

AGI时代数字学术的范式变革



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大纲

- 奇点已来?
 - 第五范式?
 - 从赋能到颠覆?
-

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AGI奇点已来？

- 2020年5月 GPT3.0发布
- 2022年11月30日ChatGPT发布（基于GPT3.5, instructGPT），进入AGI时代
- Midjourney、DALL-E 2和Stable Diffusion等文生图图生图，加上Whisper语音功能
- 2023年3月15日GPT4.0发布，全面支持多模态
- 各类“副驾驶”和成千上万的插件不断发布
- 微软、Adobe应用集成AI功能
- 2023年4月5日SAM发布以及3D
- 2023年4月Chatbox/OpenAssistant/GPT4ALL全开源模型，以及Langchain/AutoGPT等全自动应用开发框架，MacGPT等综合和领域应用产品发布，产业生态逐渐兴起
-

What, like it's hard?

Academic and professional exam scores (and percentiles) of Open AI's latest models

Exam	GPT-4	GPT-3.5
Uniform Bar Exam	298/400 (~90th)	213/400 (~10th)
LSAT	163/180 (~88th)	149/180 (~40th)
SAT Reading & Writing	710/800 (~93rd)	670/800 (~87th)
SAT Math	700/800 (~89th)	590/800 (~70th)
GRE Verbal	169/170 (~99th)	154/170 (~63rd)
GRE Writing	4/6 (~54th)	4/6 (~54th)
AP Biology	5/5 (85th-100th)	4/5 (62nd-85th)
AP Calculus BC	4/5 (43rd-59th)	1/5 (0th-7th)
AP Chemistry	4/5 (71st-88th)	2/5 (22nd-46th)
AP English Language and Composition	2/5 (14th-44th)	2/5 (14th-44th)
AP English Literature and Composition	2/5 (8th-22nd)	2/5 (8th-22nd)
AP Macroeconomics	5/5 (84th-100th)	2/5 (33rd-48th)
Introductory Sommelier	92%	80%
Advanced Sommelier	77%	46%
Leetcode (easy)	31/41	12/41
Leetcode (hard)	3/45	0/45

Table: J.D. Capelouto/Semafor • Source: OpenAI

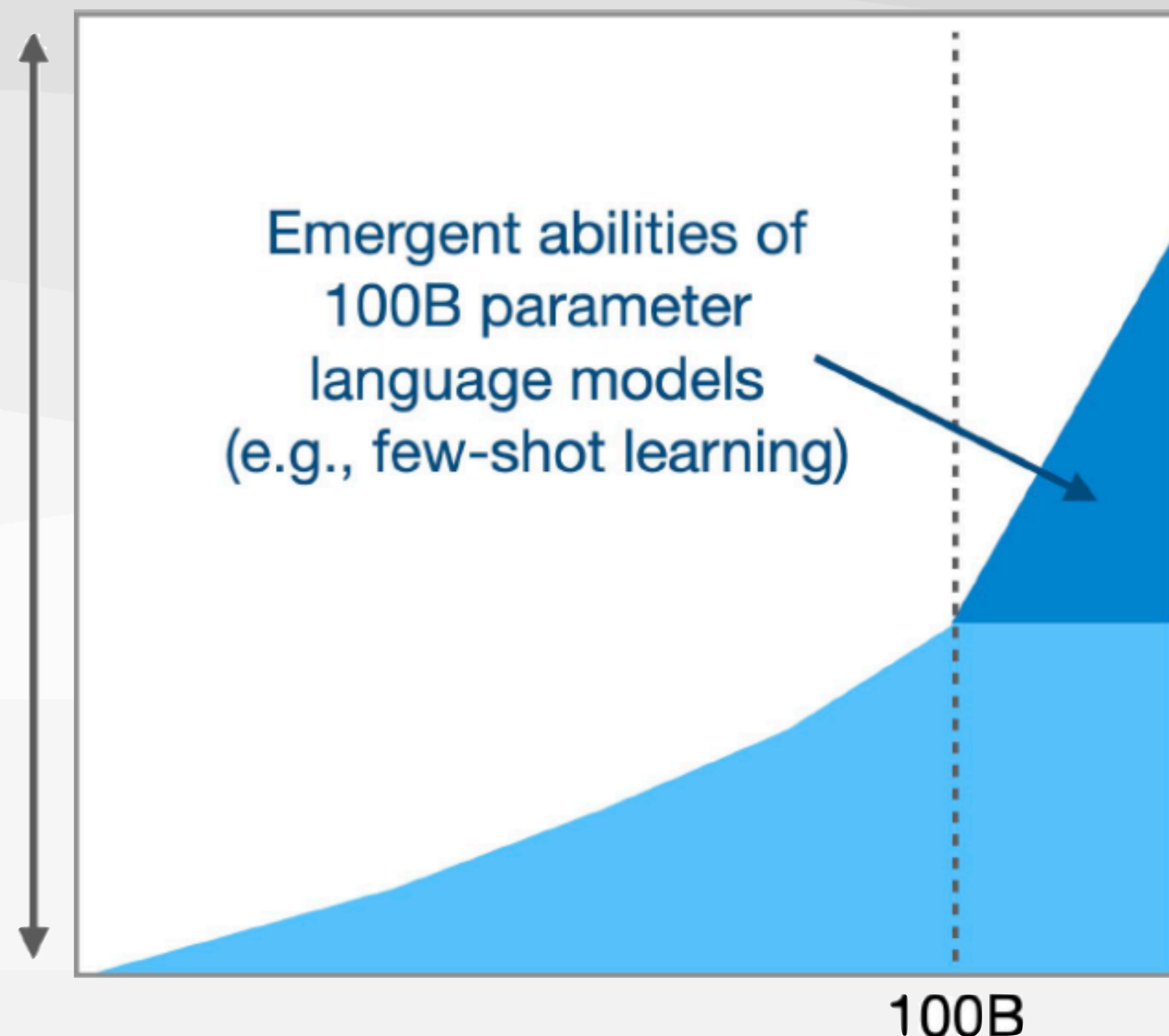
涌现已现

ChatGPT是什么：

- 聊天机器人 (Chatbot)
- 生成式人工智能 (GPT)
- 大语言模型 (LLM)
- AGI的雏形

大力如何出奇迹：

- GPT1:信息浓缩
- GPT2:任务迁移
- GPT3:知识泛化
- GPT3.5:推理闪现
- GPT4:对齐约束



万能的GPT-4？

- 语言能力：对话（角色扮演）；解答；翻译；写文章；写摘要；语音生成；文本转录；文音互译。
 - 图像能力：理解图像，这是一项突破性的功能，它将永远改变视障人士的生活。
 - 多模态能力：理解多种媒体内容，并随意交互，多种输出（文本、图像、3D图像、音频、视频）。
 - 编程能力：草图生成界面，文本产生代码、直接生成游戏，程序纠错等等。
 - 数学能力：处理复杂的数学任务，包括推理，如破译复杂的税码和执行复杂的计算。
 - Iphone时刻——“涌现”出上述能力的通用能力，能够创建高度定制化的人工智能丰富场景，针对特定用例定制模型，提供流畅的交互和响应。
 - 前景无限，市场沸腾——集成搜索，办公软件，艺术创作，软件开发，写作工具.....
-

A Deep Learning Approach to Antibiotic Discovery

Jonathan M. Stokes • Kevin Yang ¹⁰ • Kyle Swanson ¹⁰ • ... Tommi S. Jaakkola • Regina Barzilay ¹⁰ • James J. Collins ¹¹ • Show all authors • Show footnotes

Open Archive • DOI: <https://doi.org/10.1016/j.cell.2020.01.021> • Check for updates

Highlights

Summary

Graphical

Abstract

Keywords

Introduction

Results

Discussion

STAR★Methods

Acknowledgment

s

Supplemental

Information

References

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Highlights

- A deep learning model is trained to predict antibiotics based on structure
- Halicin is predicted as an antibacterial molecule from the Drug Repurposing Hub
- Halicin shows broad-spectrum antibiotic activities in mice
- More antibiotics with distinct structures are predicted from the ZINC15 database

Summary

Due to the rapid emergence of antibiotic-resistant bacteria, there is a growing need to discover new antibiotics. To address this challenge, we trained a deep neural network capable of predicting molecules with antibacterial activity. We performed predictions on multiple chemical libraries and discovered a molecule from the Drug Repurposing Hub—halicin—that is structurally divergent from conventional antibiotics and displays bactericidal activity against a wide phylogenetic spectrum of pathogens including *Mycobacterium tuberculosis* and carbapenem-resistant Enterobacteriaceae. Halicin also effectively treated *Clostridioides difficile* and pan-resistant *Acinetobacter baumannii* infections in murine models. Additionally, from a discrete set of 23 empirically tested predictions from >107 million molecules curated from the ZINC15 database, our model identified eight antibacterial compounds that are structurally distant from known antibiotics. This work highlights the utility of deep learning approaches to expand our antibiotic arsenal through the discovery of structurally distinct antibacterial molecules.

Graphical Abstract

PDF [8 MB]

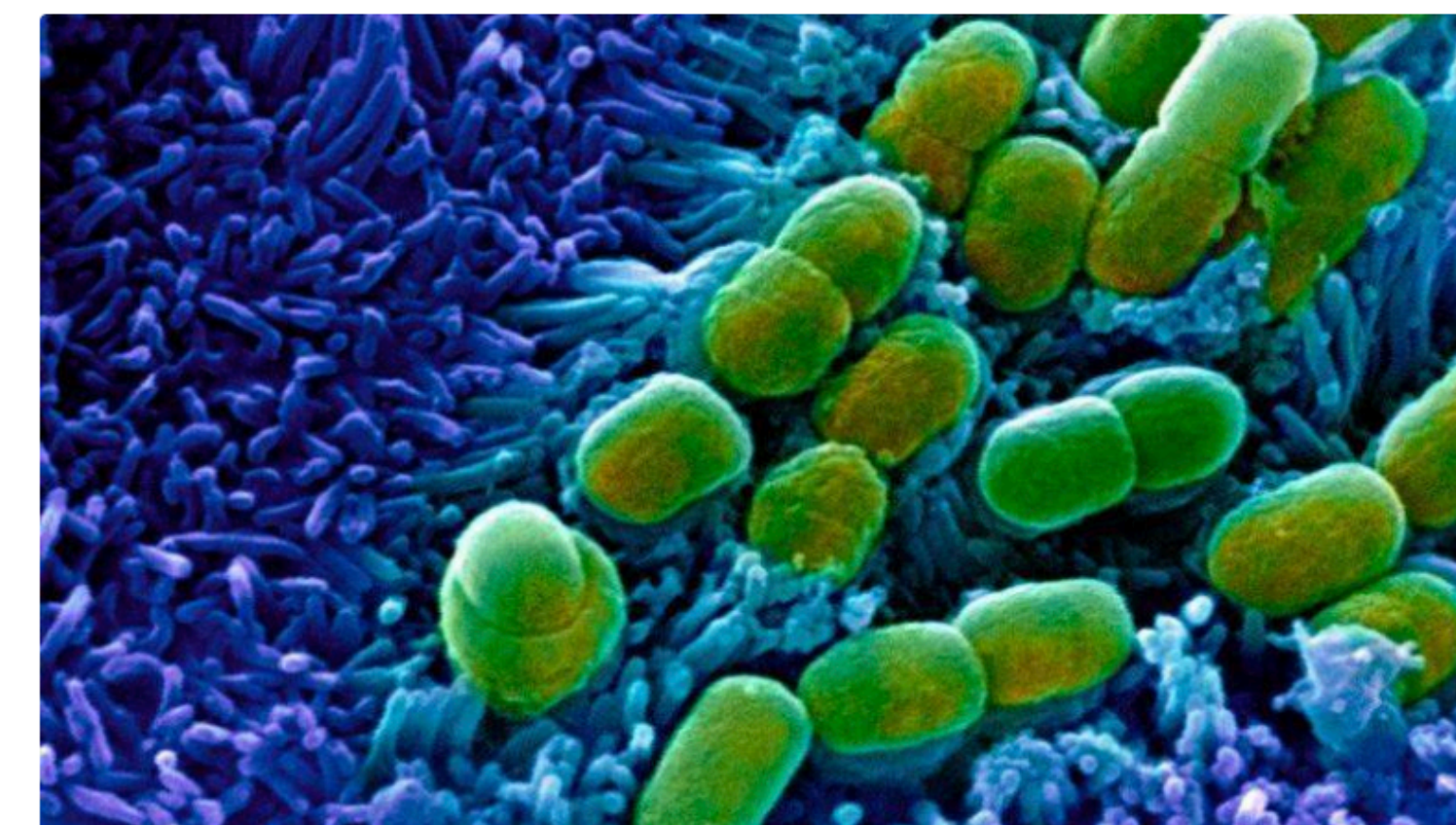
2020-02-24 13:56

人类首次完全利用AI发现“迄今最强抗生素”，登上《细胞》杂志封面

机器之心 [关注](#)

本文来自公众号：机器之心 (ID: almosthuman2014)，作者：Synced

MIT 科学家用深度学习模型发现的“halicin”抗生素分子展示了前所未有的广谱抗菌能力，这是人类首次完全使用人工智能的方法发现新抗生素。研究人员表示，halicin 可以消灭一些世界上最危险的细菌。他们的这一研究登上了生命科学顶级期刊《Cell》。



Creepy AI-Created Portrait Fetches \$432,500 at Auction

By Jeanna Bryner, Live Science Managing Editor | October 25, 2018 06:12pm ET

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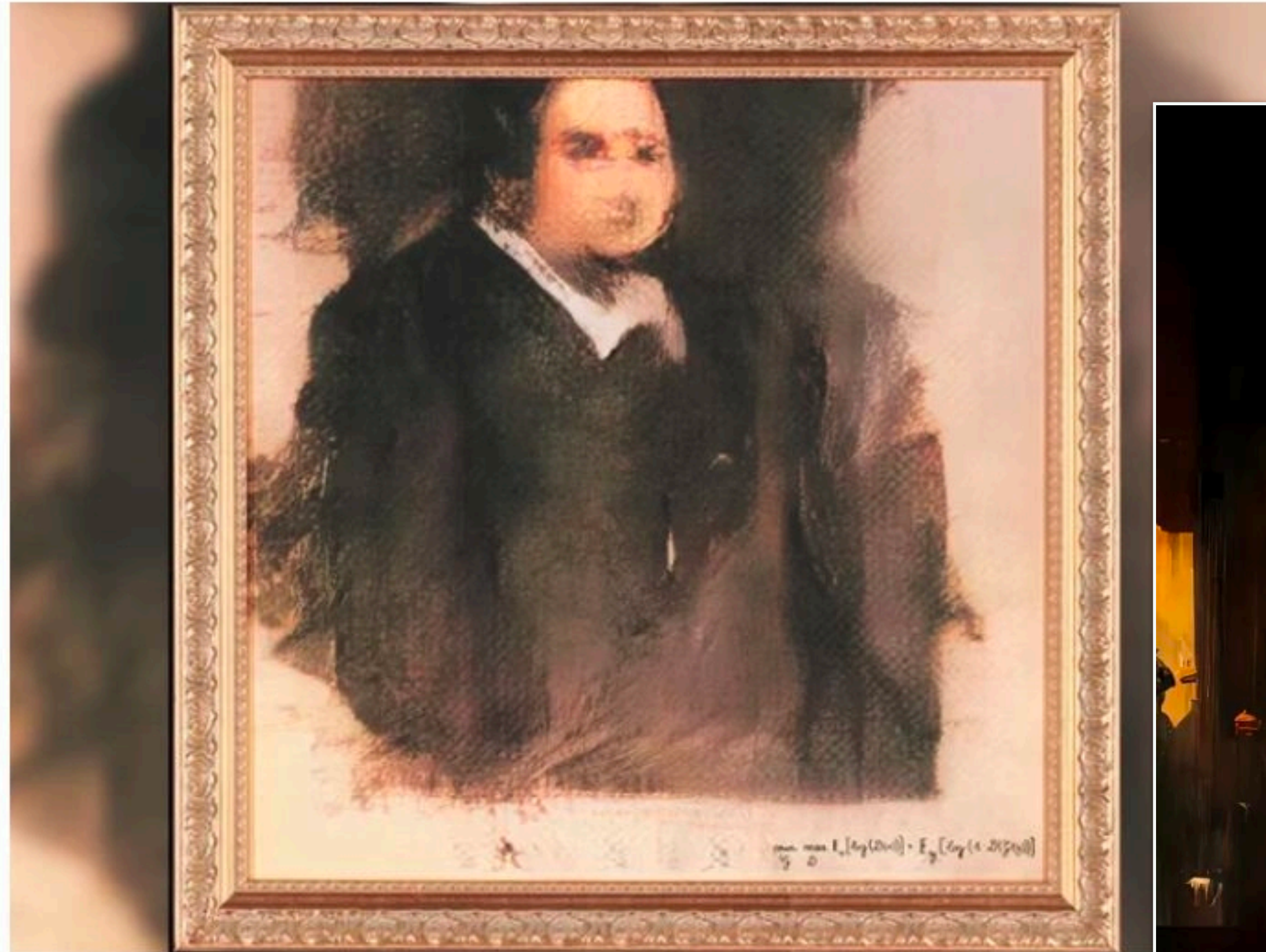
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MORE ▾



Parisian art collective Obvious created this "Portrait of Edmond De Belamy" using artificial intelligence.

Credit: Obvious





看图回答问题

- 问：我可以用这些做什么？
- 答：有很多选择。包括：煎饼或华夫饼；可丽饼；法式吐司；煎蛋卷或煎饼；乳蛋饼；奶油或布丁；蛋糕或纸杯蛋糕；松饼或面包；饼干。。。可能性是无穷无尽的。



GPT-4 visual input example, Chicken Nugget Map:

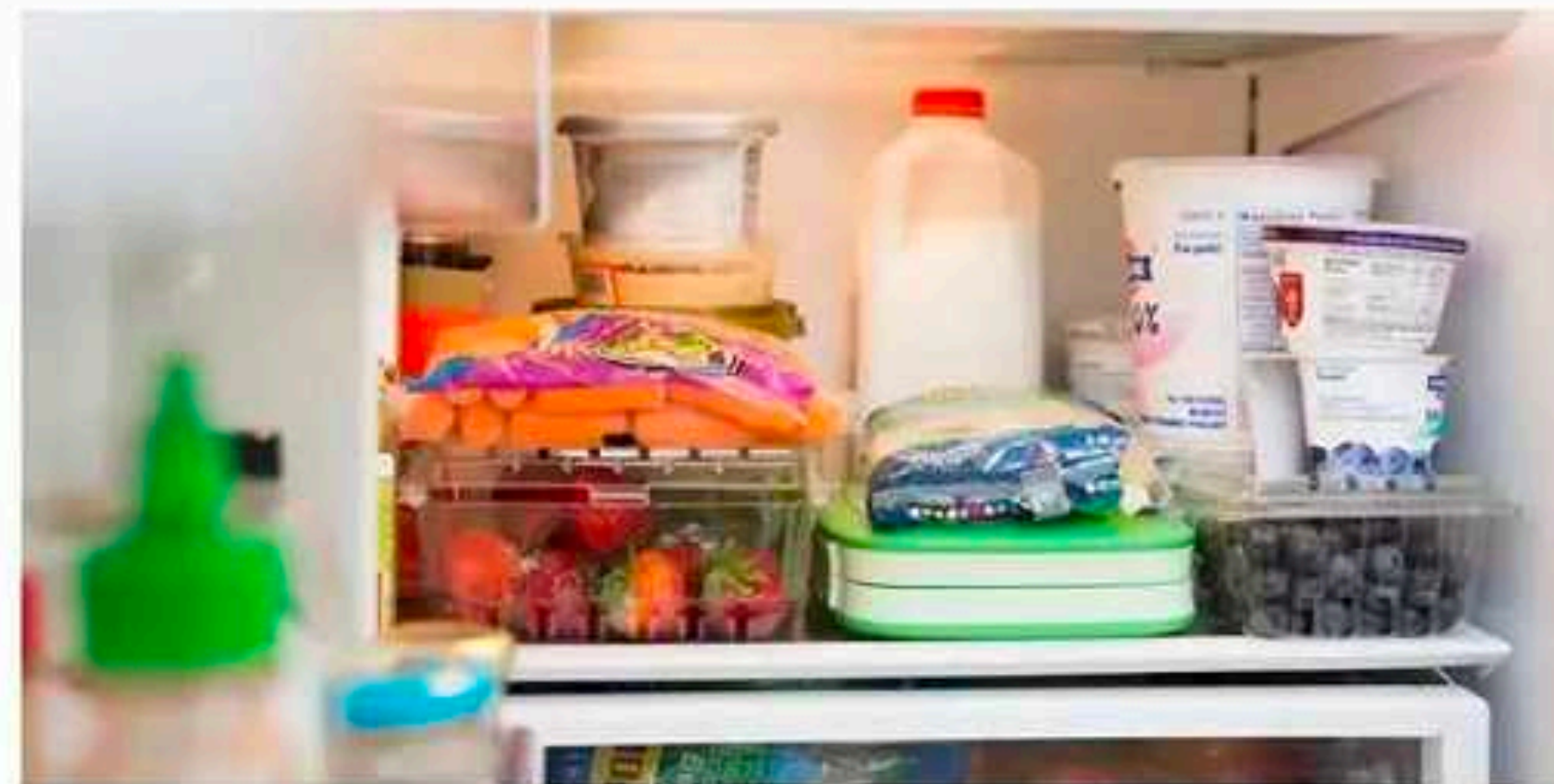
User Can you explain this meme?

Sometimes I just look at pictures of the earth from space and I marvel at how beautiful it all is.



GPT-4 This meme is a joke that combines two unrelated things: pictures of the earth from space and chicken nuggets. The text of the meme suggests that the image below is a beautiful picture of the earth from space. However, the image is actually of chicken nuggets arranged to vaguely resemble a map of the world. The humor in this meme comes from the unexpected juxtaposition of the text and the image. The text sets up an expectation of a majestic image of the earth, but the image is actually something mundane and silly.

GPT-4



我可以用这个做几顿饭?

根据冰箱中可见的物品, 这里有一些用餐建议:

- 1) 酸奶冻糕: 将酸奶、草莓和蓝莓分层放在碗或罐子里。顶部撒上蜂蜜或坚果以增加口感和风味。
- 2) 胡萝卜和鹰嘴豆泥包裹: 将鹰嘴豆泥涂在玉米饼或包裹上。上面放上切碎的胡萝卜和任何其他想要的蔬菜。卷起来享受吧!

Table 18: Example prompt demonstrating GPT-4's visual input capability.

用户 这张图片有什么不寻常之处?



资料来源: 巴诺拉马

GPT-4 这张照片的不同寻常之处在于, 一名男子正在行驶中的出租车车顶上的熨衣板上熨烫衣服。








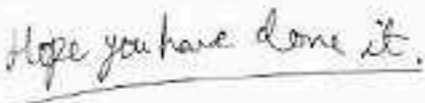



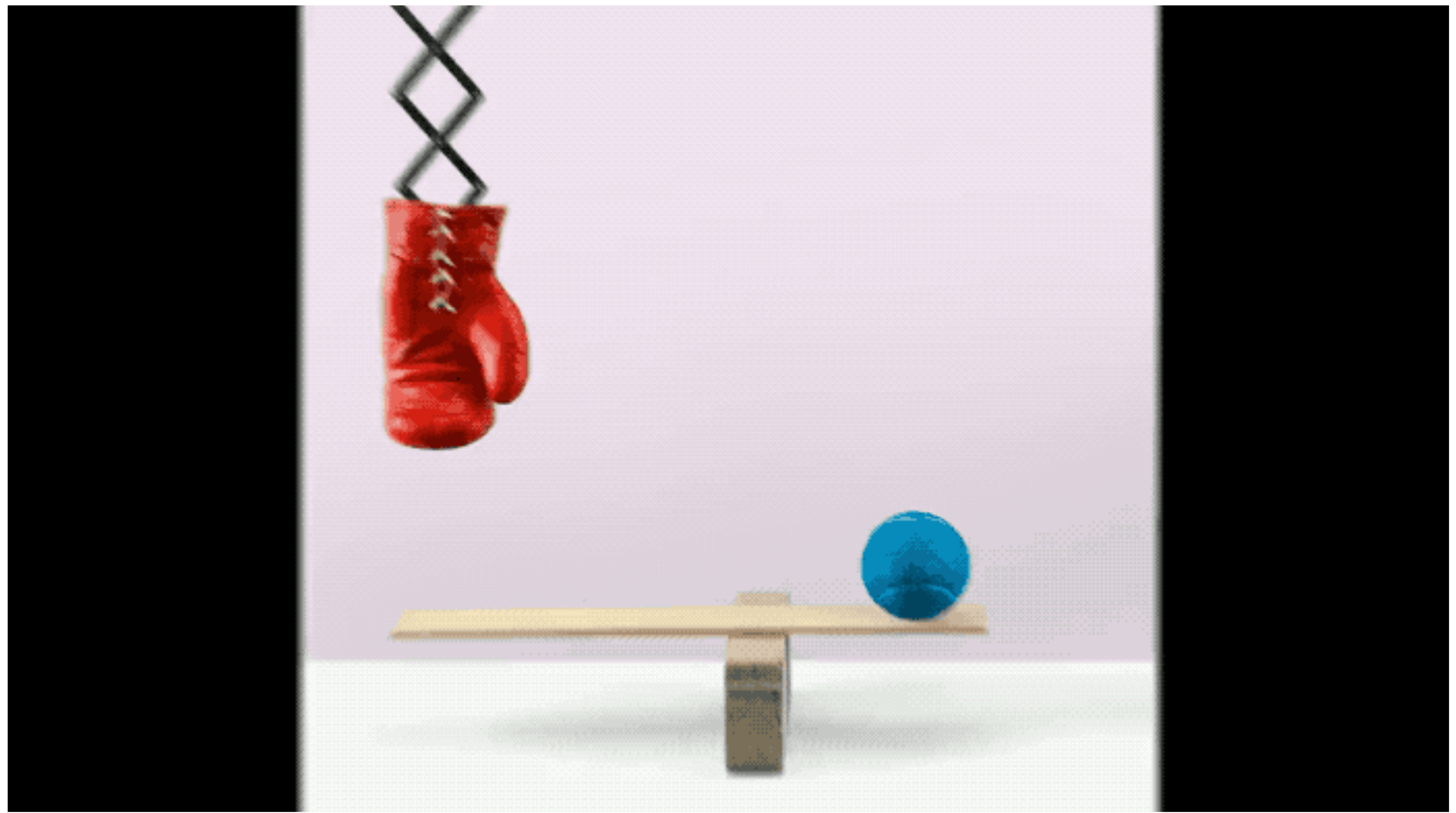
Input Prompt	 An image of	 An image of	 Question: What coffee shop is in the background? Answer:	 Question: What is inside this canned good? Answer:
Completion	a girl blowing out a candle on her birthday cake. (1)	a group of people posing for a wedding photo. (2)	Starbucks (3)	Corn (4)
Input Prompt	 Question: What is on the pillowcase? Answer:	 Question: What is the title of this book? Answer:	 An image of	 An image of
Completion	a Texas Longhorns pillow case. (5)	A Fine, Fine School (6)	a parking sign that says "Waiting? Please turn off your engine." (7)	Hope you have done it (8)
(9) Visual Dialogue				
				
What's in this picture?				
sausage roll.				
How to cook it?				
Soak sausage roll in ketchup. Bake in oven for 15 min. Cut and enjoy.				
Can I put cheese in the dish?				
Sure. But make sure it is melted.				
(10) Visual Dialogue				
				
What kind of animal is in the picture?				
It's a zebra.				
Where do they live in?				
In Africa.				
Tell me a joke about zebras.				
Zebras get in trouble for crossing the road.				
(11) Visual Dialogue				
				
What's in this picture?				
A screenshot of the Windows 10 shutdown window				
I would like to restart my computer. Which button should I click?				
Press OK.				
Now I would not like to restart. What can I do?				
Click Cancel.				

Figure 3: Selected examples generated from KOSMOS-1. Blue boxes are input prompt and pink boxes are KOSMOS-1 output. The examples include (1)-(2) image captioning, (3)-(6) visual question answering, (7)-(8) OCR, and (9)-(11) visual dialogue.



手套掉下去会怎样？
它会掉到木板上，并且球会被弹飞



AI的圣杯已经找到？

- GPT（Generative Pre-trained Transformer）是一种预训练的神经网络模型，它使用了大规模的语料库进行训练，以此学习语言的结构和规律。学习过程主要经过两步：
 - 1.无监督预训练 (Unsupervised Pre-training)。采用语言模型 (Language Model) 技术，预测给定一段文本的下一个单词是什么。不需要标注的数据，只使用未加标注的文本语料库进行训练。训练时采用 Transformer 结构，使用自注意力机制和残差连接来实现信息流的跨层传递，使得模型可以更好地学习到文本的上下文信息，从而更好地进行预测。
 - 2.有监督微调 (Supervised Fine-tuning)。通过RLHF（基于人类反馈的强化学习：Reinforcement learning from human feedback），利用带标注的数据进行有监督的语义微调和指令微调（Supervised Fine-Tuning和Instruction Fine-Tuning）和通过近似策略优化（OPP）的奖励模型，使用梯度下降算法进行优化。微调过程能够使得模型在特定任务上有更好的表现。支持生成思维链（Chain-of-thought），提高ChatGPT“知道知道”和“知道不知道”的能力、减少“不知道知道”和“不知道不知道”的限制、同时通过逐步思考帮助它回答其不知道的问题
 - GPT-3 模型的最后一个公开版本是 GPT-3 175B，该模型的语料库大小约为 570GB，其中包括来自网络的数据、网页、文章、著作（Hathitrust）、维基百科（600万篇文献）。GPT3.5 的数据量有所增加。
-

Model Name	LLaMA	Alpaca	Vicuna	Bard/ChatGPT
Dataset	Publicly available datasets (1T token)	Self-instruct from davinci-003 API (52K samples)	User-shared conversations (70K samples)	N/A
Training code	N/A	Available	Available	N/A
Evaluation metrics	Academic benchmark	Author evaluation	GPT-4 assessment	Mixed
Training cost (7B)	82K GPU-hours	\$500 (data) + \$100 (training)	\$140 (training)	N/A
Training cost (13B)	135K GPU-hours	N/A	\$300 (training)	N/A

<https://vicuna.lmsys.org/>

太多的“阿喀琉斯之踵”？

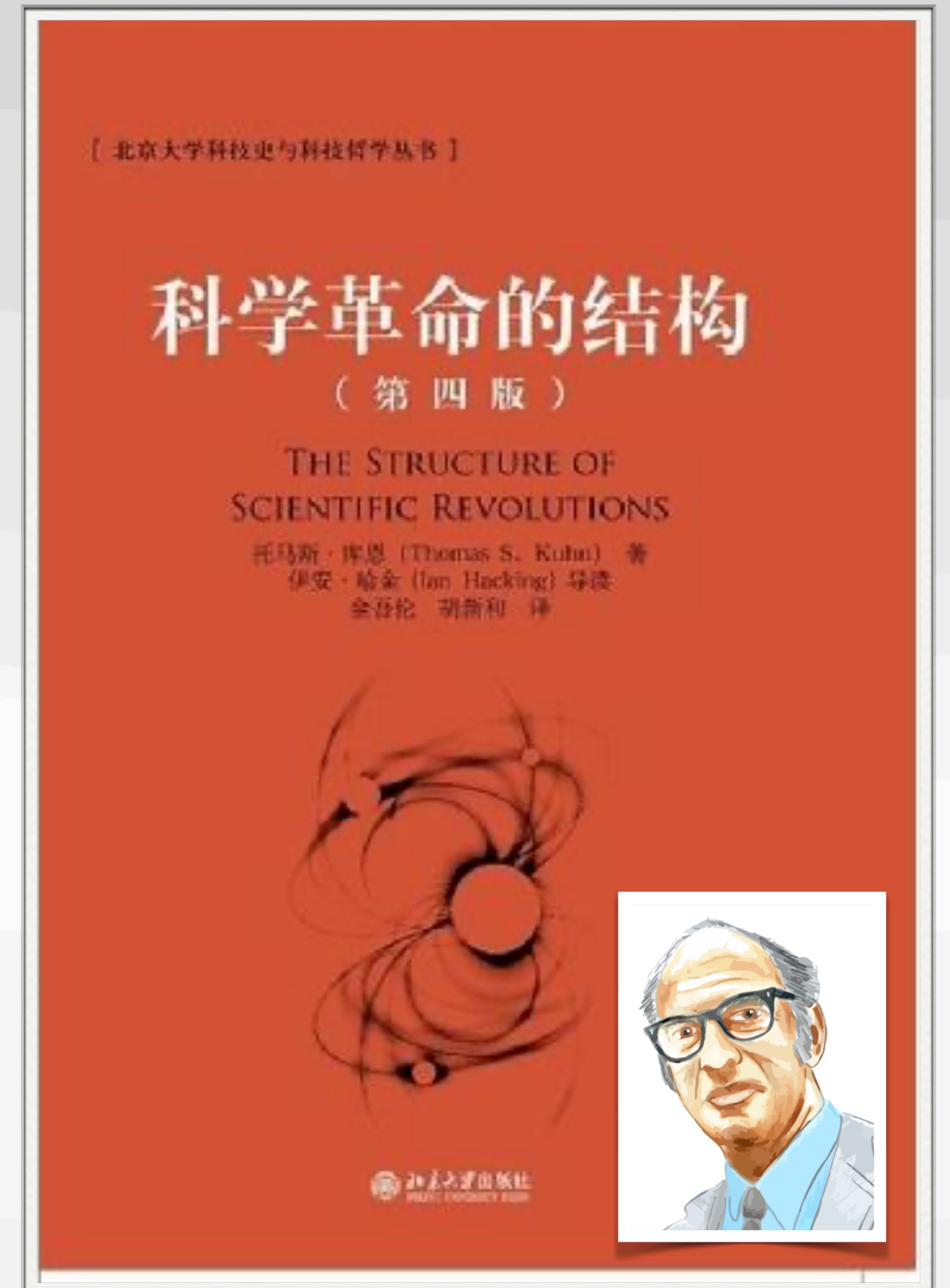
- “我们认为”它不懂因果，没有常识，计算错误，过于自信，常常产生“幻觉”，一本正经胡说八道；
 - 不能提供出处，无法作为科学研究的基础；
 - 大语言模型是一种高阶智慧，缺乏语言之外的传感摄入（没有具身认知）；
 - 缺乏与真实世界的互动（缺乏手脚，需要“全脑框架”予以解决）
-

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科学研究的范式理论

- 科学研究的范式（paradigm）理论来自于托马斯库恩，是指在特定历史时期内，科学家们共同遵循的一组基本信仰、方法和实践。
- 科学范式通常包括：1. 基本假设；2. 理论体系（相互联系的概念、原则和法则）；3. 方法论（观察、实验、数据收集和分析等的过程和规范要求）；4. 研究范围和问题；5. 实践和应用原则；6. 社会认可和共识（学术圈及利益相关者）。
- 范式概念常被泛化使用，指一项事物发展过程中的关键和本质要素，例如共同的指导原则、方法论、核心能力等。范式可能随着新的理论方法的出现而发生变革更替，新范式取代旧范式才会带来进步。



科学研究的第四范式

- 科学研究的第四范式是指数据密集型科学研究，它强调通过大量数据、高性能计算和先进的数据分析方法来发现知识和解决问题，涉及到多学科的协同合作，以及对大数据、机器学习和人工智能等技术的综合应用。

- 1. 实验研究范式；
- 2. 理论研究范式；
- 3. 计算模拟范式；
- 4. 数据密集范式。



GPT赋能第四范式(=第五范式?)

- 智慧研究新范式：数据驱动的自主研究：从辅助流程到辅助行动。
 - 全量数据、全域知识、全程智能；
 - 更高效的数据收集、模拟、处理和分析；
 - 深度挖掘数据潜在信息知识智慧；
 - 各种形态的知识交流和多模态跨学科研究与融合；
 - 虚拟实验、自动实验，自动流程并优化验证。
-

大纲

- 奇点已来?
 - 第五范式?
 - 从赋能到颠覆?
-

AGI时代的数据库产业

- 数据库的记录不再是服务的直接内容，而是学术大模型训练的素材
- 大模型就是数据库，大模型就是生产力，云服务需要国内镜像
- 学术成果以多语种、多媒体、细颗粒、多模态方式呈现，文献库地位下降
- 提问框逐渐取代搜索栏，高级、精准搜索不再重要，个性化提示词工程成为关键
- 各类垂域模型或下游应用丰富多彩，大型图书馆可以自建下游应用服务

Home

Library

Tools

Citation generator

Paraphraser

AI Detector

Chrome Extension

Hi Keven Liu! Welcome back

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Exploring the Limits of Transfer Learning with a Unified Text-to-Text Transformer



Attention is All you Need



mT5: A Massively Multilingual Pre-trained Text-to-Text Transformer



An Image is Worth 16x16 Words: Transformers for Image Recognition at Scale



Deformable DETR: Deformable Transformers for End-to-End Object Detection



How Good is Your Tokenizer? On the Monolingual Performance of Multilingual Language Models

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12.4K papers, 124.2K citations

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10.5K papers, 41.9K citations

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1.9K papers

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Molybdenum trioxide

LED display

Holistic nursing


Cluster



Help?

- Home
- Library
- Tools
- Citation generator
- Paraphraser
- AI Detector
- Chrome Extension

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 Journal Homepage: <http://journal.alsalam.edu.iq/index.php/ajest>
 e-ISSN: 2790-4822p-ISSN: 2958-0862

ChatGPT and the Future of Academic Integrity in the Artificial Intelligence Era: A New Frontier

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DOI: <https://doi.org/10.55145/ajest.2023.02.02.015>
Received January 2023; Accepted March 2023; Available online April 2023

ABSTRACT: ChatGPT is a state-of-the-art language model developed by OpenAI. It is part of the GPT (Generative Pre-trained Transformer) series, which are designed to generate human-like language output based on large amounts of input data. ChatGPT is one of the largest and most advanced language models to date, with 175 billion parameters. The article aims to examine the impact of artificial intelligence tools and techniques on academic research and their potential implications for academic ethics. In particular, this article will focus on the practices of ChatGPT in generating scientific research within the context of academic ethics. ChatGPT is a powerful tool that can generate text in different formats, conduct literature searches, and suggest titles for the created text. However, using ChatGPT to select topics with a low similarity score in similarity checkers may lead to ethical violations. This article finds that the use of artificial intelligence applications in academic research may raise concerns about academic ethics, and the limited availability of technologies that can detect such violations poses a significant challenge to academic writing.

Keywords: Artificial intelligence, ChatGPT, Machine learning, academic writing, GPT-3, GPT-4

1. INTRODUCTION

Artificial intelligence (AI) applications have become increasingly important in the development of electronic environments, and they are transforming the way we interact with technology [1-3]. Together with other cutting-edge technologies like Industry 4.0, the Internet of Things (IoT), blockchain, and augmented reality, AI is revolutionizing how we live and has a profound impact on our life. Artificial intelligence (AI) applications are overgrowing, and individuals and companies are exploring new ways to utilize them in various aspects of life [4][5]. Among the most prominent AI applications is ChatGPT, which was made accessible to the general public in the fourth quarter of 2022 [6-9]. As ChatGPT's popularity grows, questions have arisen regarding the accuracy of its outputs and their sources [10-12]. There is growing concern that originality is increasingly threatened in various domains, ranging from completing homework assignments to conducting academic research [13][14]. This has led to discussions about the importance of preserving authenticity and originality in all areas of intellectual work [15]. ChatGPT's introduction to the public domain coincided with the emergence of numerous other technologies and applications that leverage artificial intelligence algorithms to streamline processes across various industries [16-18]. These advancements have the potential to improve efficiency, save time, and enhance productivity across a broad spectrum of tasks and activities. At the same time, ChatGPT was used in research writing by writing the introduction, abstract, codes, conclusions, arranging references, improving writing language, and other things. In fact, ChatGPT has even been added as a co-author on academic studies due to its ability to generate insightful and high-quality content [19][20]. In 1988, demonstrations took place by a group of mathematics teachers in the United States of America to protest against

Copilot Chinese (zh)

该论文研究了人工智能工具和技术对学术研究的影响及其对学术伦理的潜在影响。作者使用ChatGPT在学术伦理的背景下开展科学研究，并调查了它是否符合学术写作惯例。他们承认，诸如ChatGPT之类的人工智能应用程序是支持人类工作的工具，而不是取代人类工作的工具。尽管它们可以帮助完成任务和提高写作质量，但它们不能完全取代人类在写作和批判性思维方面的作用。...Read more

9:47 pm

Save as note Follow up

Future works suggested in this paper

9:50 pm

以下是一些相关论文:

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2\.[软件工程的未来: 机器学习、敏捷和虚拟化接下来将带领我们走向何方?] (/papers/软件工程的未来机器会在哪里 35cjwg84n7) 丹尼斯·曼克尔+1 其他人 · 2021 1 引文

Suggestions (18 results) press esc

- Explain Abstract of this paper in 2 lines
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- Explain the practical implications of this paper
- Limitations of this paper
- Conclusions from the paper
- Results of the paper

Brainstorm Questions press ctrl + G

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Is there any new advancement on Digital Humanities in recent months?

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Yes, there have been recent advancements in [Digital Humanities](#). The National Endowment for the Humanities ([NEH](#)) offers grant programs that fund project teams experimenting with digital technologies to develop new methodologies for humanities research, teaching and learning, public engagement, and scholarly communications ¹. The Digital Humanities Advancement Grants program (DHAG) supports innovative, experimental, and/or computationally challenging digital projects, leading to work that can scale to enhance scholarly research, teaching, and public programming in the humanities ². The field of Digital Humanities is growing in popularity at an unprecedented speed, while digital methods and tools in all domains of Humanities are exploding ³. Recent DH work undertaken in US art libraries shows engagement with [digital humanities](#) evidenced by the development of open access projects, the creation of linked data sets, and the innovative sharing of art and archive collections to support digital pedagogy ⁴. Optical Character Recognition ([OCR](#)) and the Text Encoding Initiative ([TEI](#)) have enabled humanities researchers to process vast amounts of textual data, and sound, images, and video have all been subject to these new forms of research ⁵.

¹ [neh](#) ² [neh](#) ³ [peterlang](#) ⁴ [cambridge](#) ⁵ [harvard](#)



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Ask follow-up...



怎么做？

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- 超融合模型=（云算力+本地算力）*（开源算法+本地优化）*（预训练模型+本地/领域数据）【[欢迎参加617属兔班相关培训！](#)】
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- 综合ChatGPT、DALL-E、Whisper等，采用AutoGPT/Langchain等满足多模态多样化工作流的需求

传统情报走向智慧情报

- 情报人员的信息差
- 情报人员的素养差
- 当前如何强化
- 未来如何避免被颠覆

- Principles:
 - Write clear and specific instructions
 - Give the model time to “think”
- Iterative prompt development
- Capabilities: Summarizing, Inferring, Transforming, Expanding
- Building a chatbot

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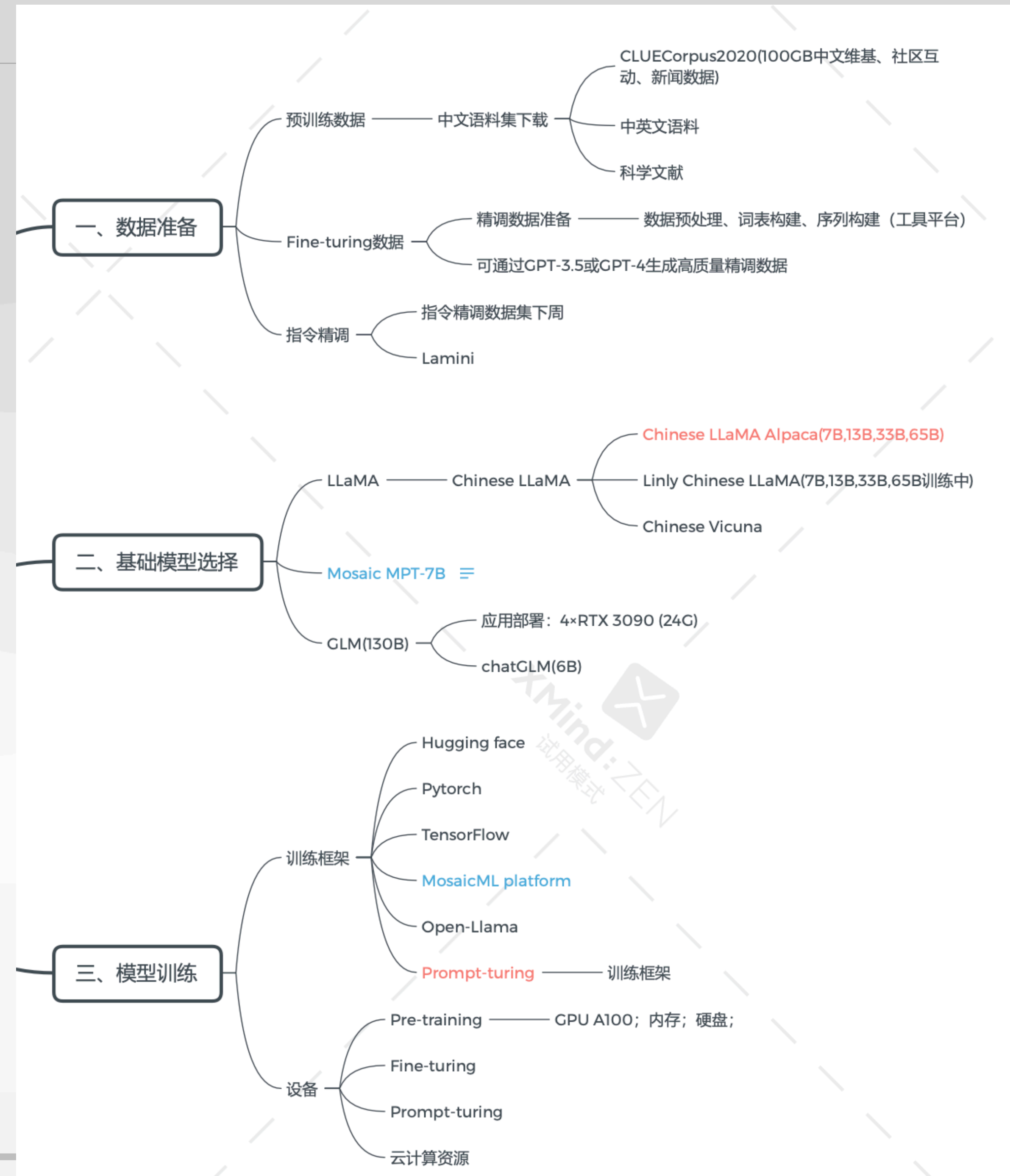
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 - AI代理：付诸行动、解决问题（馆藏政策、阅读推荐、咨询馆员、资源加工、摘要翻译）
-

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谢谢！



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