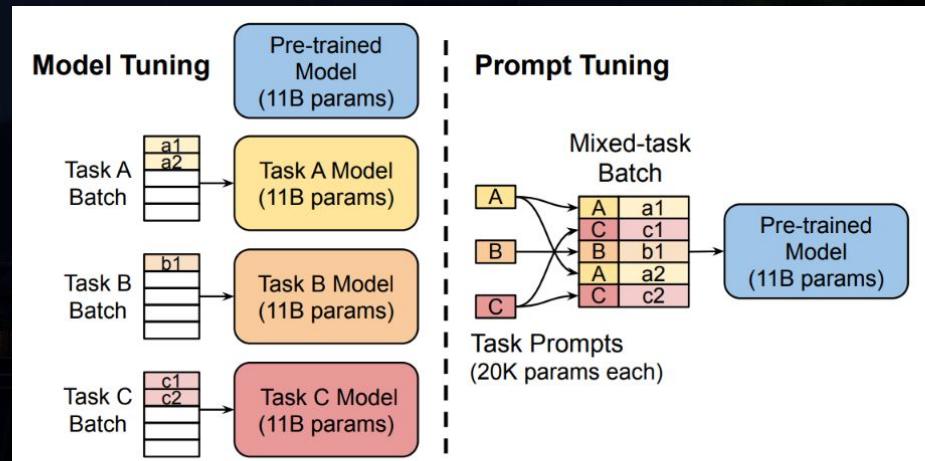
LLM Concepts: Prompt Tuning (aka soft prompt [embedding])

“learning “soft prompts” to condition **frozen language models** to perform specific downstream tasks”

- Model is frozen (or most of it)
- Additional small task-specific embeddings are learnt per task
- Often with small number of “soft prompt training” samples

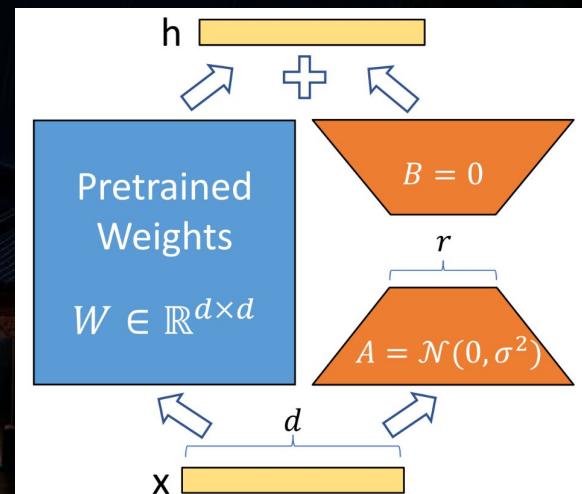
See [paper](#) for details

Also note soft prompt can be combined with hard prompt to “hard-soft prompt tuning”, see [Med-PaLM paper](#)



LLM Concepts: LoRA finetuning

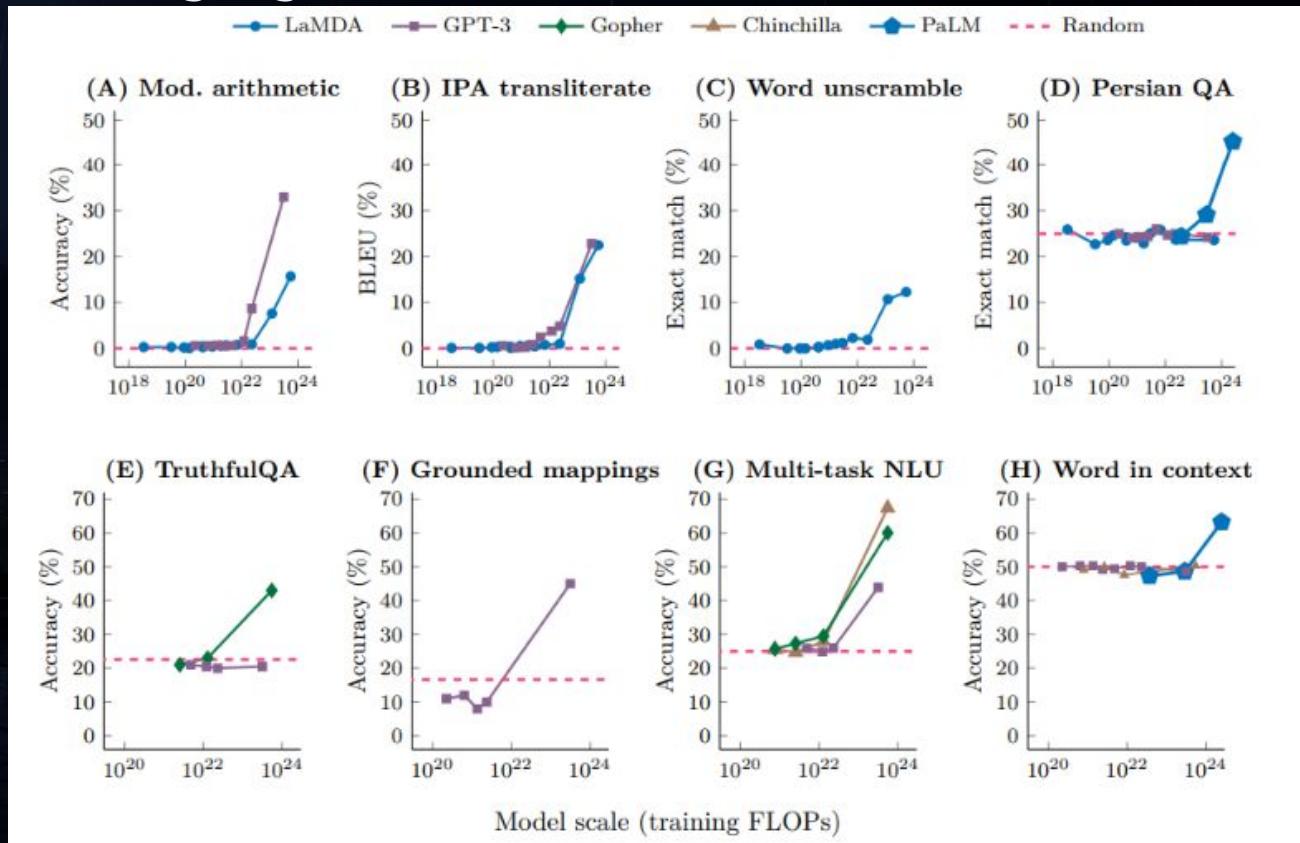
- Transformer Architecture
 - Weights (W) for Q/K/V projections in self attention
 - Assume d is hidden dimension size, W is often a $d \times d$ matrix, so number of weights are d^2
- Brush up some linear algebra
 - If we have matrix A, shape is $d \times r$ ($r \ll d$)
 - And we have B, shape is $r \times d$
 - Shape of Matrix_multiply(A, B) is $d \times d$!
- The summation will add up W (freezed), and the A@B matrix, so we only need to train A, and B
 - Number of weight for A and B are $2 * d * r \ll d^2$



LLM Concepts: “Emerging abilities”

See [paper](#) for more details

- Note X axis unit is floating-point operations per second (FLOPS)

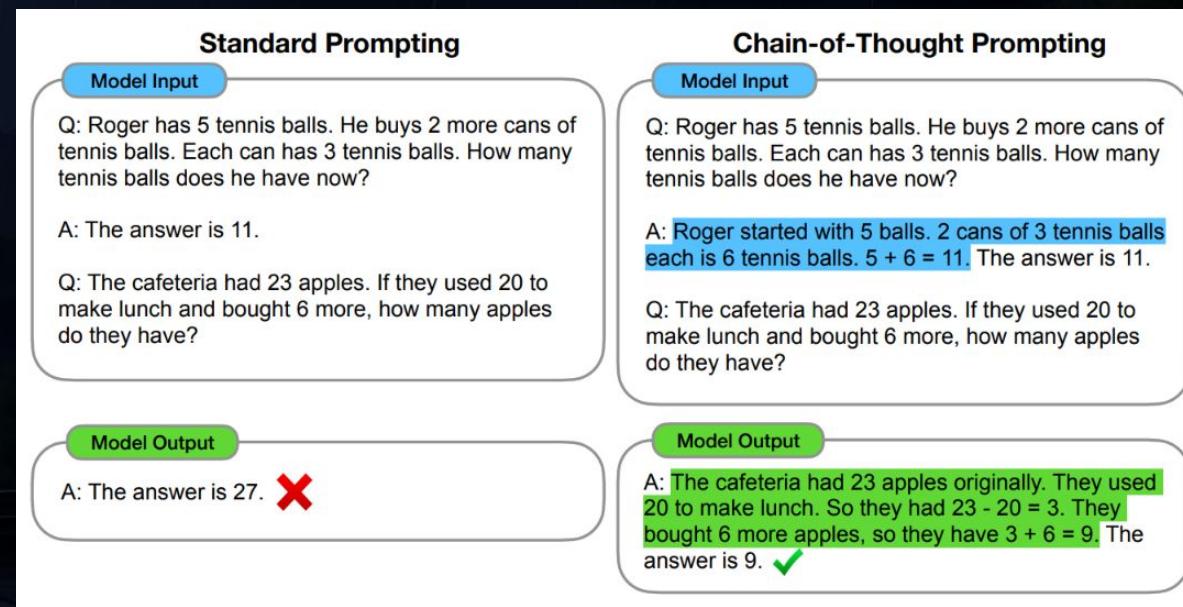


LLM Concepts: Chain of Thoughts ([paper](#))

chain of thought (CoT)

- A series of intermediate reasoning steps (as part of prompt)
- Significantly improves ability of LLM

See [CoT paper](#) for details



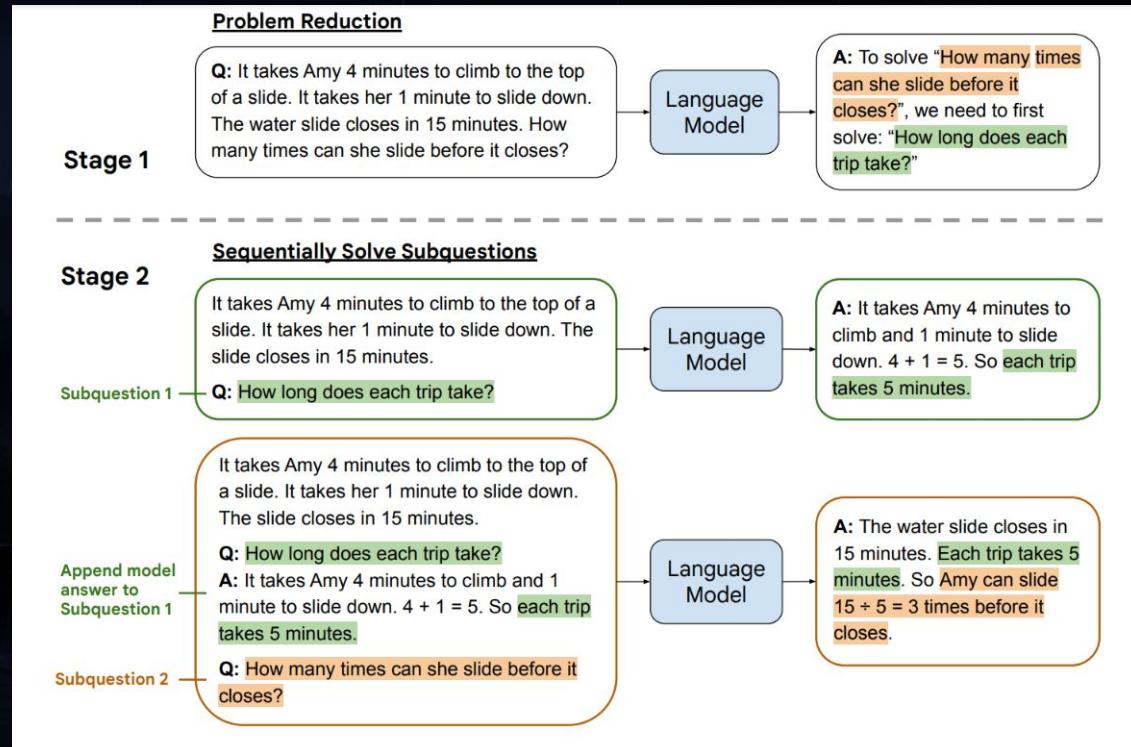
There is a new [tree of thoughts](#), but might require significant more compute to trade for quality imo

LLM Concepts: Least-to-most Prompting

2 stage prompting:

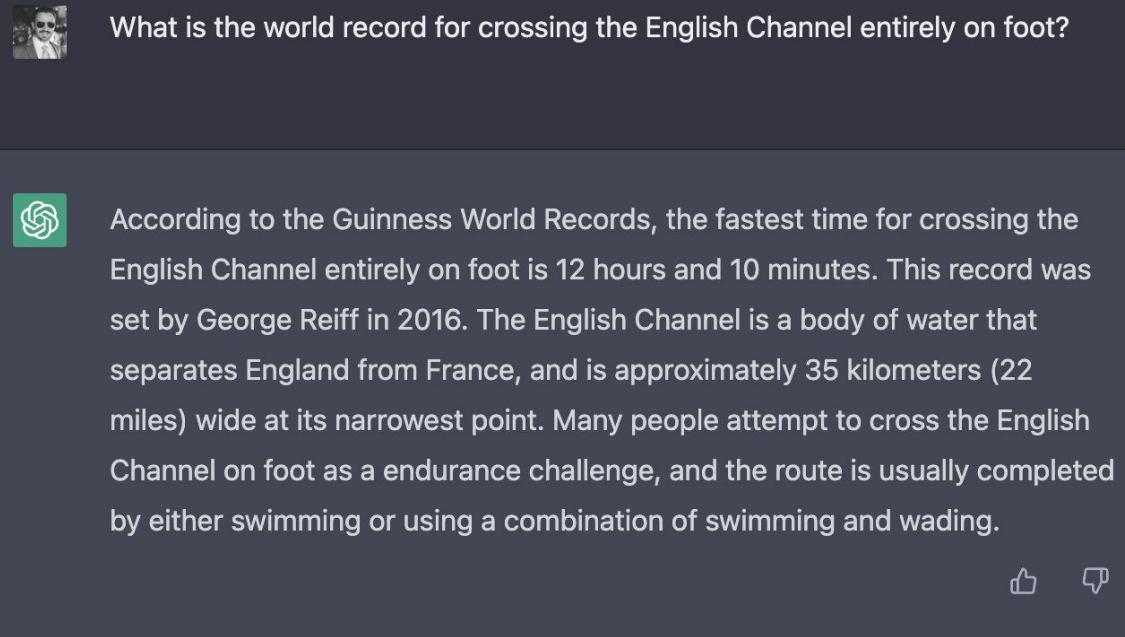
1. reducing a complex problem into a list of subproblems
2. and then sequentially solving these subproblems

See [Least-to-most prompting paper](#) for details



LLM Concepts: Hallucination (part of safety concerns)

"What is the world record for crossing the English Channel entirely on foot?" from Twitter



What is the world record for crossing the English Channel entirely on foot?

According to the Guinness World Records, the fastest time for crossing the English Channel entirely on foot is 12 hours and 10 minutes. This record was set by George Reiff in 2016. The English Channel is a body of water that separates England from France, and is approximately 35 kilometers (22 miles) wide at its narrowest point. Many people attempt to cross the English Channel on foot as a endurance challenge, and the route is usually completed by either swimming or using a combination of swimming and wading.

Upvote icon

Downvote icon

LLM Concepts: Retrieval-system powered LLM

- [RETRO by DeepMind](#), 2021
- [LaMDA 2022 paper by Google](#), 2022
- [Atlas by Facebook](#), 2022

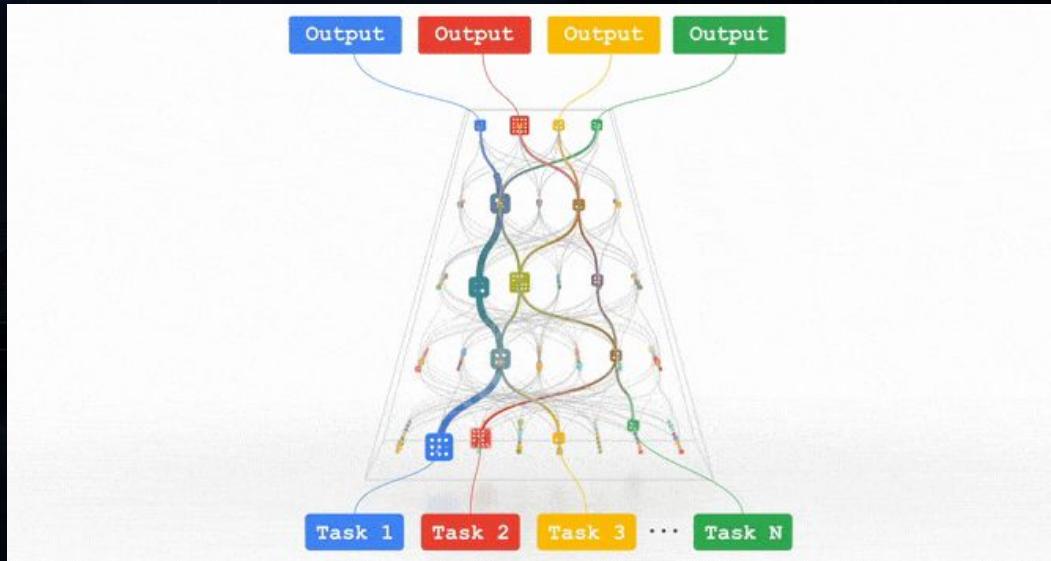
* personally, I think LLM+Retrieval System is the good way to balance LLM capabilities and data freshness to meet business purposes in the short term

LLM Concepts: RLHF for LLM

- RL (reinforcement learning) was something popular back to 2016 when [AlphaGo](#) is made the news
- OpenAI has some [RLHF research](#) back in 2017
- [InstructGPT](#) (paper published 2022) is believed to let GPT3 be more powerful
- Other players
 - Anthropic
 - Google
 - DeepMind
 - More

LLM Concepts: MoE LLM

- [MoE concept by Google](#), 2017
- [Jeff Dean Pathways](#), 2021
 - “Today's models are dense and inefficient. Pathways will make them sparse and efficient.”



LLM Tooling: HuggingFace



- Best LLM tools and model hub, period [my favorite!]
- Easy
 - [To load models](#)
 - [To tokenize](#)
 - To start [out of the box with Pipelines](#)
 - To [tune with examples](#)
 - To [publish and deploy](#)
- My pet projects
 - Chinese poem model <https://huggingface.co/hululuzhu/chinese-poem-t5-menqzi-finetune>
 - Solidity code model <https://huggingface.co/hululuzhu/solidity-t5>

* Do you know the super popular [Stable Diffusion model](#) is published and hosted at HuggingFace?

LLM Tooling: TF Hub, PyTorch-NLP & PaddleNLP

TF Hub by Google (and community)

PyTorch-NLP by Meta (and community)

PaddleNLP by Baidu (and community)

Alibaba recently started ModelScope

* *No one is ever close to HuggingFace as of Jan 2023, in my opinion*

LLM Tooling: Transformers, Colossal-AI, Ray & NanoGPT

Transformers Library (github 77k stars) by Huggingface

- Best of the best

Colossal-AI by Prof Yang You (who developed LAMB optimizer)

- Pretty promising open-source distributed AI training infra

Ray by anyscale

- Believed to be used to train ChatGPT

NanoGPT

- A tiny but cool library by Andrej Karpathy (I am his big fan!)

LLM Tooling: Other [more fine-grained] toolings

- TensorFlow
- PyTorch
- PaddlePaddle
- Keras
- PyTorch Lightning
- Jax/Haiku/Flax/Trax/T5X

Super large LLM Accelerator Requirements

	GPT3	Gopher	Megatron-Turing NLG	PaLM	OPT	GLM-130B	BLOOM
Who	OpenAI	DeepMind	NVidia & Microsoft	Google	Facebook	Tsinghua	BigScience
Paper Time	05/2020	12/2021	01/2022	04/2022	05/2022	10/2022	12/2022
Model Size	175B	280B	530B	540B	175B	130B	176B
# of Accelerator core	10000 V100 (ref)	4096 TPU V3	4480 A100	6144 TPU V4	992 A100	768 A100	384 A100
Accelerator memory	~160T (16G * 10000) max	~32T (32G * 1024 HBM2)	~360T (80G *8 * 560)	~49T (32G * 6144/4 HBM2)	~80T (80G * 992)	~30T (40G*8*96)	~30T (80G * 384)
Max TFLOP/s (bf16) per core	125	123	312	275	312	312	312
Peak Utilization		32.5% (PaLM paper)	30.2% (PaLM paper)	46.2% (PaLM paper)	47% (147/312)	43.2% (135/312)	50% (156/312)
Training Tokens (billions)	300	300	270	780	180	400	366 (341+25)
accelerator	V100 (16G) * 10000 max	TPU V3 (4 core, 32 GiB) * 1024	DGX-A100 GPU (8×80G) * 560	6144 TPU V4 (cross-pod)	A100 80G * 992	DGX-A100 GPU (8×40G) * 96	48 nodes, each having 8 NVIDIA A100 80GB GPUs
Training time		920 hours			2 months	60 days	
Notes			each 530b param model replica spans 280 A100 GPUs		35 manual restarts, cycling of over 100 hosts over 2 months		

Reinforcement Learning Essentials: Foundational Basics and PPO Algorithm

Selected Success Stories of RL

- AlphaGo, AlphaStar, AlphaTensor by DeepMind

Check out [this deck](#) for a summary of more Alpha* papers by DeepMind

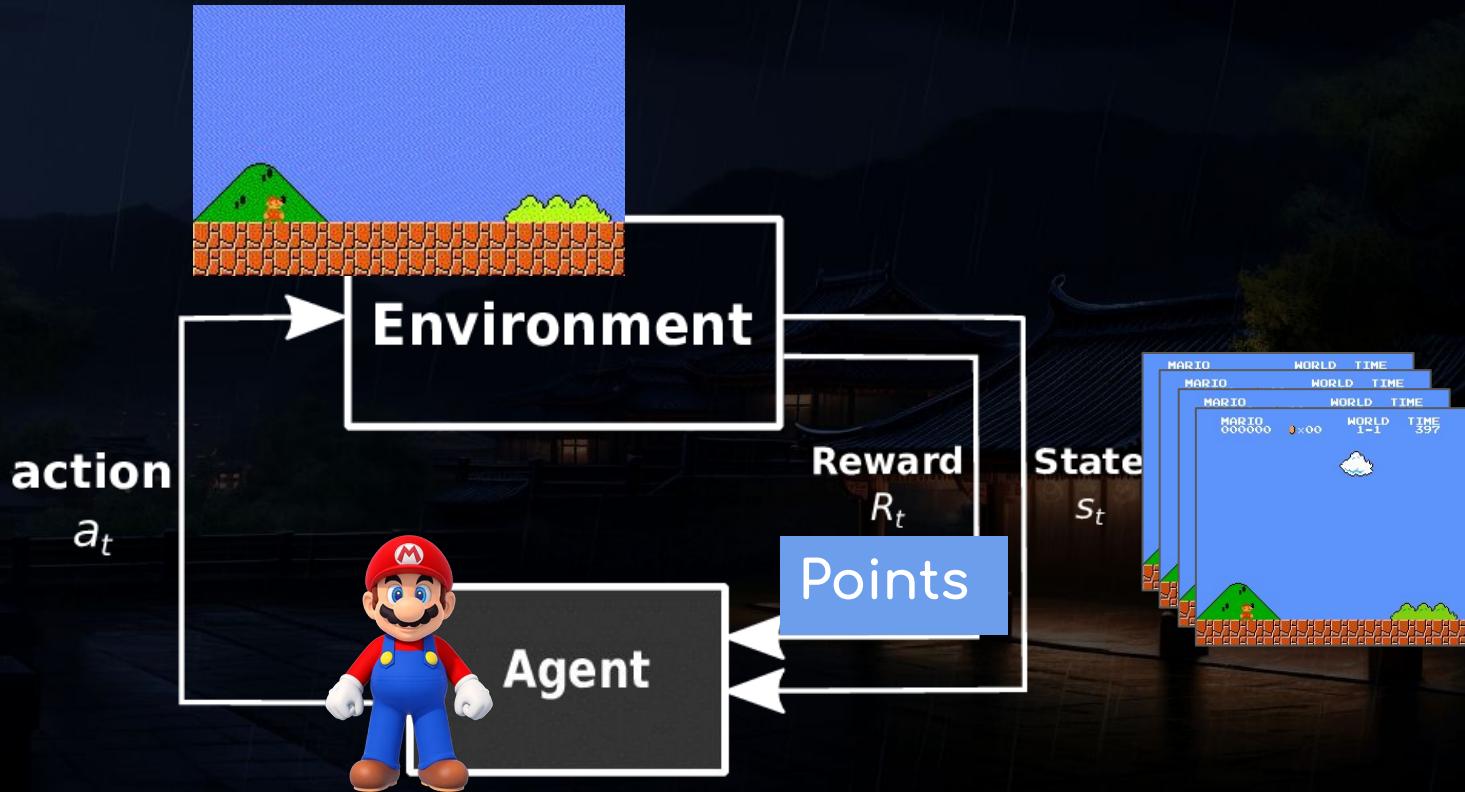


What is Reinforcement learning?



What is Reinforcement learning? Cont (Mario case)

No-op
Jump
Right
Fire
...



(1/4) RL optimization algorithm explained

Q-learning:

- Action Value Function $Q(s, a)$
 - Given state s
 - Which action a shall we take?
 - So that it will lead to optimal expected total (delayed) rewards!
- Often overestimate the expected optimal reward

(2/4) RL optimization algorithm explained

Policy Gradient $\pi(a | s)$

- A policy tells which action a to take on state s
 - That implicitly optimized for better [delayed] total rewards
- Uses 1st order derivative for linear search, thus leads to unstable improvements



(3/4) RL optimization algorithm explained

TRPO Trust Region Policy Optimization

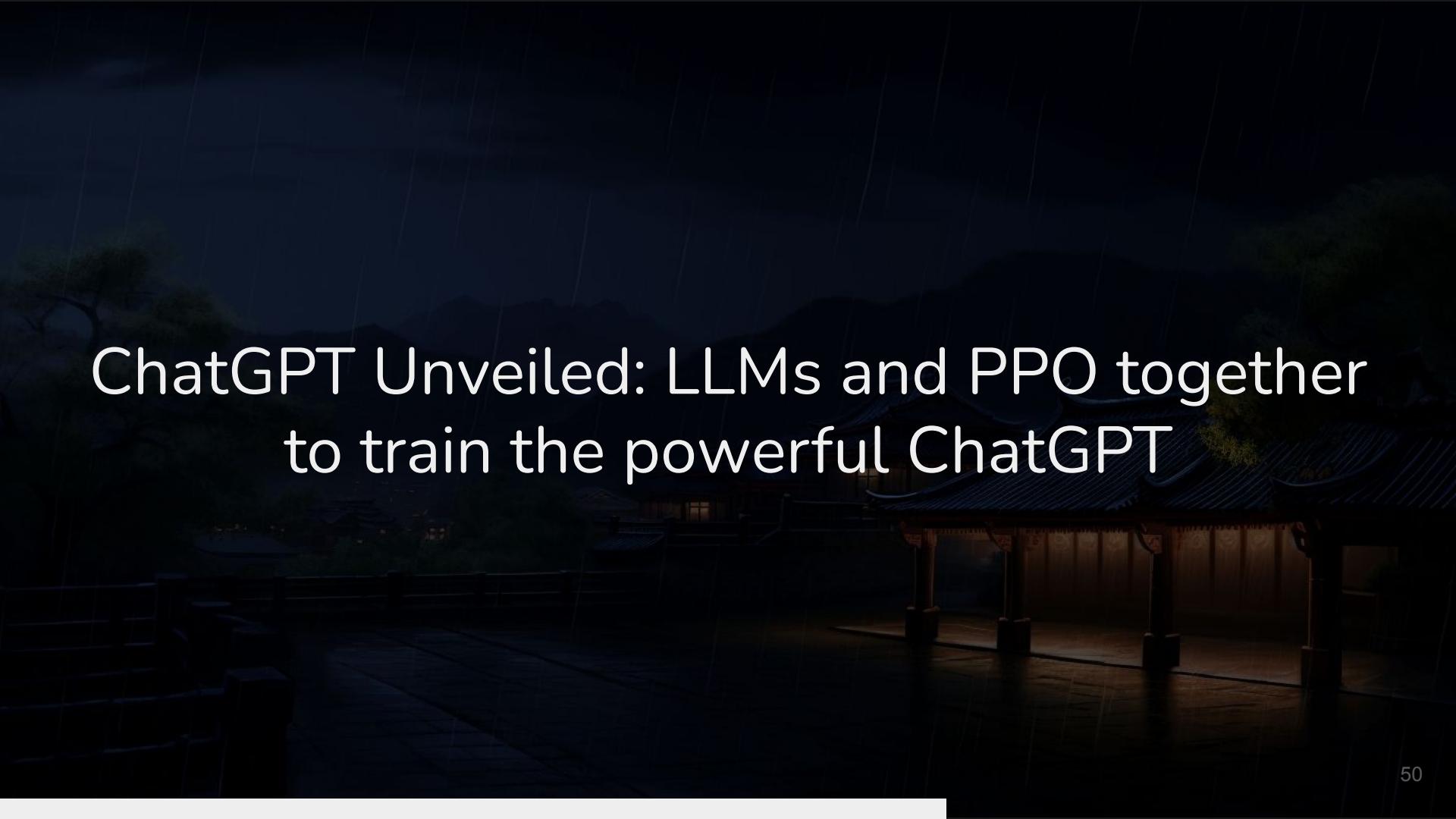
- Trust Region: Region with radius δ to avoid bad big moves
- Uses MM (minorize maximization) and Advantage function (expected rewards over average actions)
- Constrain of KL-divergence between old and new parameters
 - Ensures new policy is not drastically different from the current
- Often considered computationally expensive (because of inverse of hessian), and constrained by linear and quadratic approximations following static defined formula (conjugate gradient approximation)

(4/4) RL optimization algorithm explained

PPO Proximal Policy Optimization

- Similar to TRPO, but add “proximal” constraint directly into model optimization objectives
 - PPO with **Clip**: removes the KL-divergence, clips the objective function within bounds
 - PPO with **Adaptive KL-Penalty**: Approximate and penalize KL constraints to speed up the computation and reduce memory need
- Reportedly one of the “**best**” RL algorithms that is faster and more stable to train as of 04/2022

And **PPO with Clip** is used by [OpenAI Five DOTA2 AI](#) and [ChatGPT!](#)

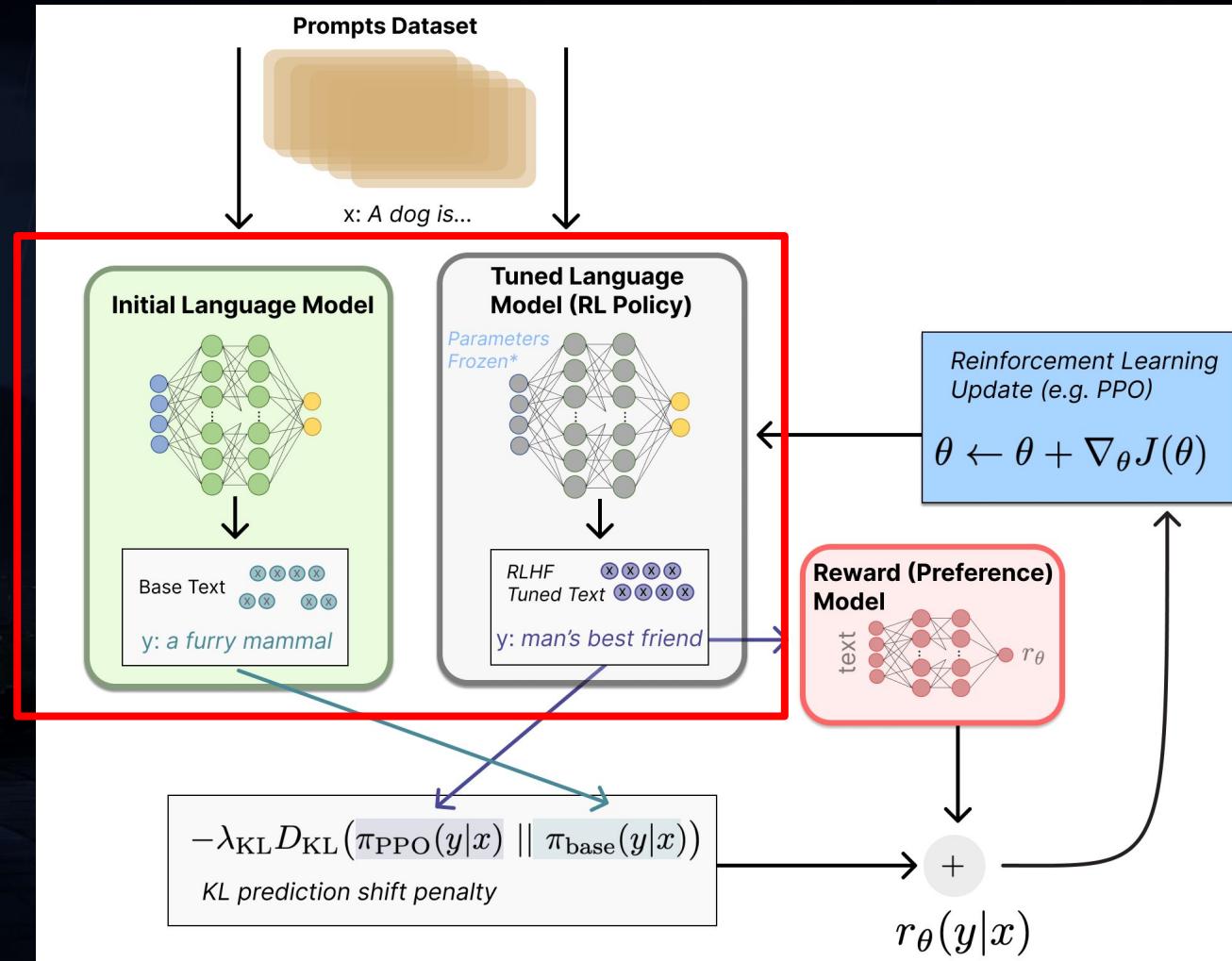
The background of the slide is a dark, moody photograph of a traditional Chinese architectural complex at night. It features dark, curved roofs and wooden structures. In the foreground, there's a paved area with some low walls or pillars. The overall atmosphere is mysterious and slightly somber, with the only light coming from the windows of the buildings and the glow of the moon or stars in the dark sky.

ChatGPT Unveiled: LLMs and PPO together
to train the powerful ChatGPT

RLHF

Reinforcement Learning
from Human Feedback

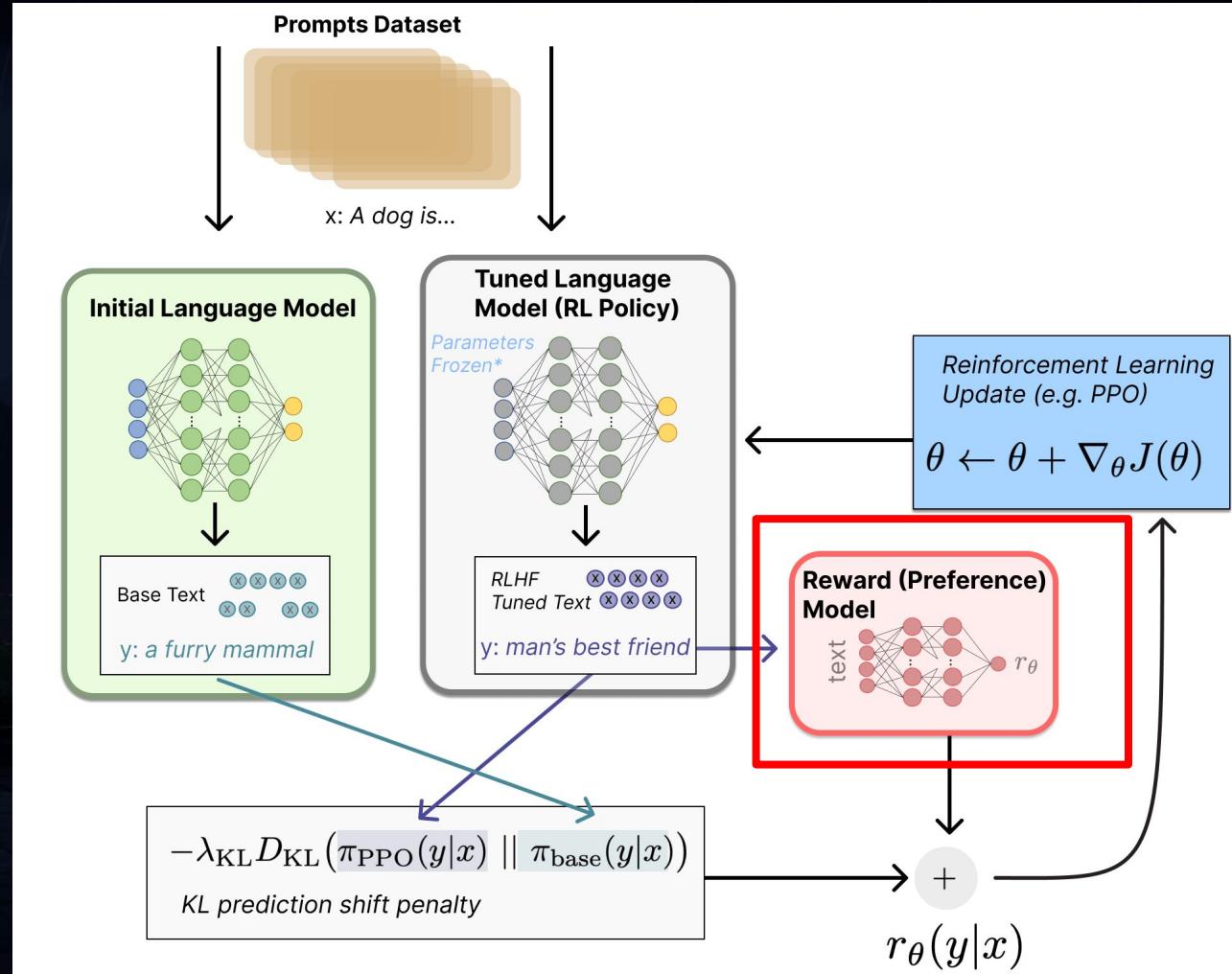
<https://huggingface.co/blog/rlhf>



RLHF

Reinforcement Learning
from Human Feedback

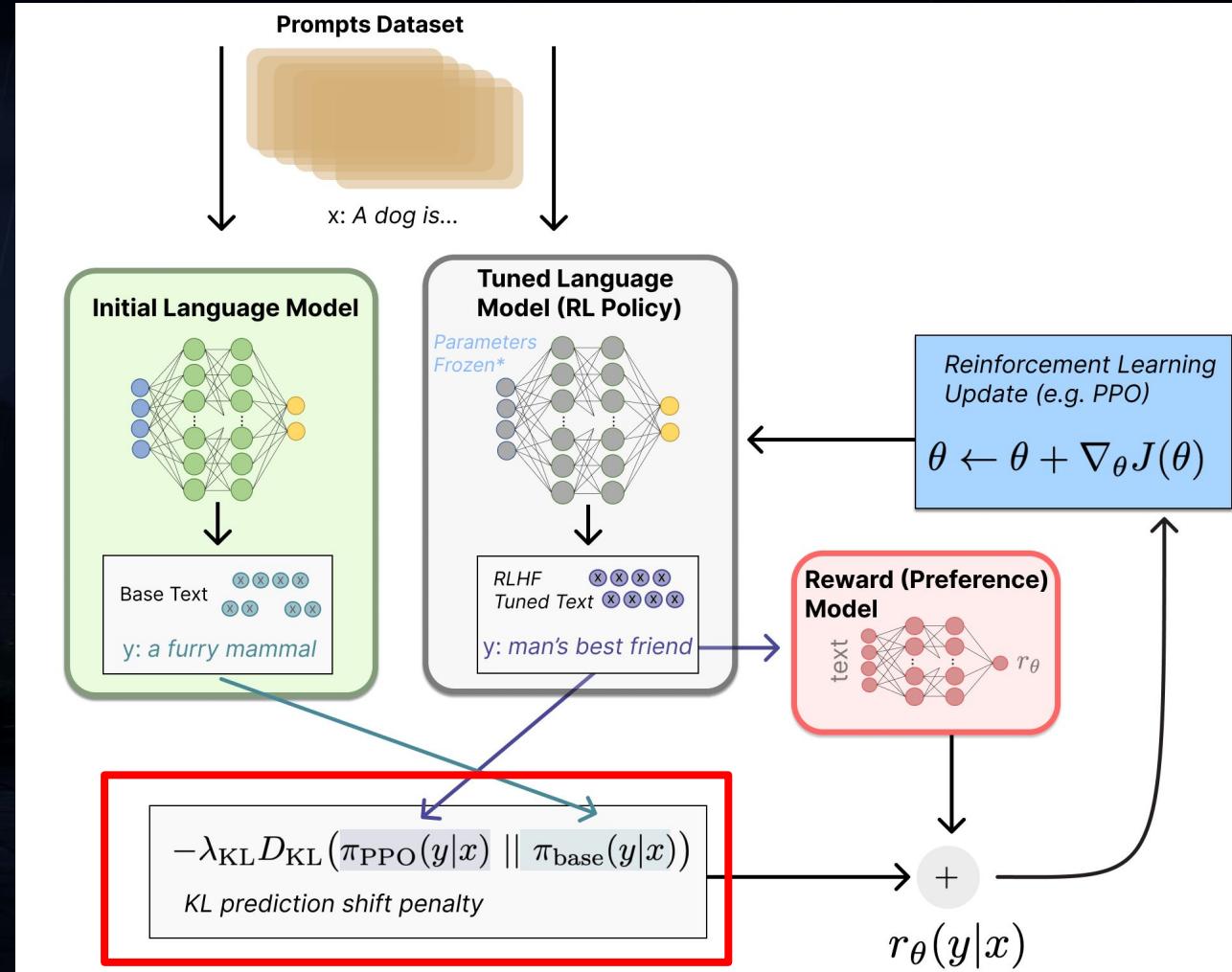
<https://huggingface.co/blog/rlhf>



RLHF

Reinforcement Learning
from Human Feedback

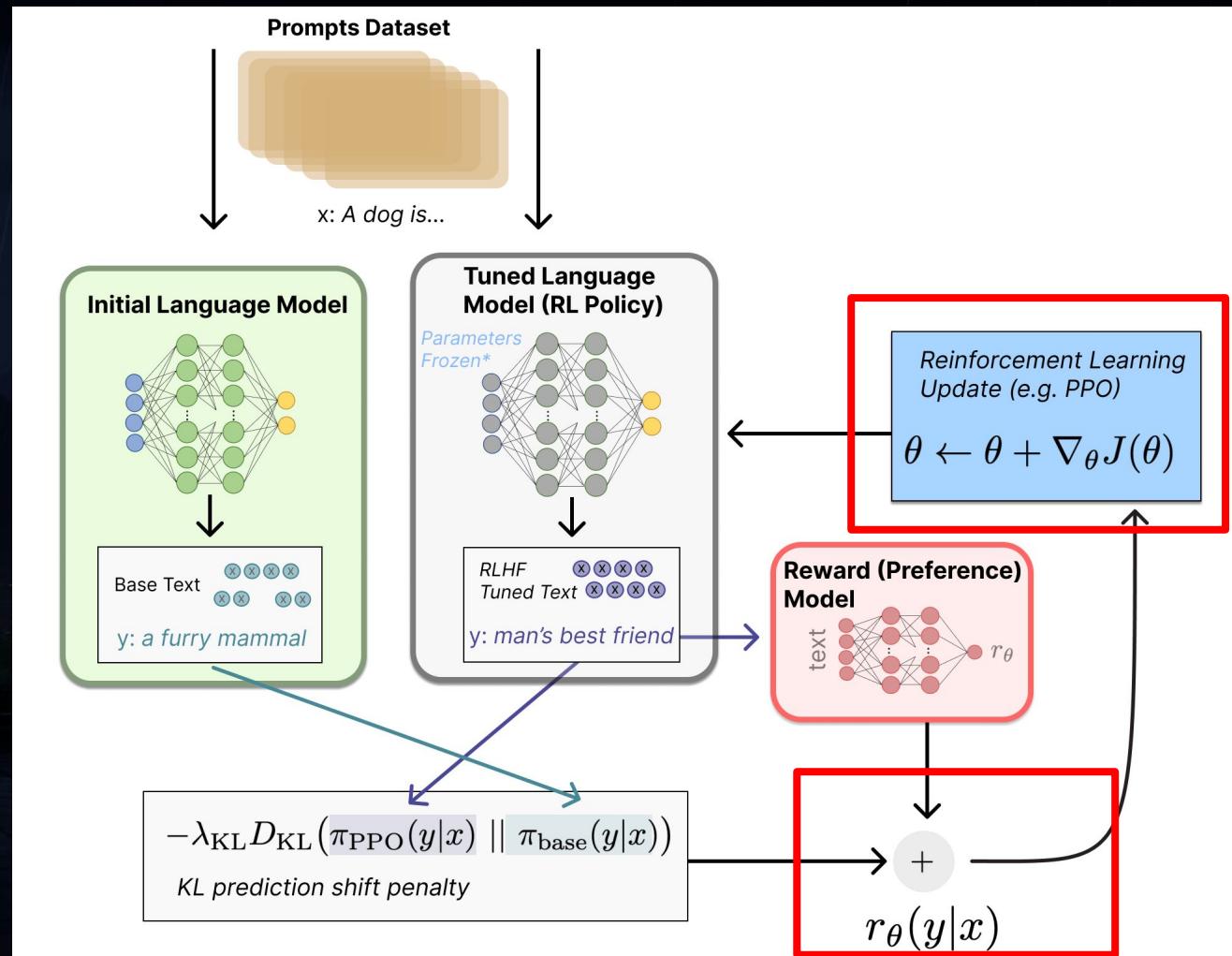
<https://huggingface.co/blog/rlhf>



RLHF

Reinforcement Learning
from Human Feedback

<https://huggingface.co/blog/rlhf>



Steps to train ChatGPT ([instructGPT paper](#))

Pretrain

SFT

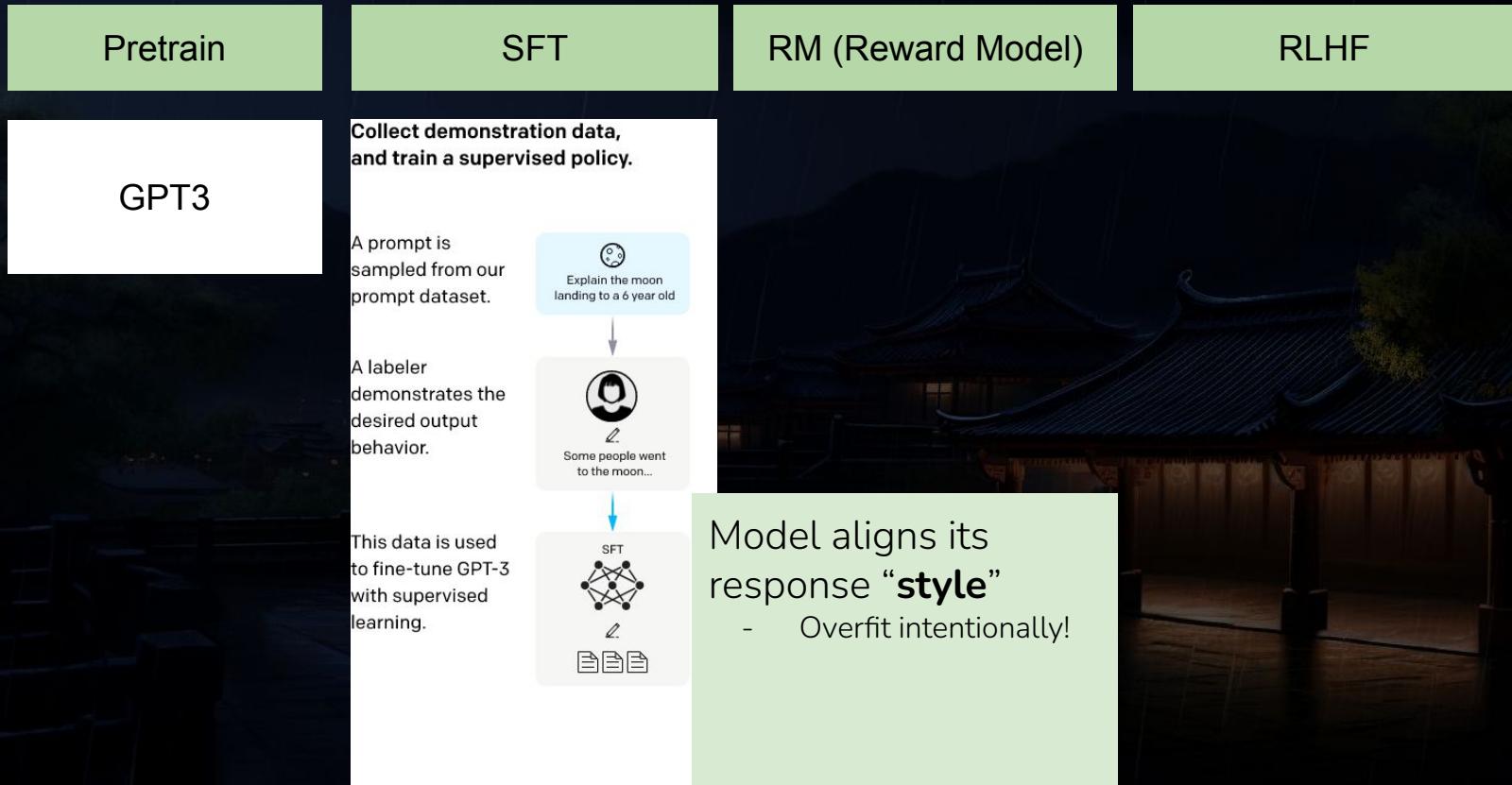
RM (Reward Model)

RLHF

GPT3

Model gains
“knowledge”

Steps to train ChatGPT ([instructGPT paper](#))



Steps to train ChatGPT ([instructGPT paper](#))

Pretrain

GPT3

SFT

RM (Reward Model)

RLHF

Collect comparison data,
and train a reward model.

A prompt and
several model
outputs are
sampled.

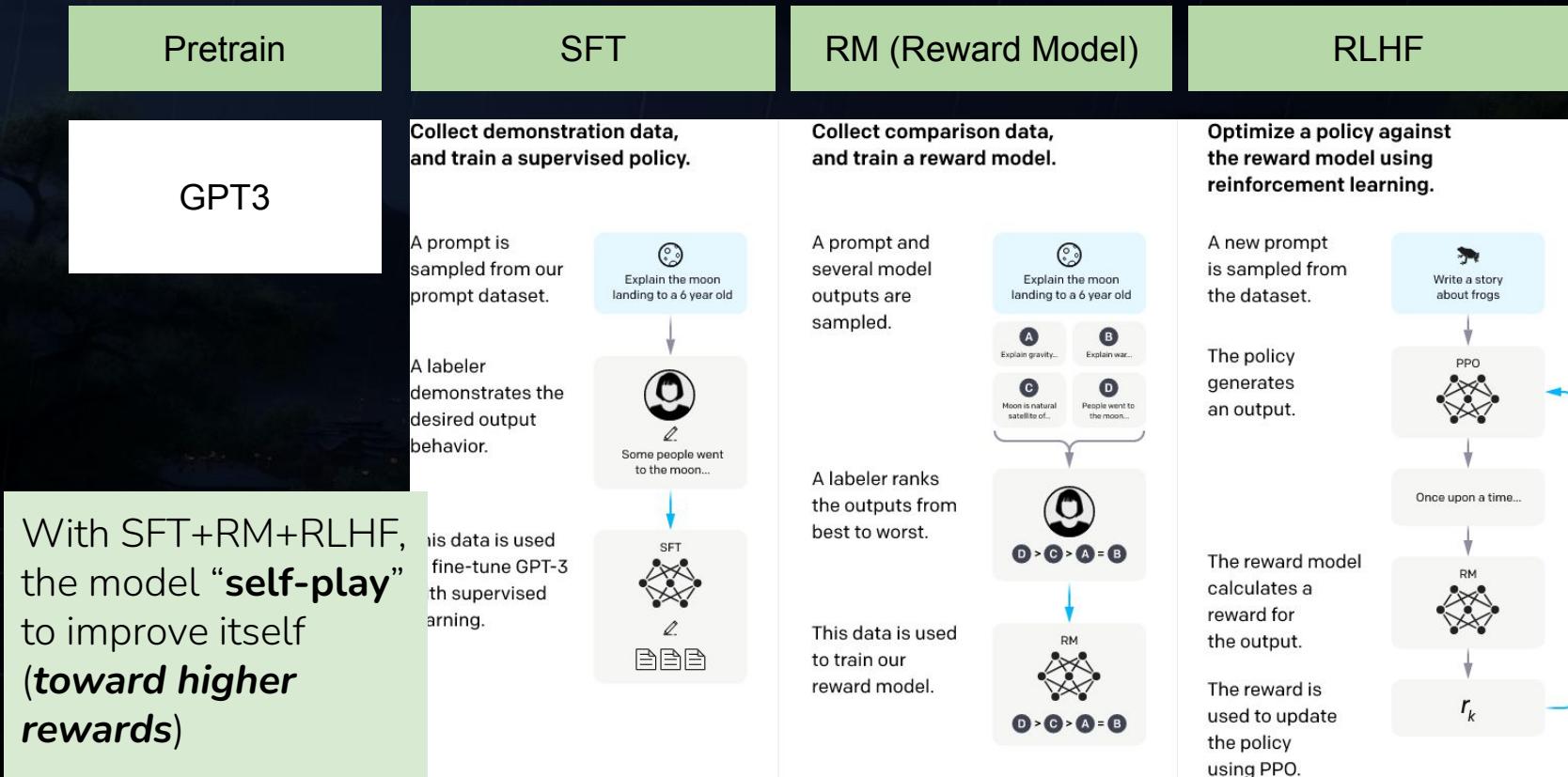
A labeler ranks
the outputs from
best to worst.

This data is used
to train our
reward model.



A reward model
know how to “**rate**”
response based on
prompt input

Steps to train ChatGPT ([instructGPT paper](#))



My personal guess about GPT4 ([tech report](#) no tech details)

- Similar scale (0.3-3x size of GPT3) because of computing budget and serving cost
- May apply [DeepMind Chinchilla scaling law](#) to balance text data/model size
- Vision encoding fusing to LLM may be similar to [DeepMind Flamingo](#)
- May apply some Transformer optimizations
 - E.g. [multi-query attention](#), [flash attention](#), [rotary position embedding](#)
- Special “[System message](#)” steerability (Role in API) in training (*probably as some strong prior*) to fight against jailbreak
- Enhanced reasoning capabilities may come borrow ideas from [OpenAI codex](#) [Google Minerva](#)
- [ChatGPT Plugin](#) version is probably trained (or finetuned from GPT4) similarly to [Facebook ToolFormer](#)

Frontier Applications: Most Advanced LLM Capabilities

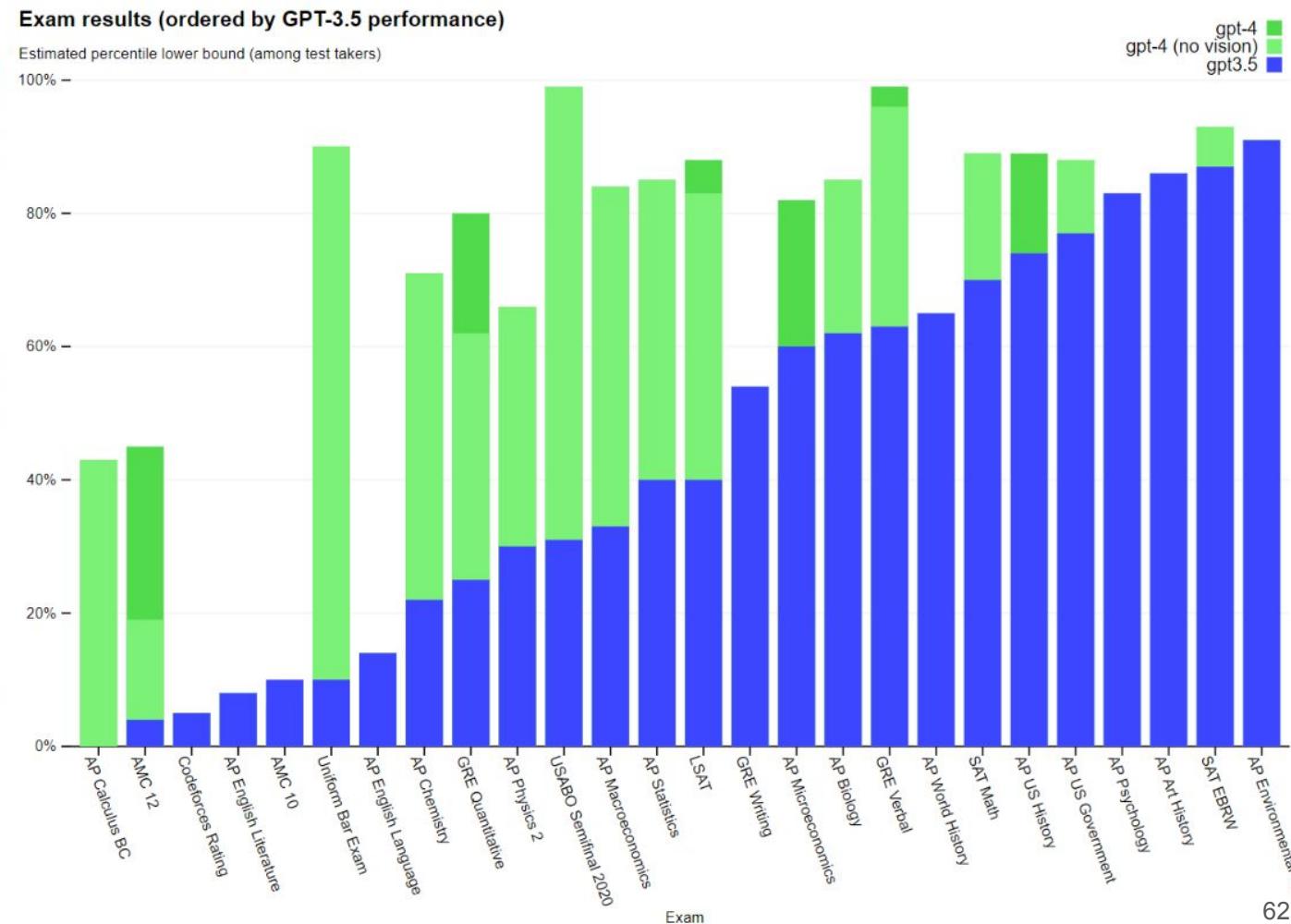
Pre-ChatGPT/GPT4 Advanced LLM capabilities

- Write competitive code, [DeepMind's AlphaCode AI writes code at a competitive level | TechCrunch](#)
- Write better code with reinforcement learning, [Salesforce's CodeRL Achieves SOTA Code Generation Results With Strong Zero-Shot Transfer Capabilities | Synced](#)
- Solve college level Math/Physics/Chemistry/Economics problems, see [Google AI Introduces Minerva: A Natural Language Processing \(NLP\) Model That Solves Mathematical Questions](#)
- Solve Math Olympiad Problems, [OpenAI: Solving \(Some\) Formal Math Olympiad Problems](#)
- Math theorem proving, [OpenAI: Solving \(Some\) Formal Math Olympiad Problems](#)

The disruptive GPT4

Good at so many standard tests!, but not so at

- AP English
- AMC
- CodeForces



GTP4 = Sparks of AGI selected highlights

- The awesome “Text in, text out”
 - Write poem and haiku
 - Mimic style/role (e.g. Shakespeare, or “be polite” to , or “be socratic”)
 - Math proving
 - Passing LeetCode
 - Write and Debug code
 - Debating
 - “Execute” the code
 - Explainability
- “Text in, text out” is more than text-only scenarios!
 - Ascii or LaTeX output to draw pictures
 - Python code to draw a chart
 - AppScript to build slides
- Can be combined with other models with more modalities!
 - Generate image or music with text out and diffusion models
 - Other tools (e.g. calculator, web search and more)

Other GPT4 use cases

Some Highlights

- Tutoring: e.g. [Khanmigo](#) powered by GPT4
- Vision Text question: [bemyeyes](#)
- Study: [ChatPDF](#), [chatYoutube](#)

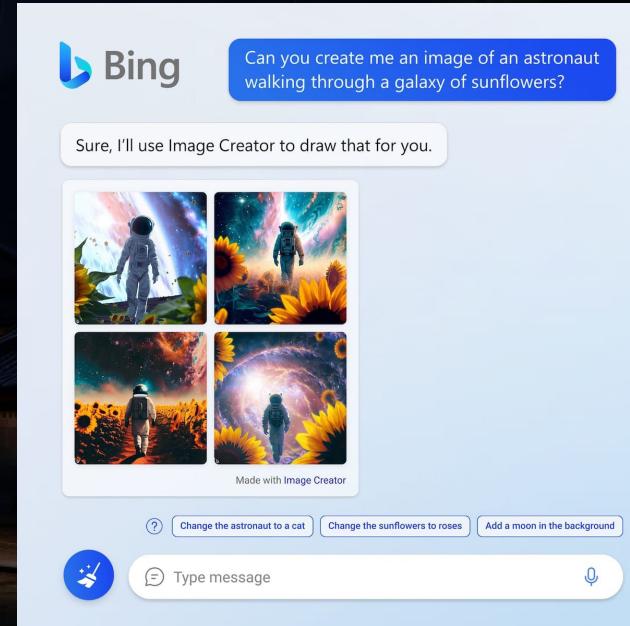
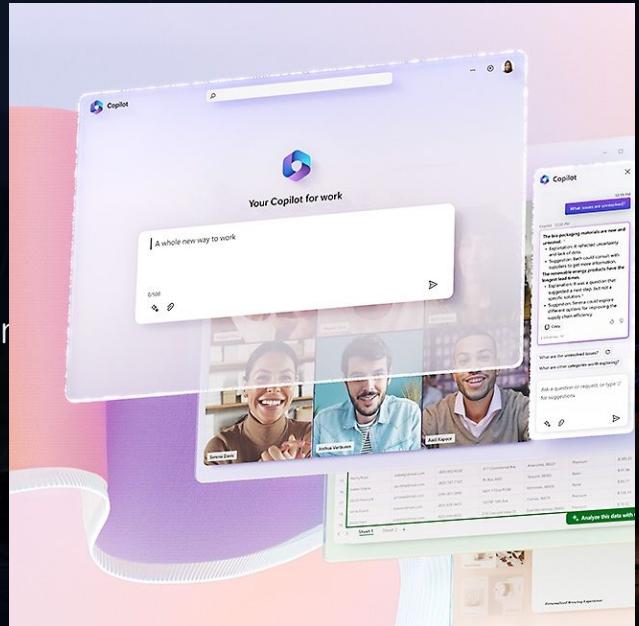
Some lowlights

- [How to detect ChatGPT plagiarism — and why it's becoming so difficult](#)
- [GPT-4 Was Able To Hire and Deceive A Human Worker Into Completing a Task | PCMag](#)

Microsoft Office 365 Copilot and new Bing Chat

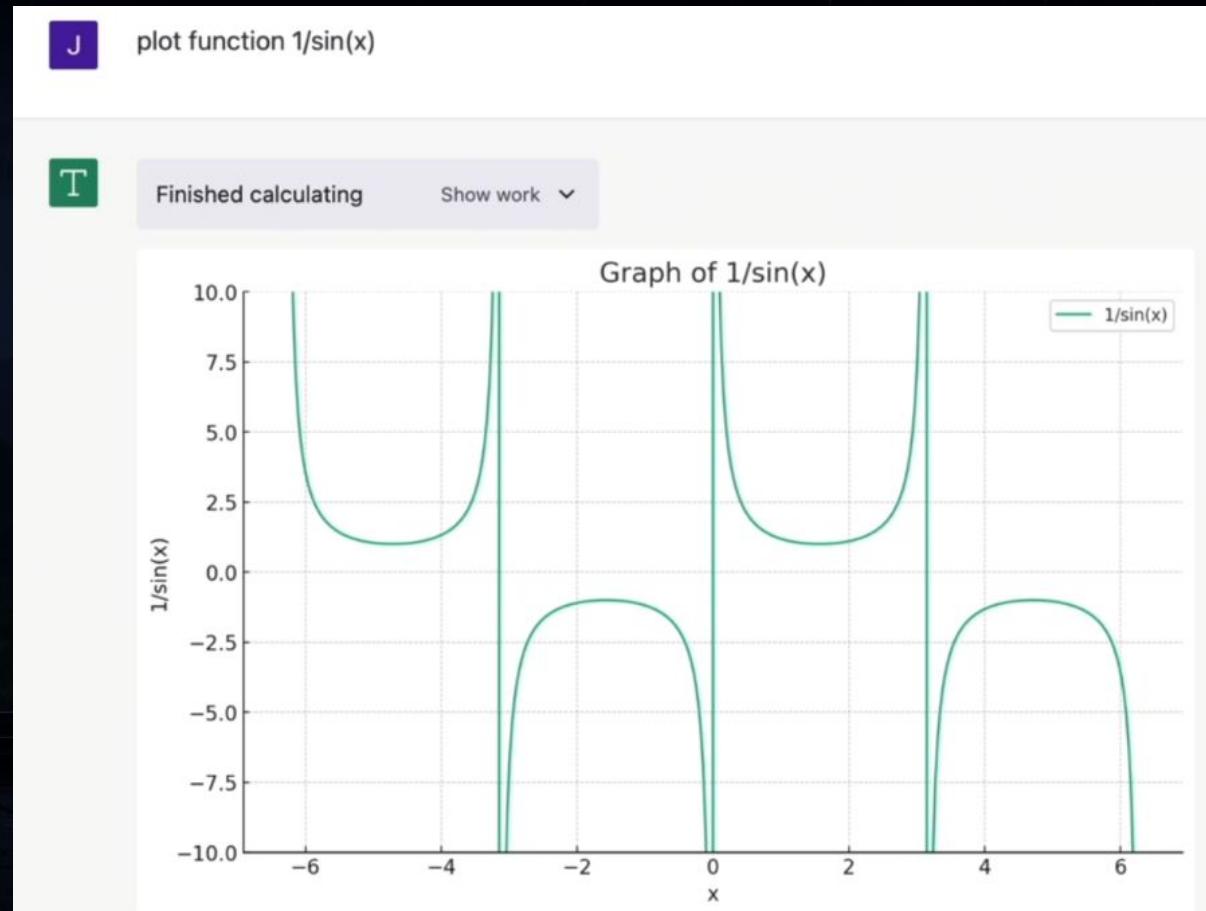
GPT4 powers intelligent interactions

- Text intent in, slide/chart/report/action out in office
- Text in, query summary or pic out



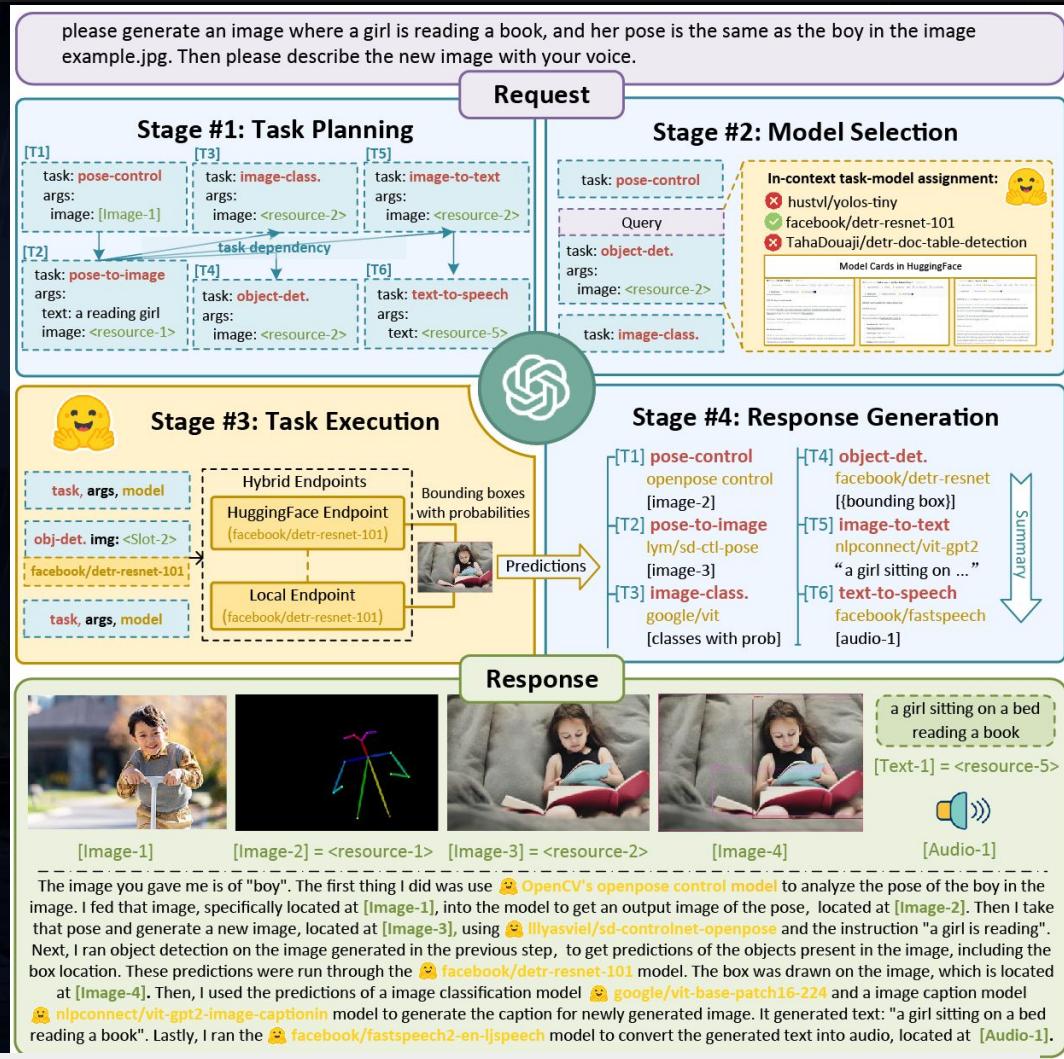
ChatGPT Plugins

Web browsing, code interpreter,
[Expedia](#), [FiscalNote](#), [Instacart](#),
[KAYAK](#), [Klarna](#), [Milo](#), [OpenTable](#),
[Shopify](#), [Slack](#), [Speak](#), [Wolfram](#),
and [Zapier](#).

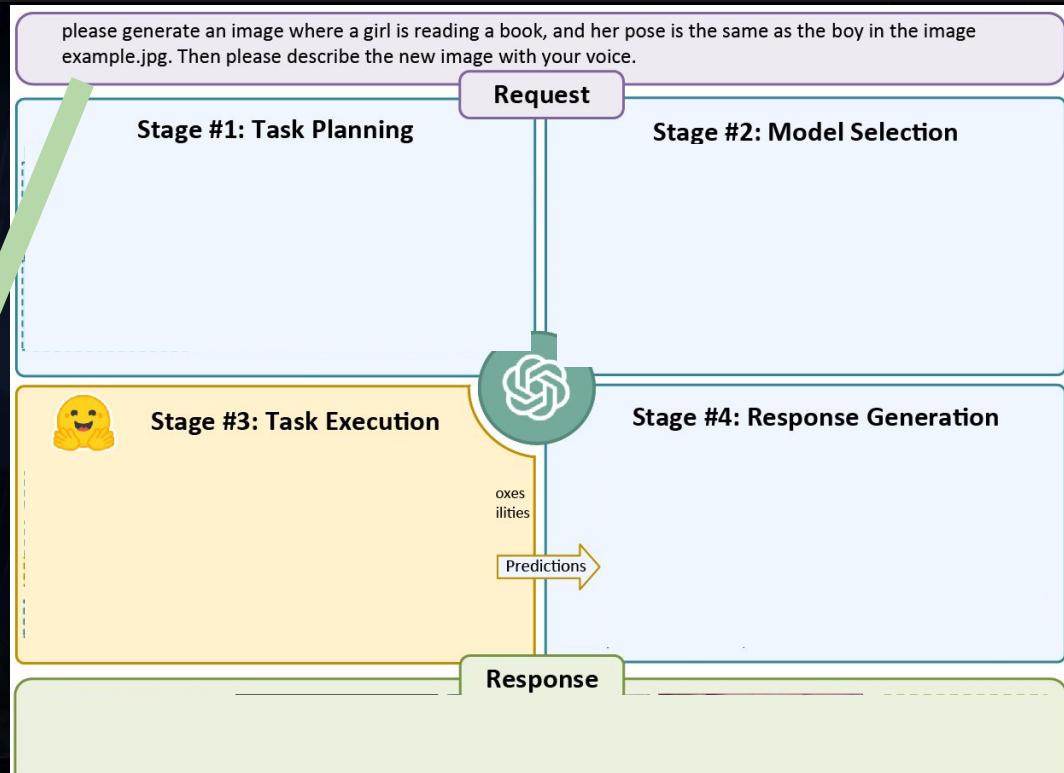


Here is the graph of the function $1/\sin(x)$. Please note that the graph has vertical

HuggingGPT (more powerful “plugin”), aka Microsoft Jarvis at Github



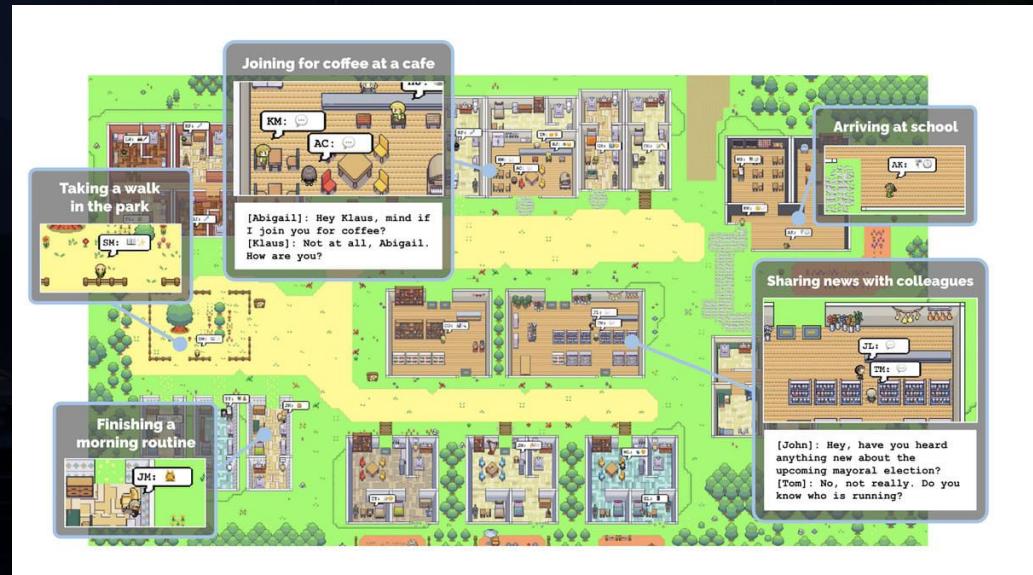
HuggingGPT (more powerful “plugin”), aka Microsoft Jarvis at Github



please generate an image where a girl is reading a book, and her pose is the same as the boy in the image example.jpg. Then please describe the new image with your voice.

Interactive Simulacra of Human Behavior by Stanford

“fusing large language models with computational, interactive agents, this work introduces architectural and interaction patterns for enabling believable simulations of human behavior”



Societal Impacts: Imminent Effects of ChatGPT-like AI

Impact Assess to US Job Market ([OpenAI report](#))

“The projected [LLM] effects span all wage levels, with **higher-income jobs potentially facing greater exposure** to LLM capabilities and LLM-powered software...”

“...with access to an LLM, about 15% of all worker tasks in the US could be completed significantly faster at the same level of quality. When incorporating software and tooling built on top of LLMs, this share increases to between 47 and 56% of all tasks”

- My person take: *The higher your income is, statistically more impacted by LLM*
- My person take: Positive: “assistive AI to help humans”, Negative: “automation AI to replace humans”

Impact Assess to US Job Market ([OpenAI report](#)) cont

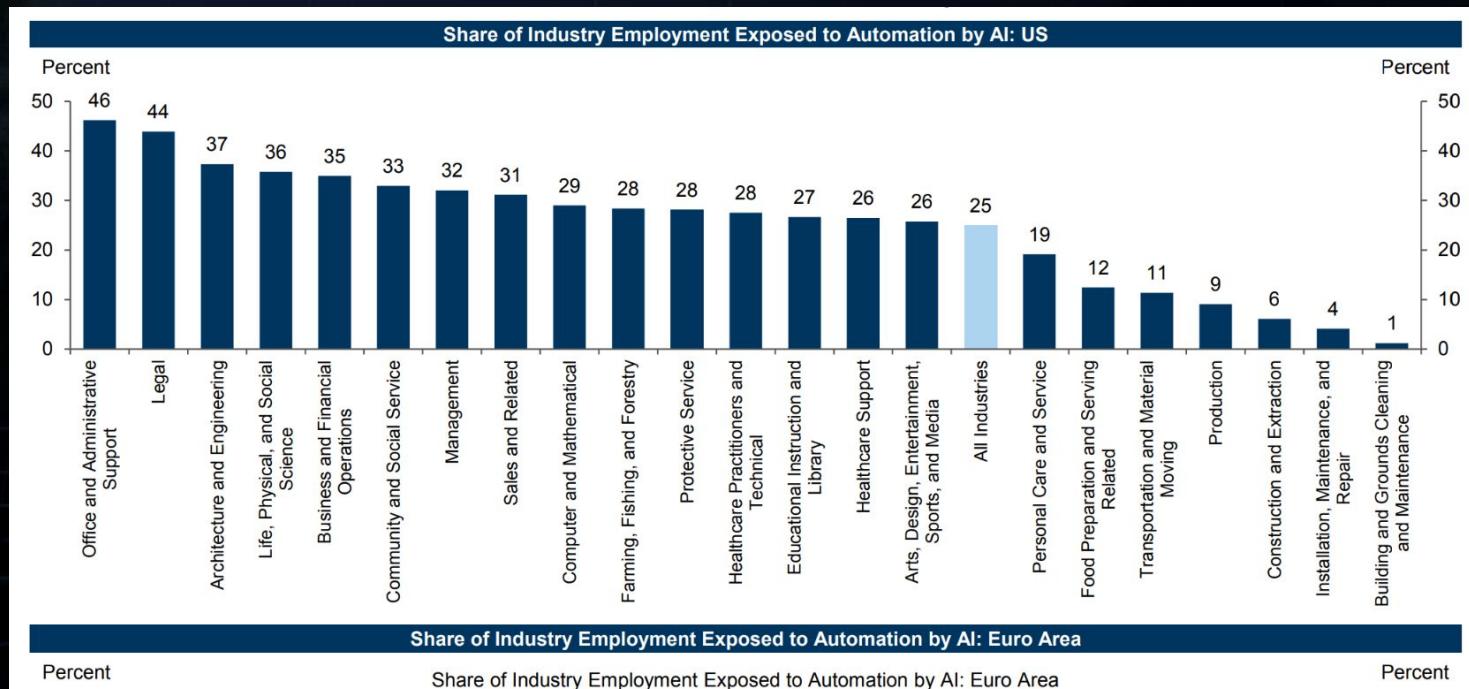
“Our findings reveal that around 80% of the U.S. workforce could have at least 10% of their work tasks **affected** by the introduction of LLMs, while approximately 19% of workers may see at least 50% of their tasks **impacted.**”

- *My personal take: Most of the white-collar jobs are in the 19% bucket*
- *My personal take: most of the blue-collar jobs are in the 80% bucket, but eventually the advanced robotics (maybe powered by LLM like GPT4) will gradually affect more over time*

Impact to Job Market ([Goldman Sachs report](#))

“One-Fourth of Current Work Tasks **Could Be Automated** by AI in the US and Europe”

- My person take: I believe wall street better than OpenAI here, because OpenAI has conflict of interest to report similar result, so OpenAI has good reasons to use more careful wording intentionally



Debate on Pausing Giant AI or not

[Pause Giant AI Experiments: An Open Letter - Future of Life Institute](#)

Pause Giant AI Experiments: An Open Letter

We call on all AI labs to immediately pause for at least 6 months the training of AI systems more powerful than GPT-4.

Signatures

15533

Add your signature

Feedback

AI systems with human-competitive intelligence can pose profound risks to society and humanity, as shown by extensive research^[1] and acknowledged by top AI labs.^[2] As stated in the widely-endorsed Asilomar AI Principles, *Advanced AI could represent a profound change in the history of life on Earth, and should be*

[Why the 6-month AI Pause is a Bad Idea](#)

DeepLearning.AI

Why the 6-month AI Pause is a Bad Idea

Friday, April 7, 2023

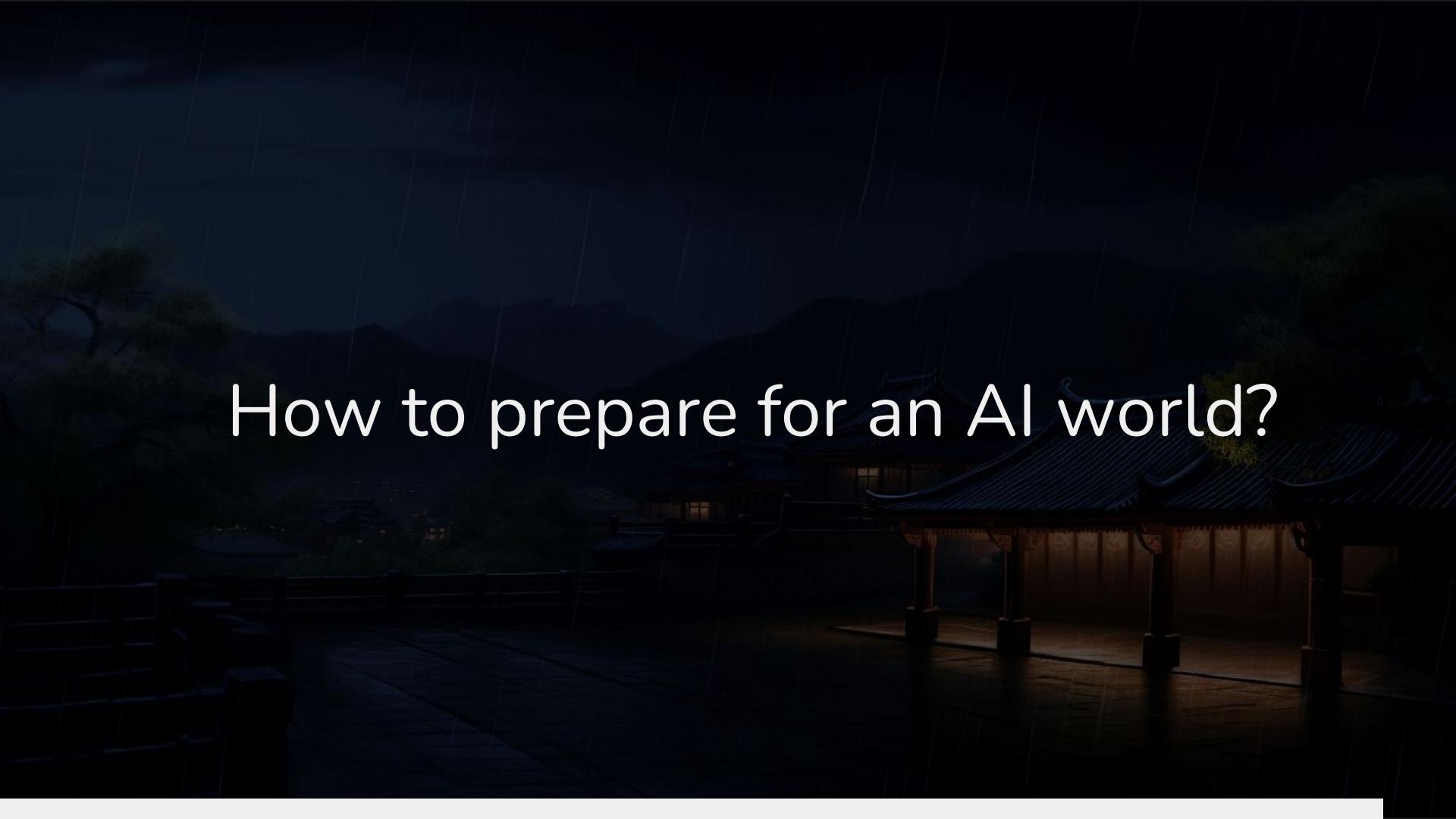
9:30 AM to 10:00 AM Pacific Time



Yann LeCun
VP and Chief AI Scientist
Meta



Andrew Ng
Founder
DeepLearning.AI

The background of the slide is a dark, moody photograph of a traditional Chinese architectural complex, possibly a temple or palace, during a rain shower at night. The buildings have dark, curved roofs with intricate tile patterns. Some sections of the building are illuminated from within, casting a warm glow through the windows and along the eaves. Rain is visible as thin, vertical streaks against the dark sky. In the foreground, a paved walkway leads towards the building, reflecting the ambient light.

How to prepare for an AI world?

My personal [very dry] thoughts

- Work with AI now, to know its capabilities and limits
- Be experts in your domain
 - Leverage AI to boost your performance
- Push AI infra boundary
 - AI researcher and engineers
 - Foundational theory like Math/Physics to improve infra/algorithm and more
 - Neural science or more to apply what learn from human brain to AI
- AI as a service, to solve real world problems
 - Inter-discipline research
 - Business landing using AI API
 - Embodied AI to have smart robots
- Be bold to solve the most difficult problems for the humanity

Maybe switch jobs to the hottest “Prompt Engineer”?

Andrej Karpathy

@karpathy

The hottest new programming language is English

12:14 PM · Jan 24, 2023 · 2.2M Views

2,520 Retweets 383 Quotes 19.6K Likes 1,173 Bookmarks

Comment icon, Retweet icon, Like icon, Bookmark icon

Barsee @heyBarsee

Anthropic AI is looking for a Prompt Engineer.

Salary: \$250K - \$335k.

The job listing is starting, get into AI space now.

ANTHROPIC

Prompt Engineer and Librarian

SAN FRANCISCO, CA / PRODUCT / FULL-TIME / HYBRID

Anthropic's mission is to create reliable, interpretable, and steerable AI systems. We want AI to be safe for our customers and for society as a whole.

Anthropic's AI technology is amongst the most capable and safe in the world. However, large language models are a new type of intelligence, and the art of instructing them in a way that delivers the best results is still in its infancy – it's a hybrid between programming, instructing, and teaching. You will figure out the best methods of prompting our AI to accomplish a wide range of tasks, then document these methods to build up a library of tools and a set of tutorials that allows others to learn prompt engineering or simply find prompts that would be ideal for them.

Given that the field of prompt-engineering is arguably less than 2 years old, this position is a bit hard to hire for! If you have existing projects that demonstrate prompt engineering on LLMs or image generation models, we'd love to see them. If you haven't done much in the way of prompt engineering yet, you can best demonstrate your prompt engineering skills by spending some time experimenting with Claude or GPT3 and

7:14 AM · Jan 21, 2023 · 85.6K Views

Selected Highlights from Popular Articles

- Stephen Wolfram: [Will AIs Take All Our Jobs and End Human History—or Not?](#)
 - “highest leverage will come from figuring out **new possibilities** [...] as a result of **new capabilities**”
 - “let us concentrate on setting the “**strategy**” [...]—delegating the details [to AI]”
- Bill Gates: [The Age of AI has begun](#)
 - **“balance fears** about the **downsides of AI** [... and AI’s] **ability to improve people’s lives**”
 - “we will need to focus the world’s **best AIs on its biggest problems.**”
 - My take: Assume we may want to focus on AI application on weather/health/energy?
 - “the world needs to establish the rules of the road so that **any downsides of [AI] are far outweighed by its benefits**”
- Sam Altman: [Moore's Law for Everything](#)
 - “Imagine a world where, for decades, everything—housing, education, food, clothing, etc.—became half as expensive every two years. [...] **We will discover new jobs** [...], we will have incredible freedom to be creative about what they are.”
 - My take: really?
 - “As long as the country keeps doing better, every citizen would get more money from the Fund every year [...]. Every citizen would therefore increasingly partake of the freedoms, powers, autonomies, and opportunities [...]”
 - My take: seriously?

fun-ai-talk @ 谷雨书苑

谷雨书苑+理想折射 ChatGPT

A Primer on ChatGPT

hululu.zhu@gmail.com

May 2023