

ChatGPT4.0在投资中的运用初探

全球宏观交易员 熊鹏

2023.03

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說個笑話吧？



由開發者準備好的罐頭回應

脑神经科学与人工智能

人工智能借鉴脑神经科学，但远远不是

神经元 VS Token

注意力过滤机制

意识的本质 VS 人工智能能否产生意识

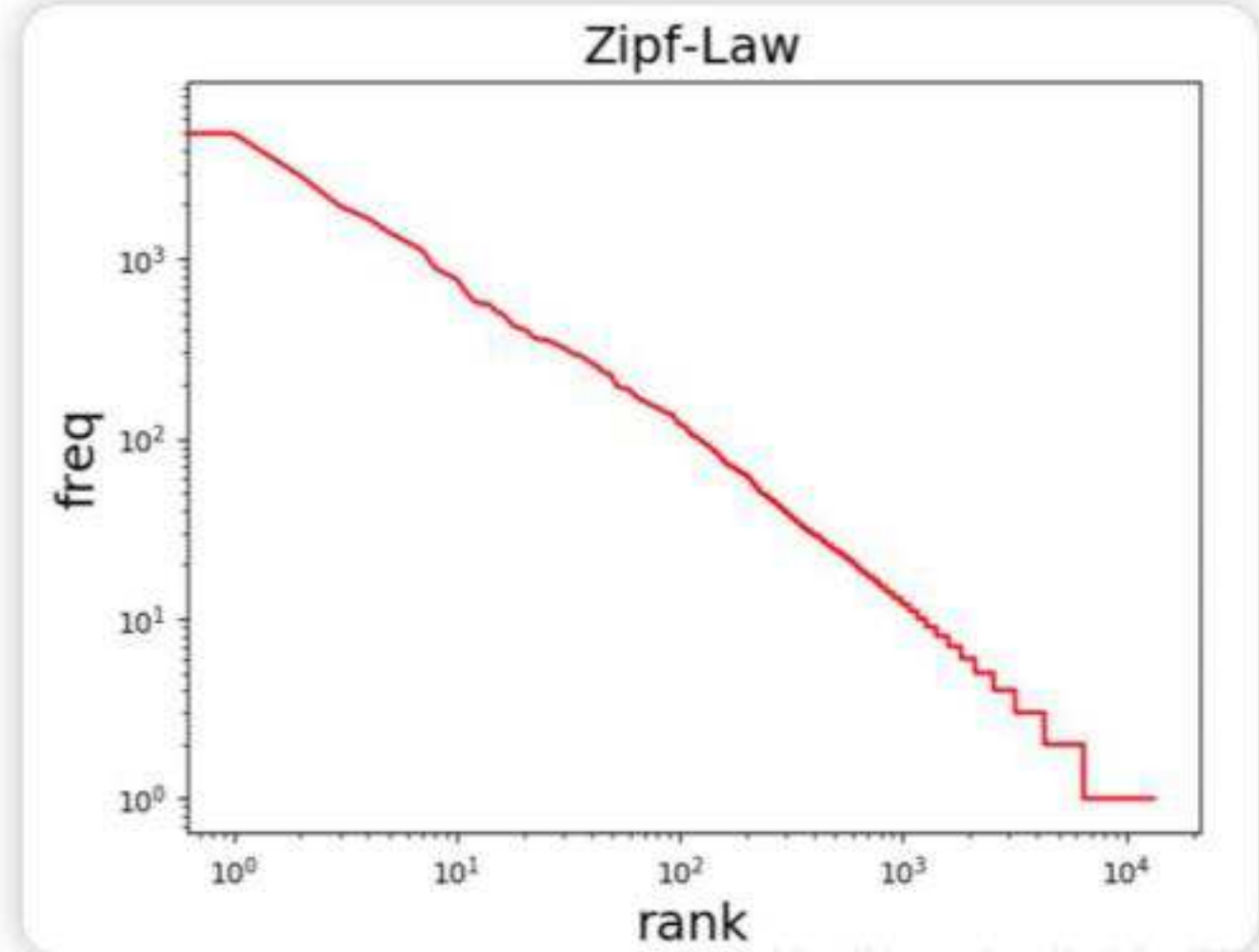
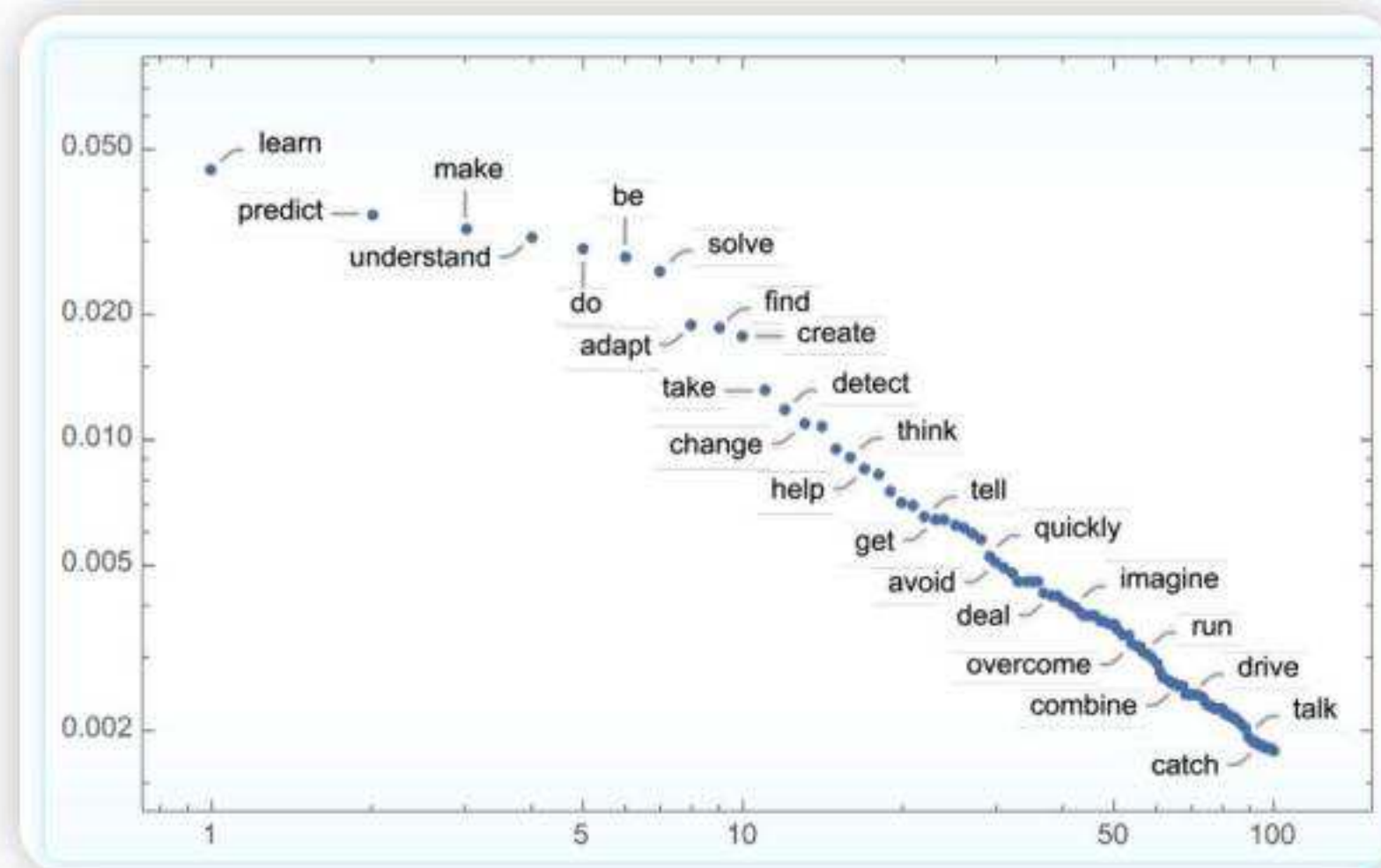


ChatGPT是干什么的？

- *It's Just Adding One Word at a Time*

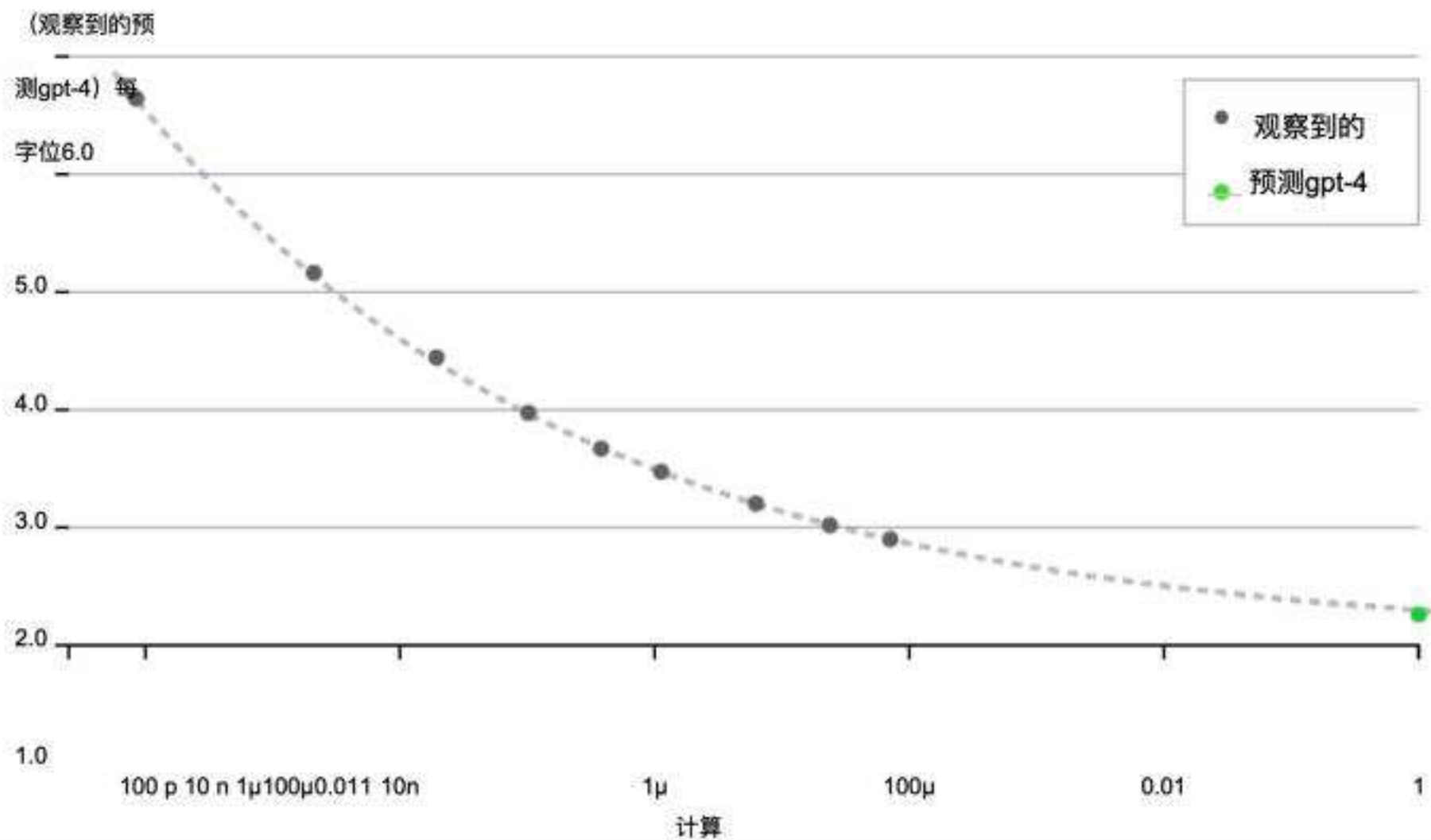
The best thing about AI is its ability to

learn	4.5%
predict	3.5%
make	3.2%
understand	3.1%
do	2.9%



比看起来似乎简单一些

OpenAI代码库下一个单词预测

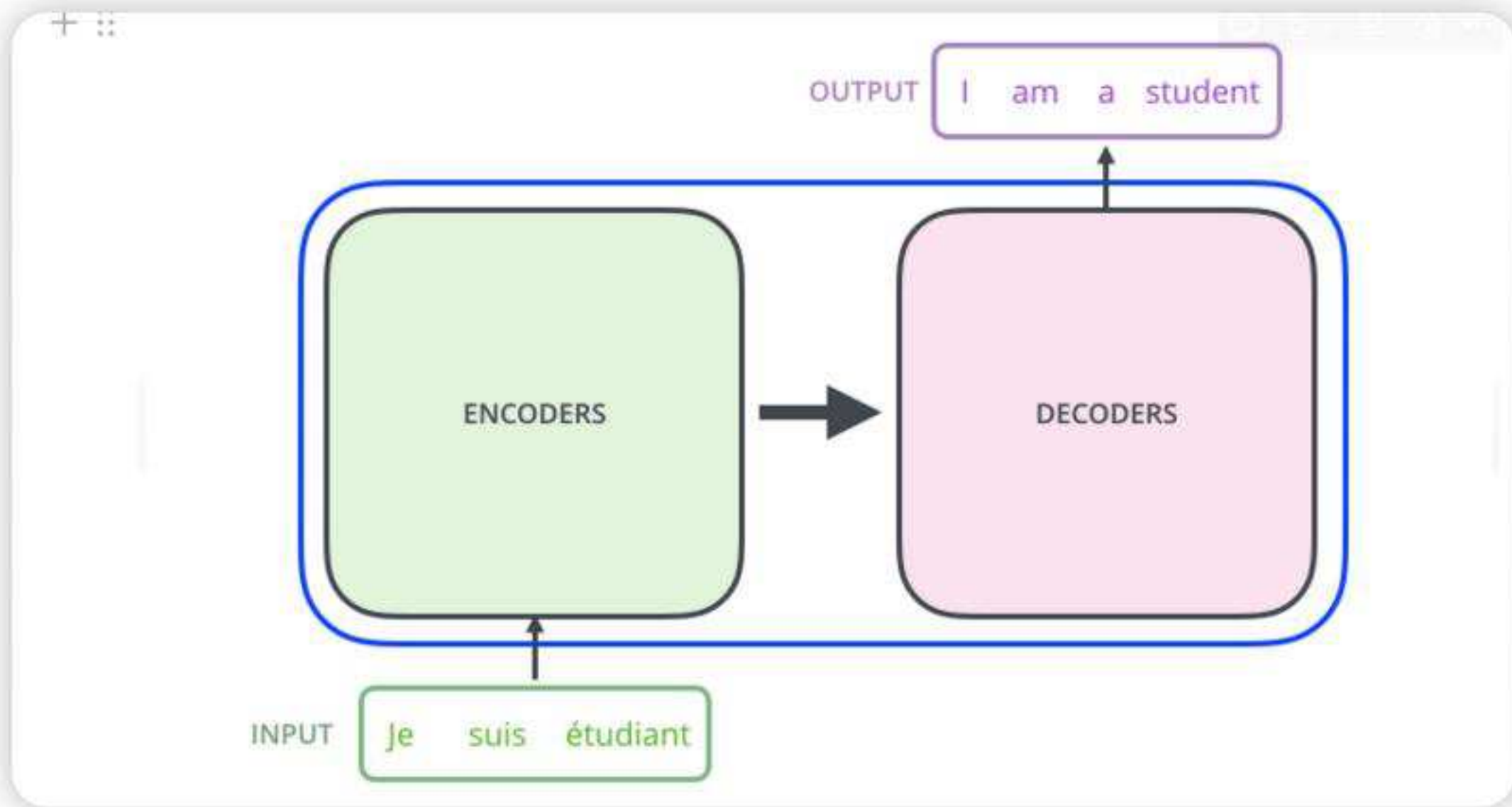


GPT就是在
这么干

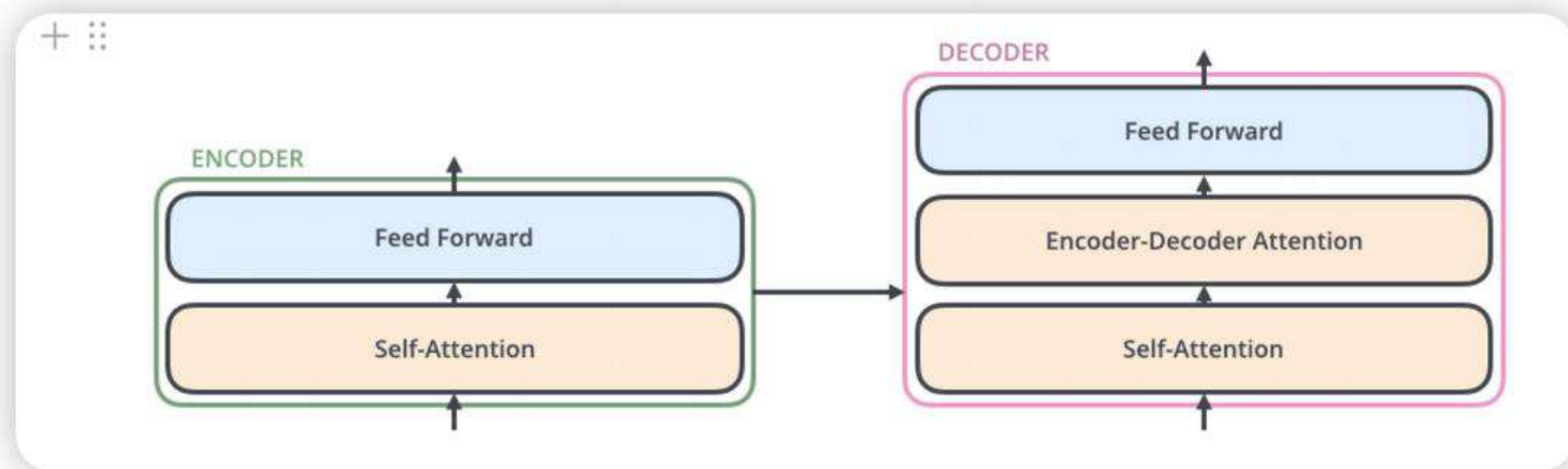
ChatGPT是如何工作的？



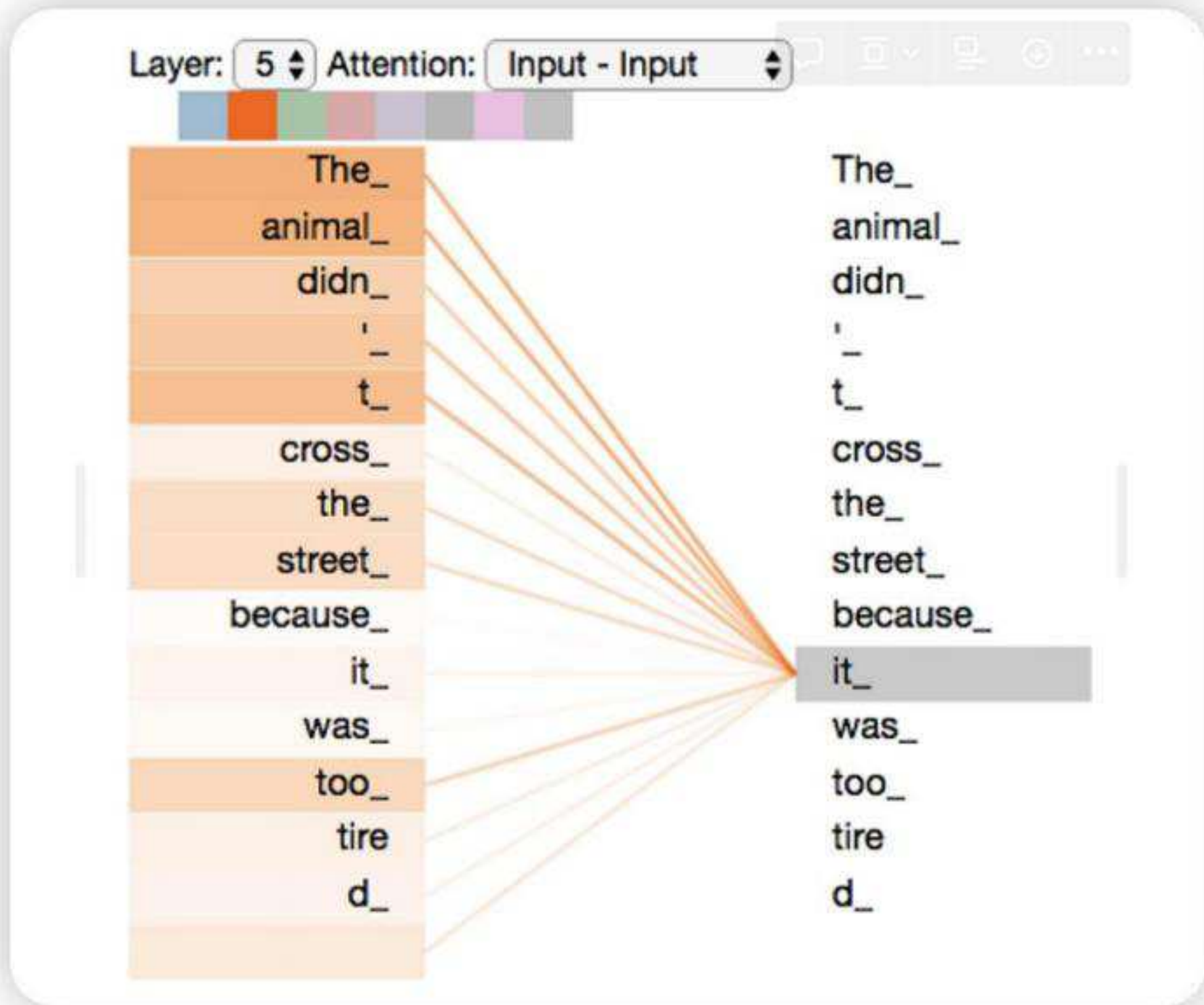
稍微细节一点



再细节一点



注意力机制： 让文字理解 语境



一个实际的例子：导入数据

Add to the knowledge base

1. Copy the source text and paste it below:

2. Review your paragraphs below:

"We're seeing a liquidity withdrawal, the classic thing that you'd expect following a credit event like what's happening at SVB," said Haig Bathgate at Atomos Investments. "People get scared, reduce exposure to equities and move into government bonds. They're wondering if anyone else will be in this position as these things don't tend to happen in isolation."

Government intervention managed to avert deposit losses, but deposit migration to large banks may keep the pressure on some lenders, Wells Fargo strategists including Christopher Harvey said in a note. Harvey said he wouldn't buy risk now and sees Tuesday CPI print as a wild card.

US stocks tumbled at the end of last week when Silicon Valley Bank suddenly collapsed in the biggest such incident since the global financial crisis. The Fed's aggressive tightening campaign has sent interest rates surging, leaving some banks holding long-dated bonds that have plunged in value at the same time their financing costs are surging.

WATCH: Susannah Streeter of Hargreaves Lansdown sees a "risk averse nature really sweeping through," as she discusses the financial stability of the banking system.

"I don't think the system as a whole is inherently financially unstable, certainly systemic risk has been considered low," Susannah Streeter, Hargreaves Lansdown, head of money and markets, said in a Bloomberg TV interview. "But what I think you're seeing is this risk averse nature really sweeping through and renewed worries just about higher interest rates being elevated for longer and the repercussions of that."

"I actually think that what happened this morning is that investors have woken up to the fact that a very serious situation has been averted and I think the seriousness was just underestimated actually," she added.







As a result of the latest turmoil, Goldman Sachs Group Inc. economists said they no longer expect the Fed to deliver a rate increase next week.

"The market is likely to remain very cautious despite regulators stepping in," said Marija Veitmane, senior multi-asset strategist at State Street Global Markets. "This is a difficult position Fed is in, on the one hand it needs to keep hiking to arrest inflation, but also it needs to protect the financial system. Feels like a lose-lose situation for the Fed and the market."

3. Click to or

清理数据，断词

View the knowledge base

Paragraph	Fingerprint	Date	Time	Delete All
Investors pinpointing potential for additional bank failuresBy Allegra Catelli and Jan-Patrick Barnert		Mon Mar 13 2023	21:40:23	Delete
The buckling shares highlighted that even after emergency measures by US regulators, including a new backstop for banks, investors remained on edge that more seizures were possible. Broadly, the government actions bolstered markets, though overnight gains wobbled as investors poured into fixed income investments. The latest crisis poses a risk to the strong rally seen in US and European shares since October.		Mon Mar 13 2023	21:40:23	Delete
"We're seeing a liquidity withdrawal, the classic thing that you'd expect following a credit event like what's happening at SVB," said Haig Bathgate at Atomos Investments. "People get scared, reduce exposure to equities and move into government bonds. They're wondering if anyone else will be in this position as these things don't tend to happen in isolation."		Mon Mar 13 2023	21:40:23	Delete
As a result of the latest turmoil, Goldman Sachs Group Inc. economists said they no longer expect the Fed to deliver a rate increase next week.		Mon Mar 13 2023	21:40:23	Delete
(Bloomberg) -- Turmoil continued to engulf shares in regional banks as investors who saw equity stakes wiped out at Silicon Valley Bank and Signature Bank rushed out of the industry.		Mon Mar 13 2023	21:40:23	Delete
While US regulators introduced a new backstop for banks that Federal Reserve officials said was big enough to protect the nation's deposits, the surprise announcement that New York's Signature Bank was being shuttered reminded investors that further turmoil, at least among regional banks, was still possible. A senior US Treasury official said some institutions had issues similar to the failed Silicon Valley Bank.		Mon Mar 13 2023	21:40:23	Delete

建立数据字典，转换为词向量

新聞標題 1:

[0 0 0 185 300 72 4029 37 1 121 250 95 30 511
92 2358 33 2565 19 55]

新聞標題 2:

[0 0 0 0 0 0 0 0 0 0 0 0 0 7149
54 130 8454 3404 6172 66]

新聞標題 3:

[0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 87 6339 59 5236 2848]

新聞標題 4:

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1017 1466 25 11 139 50]

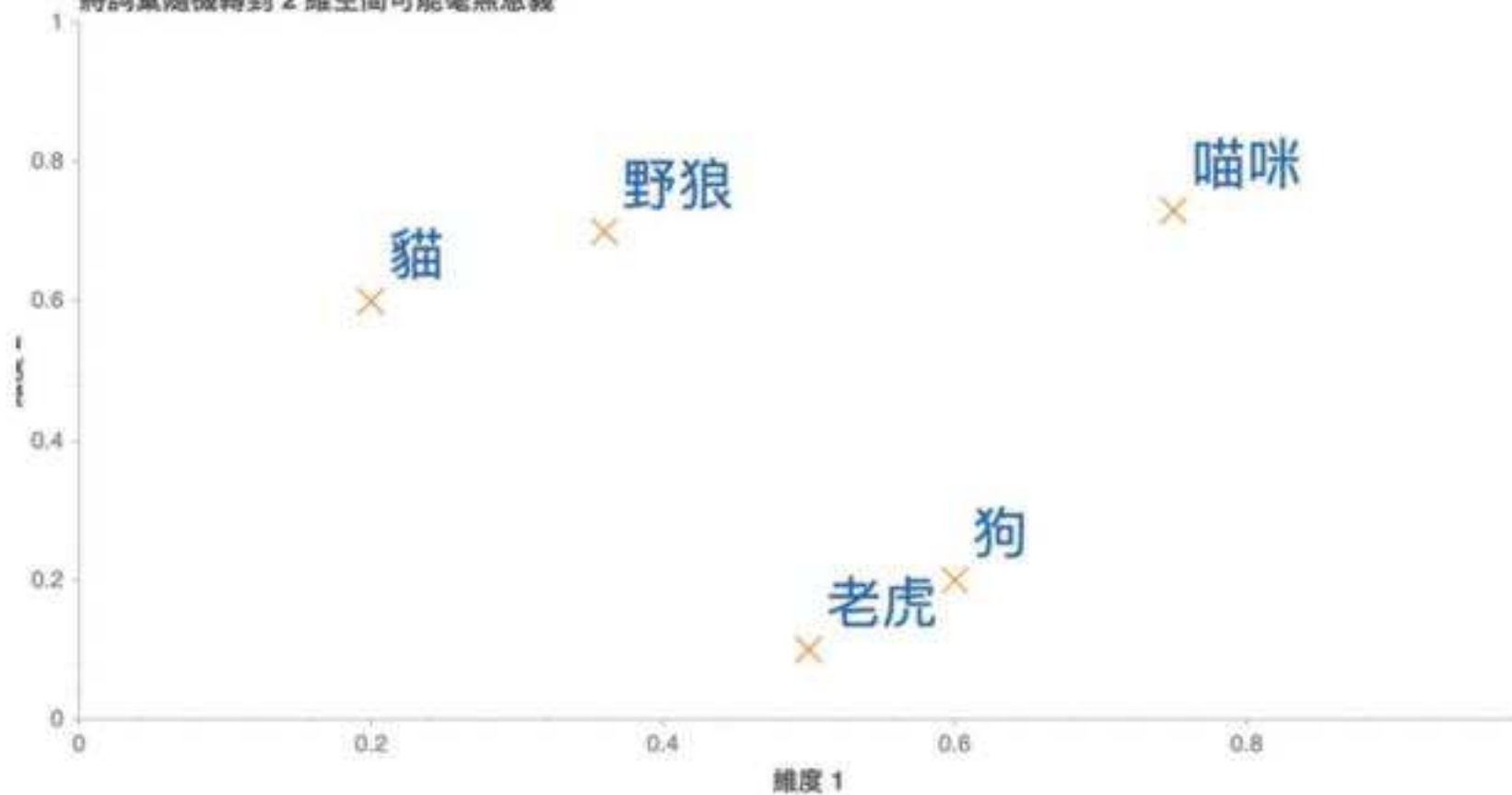
新聞標題 5:

[0 0 0 0 0 25 9 24 1402 12 667 63 64 483
9523 303 1402 18 332 3258]

词向量的维度

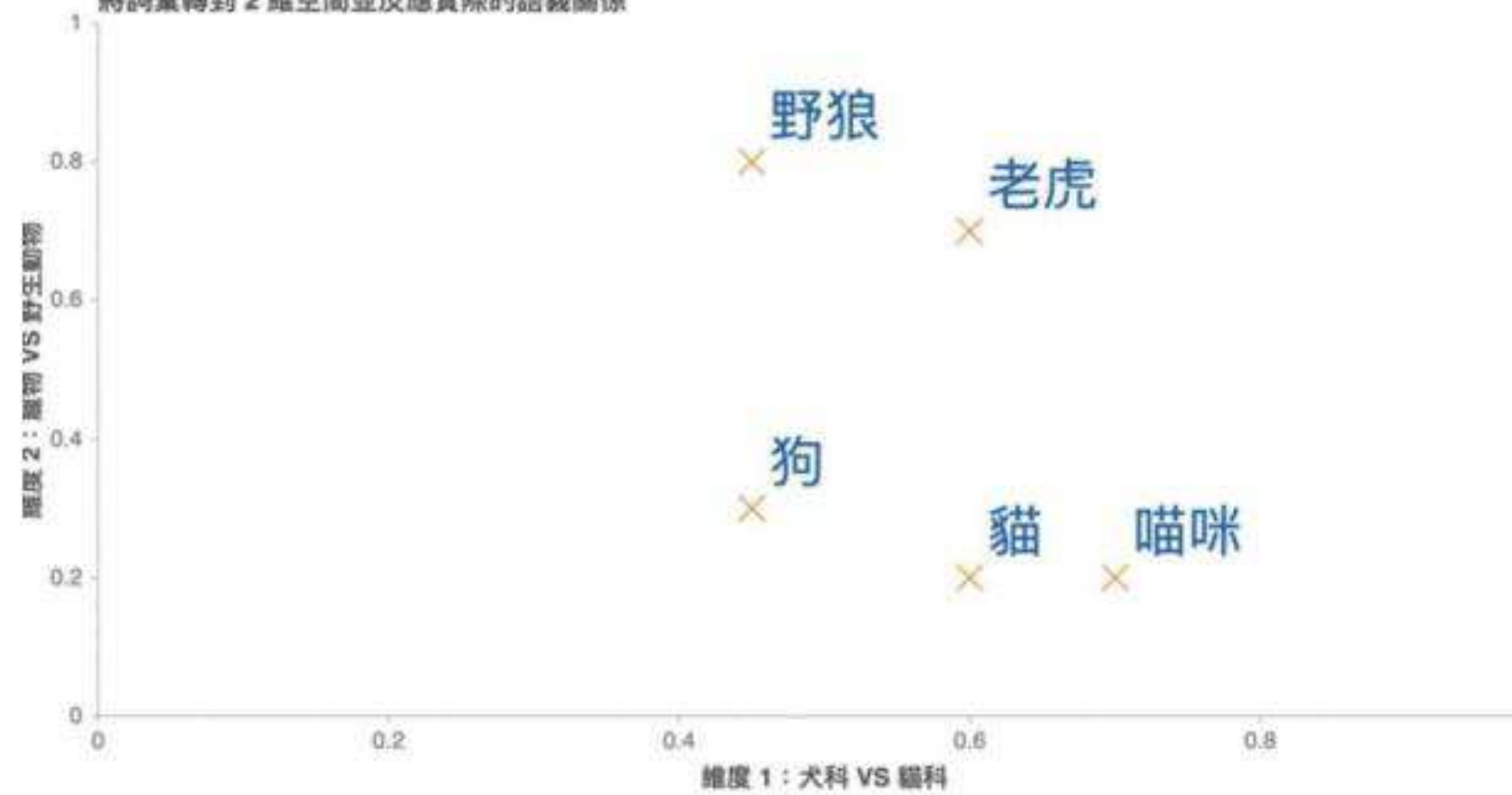
隨機轉換

將詞彙隨機轉到 2 維空間可能毫無意義



理想轉換

將詞彙轉到 2 維空間並反應實際的語義關係



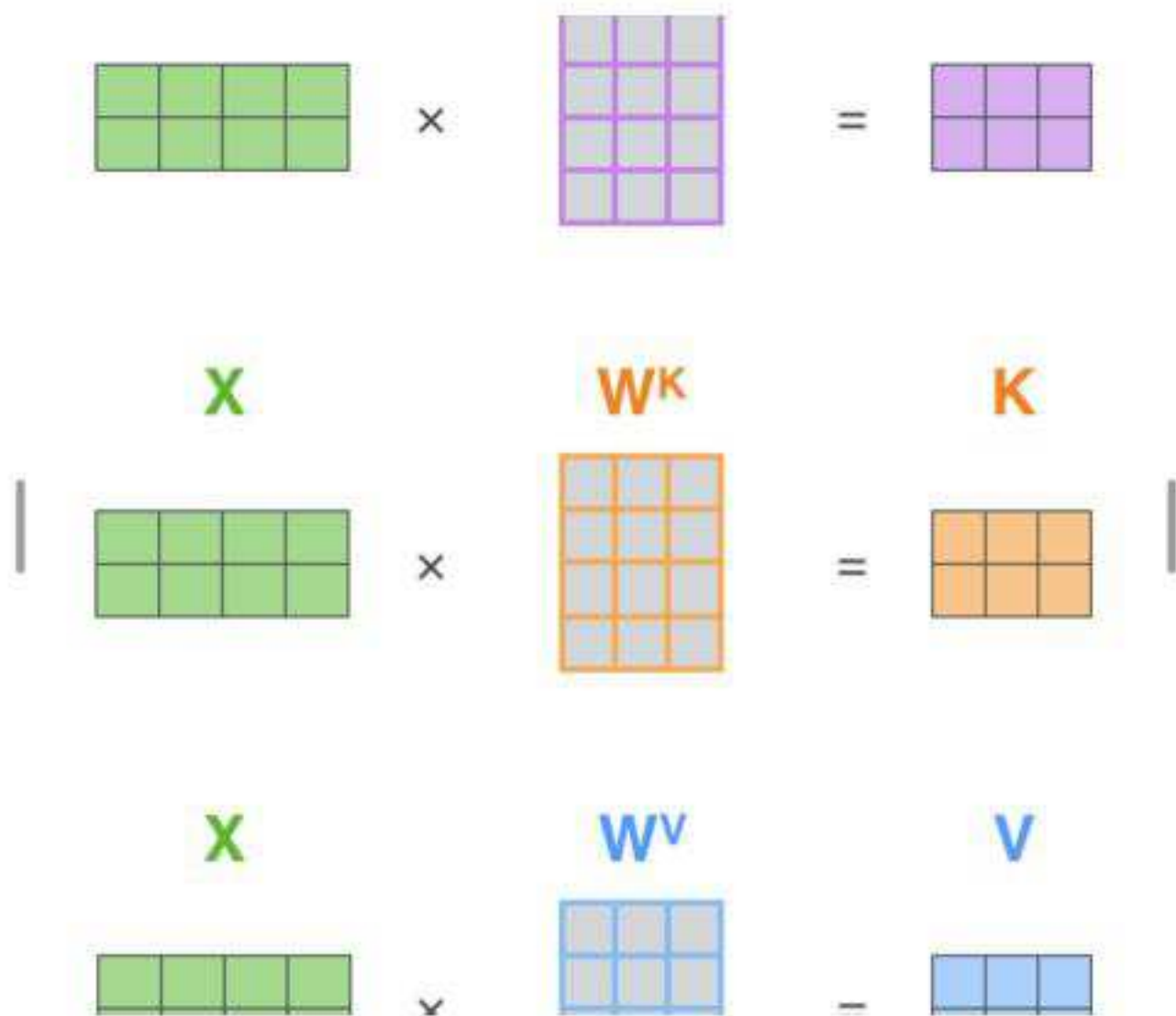
一个三维的词 向量

新聞標題: [

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[0.077, 0.695, 0.776],
[0.624, 0.962, 0.96],
[0.456, 0.927, 0.404],
[0.353, 0.119, 0.108],
[0.805, 0.969, 0.725],
[0.379, 0.265, 0.473],
[0.436, 0.186, 0.738],
[0.923, 0.287, 0.967],
[0.477, 0.614, 0.838],
[0.089, 0.328, 0.993],
[0.887, 0.913, 0.885],
[0.604, 0.118, 0.646],
[0.907, 0.52, 0.437],
[0.443, 0.432, 0.498],

]

预训练 Pre-Training



$$\text{softmax}\left(\frac{Q \times K^T}{\sqrt{d_k}}\right) V$$

$$= Z$$

The diagram shows the calculation of the output matrix Z using the Q, K, and V matrices. The Q matrix (purple 2x3) is multiplied by the K matrix (orange 2x3) and the result is divided by $\sqrt{d_k}$. The result is then passed through a softmax function to produce the output matrix Z (pink 2x3). The V matrix (blue 2x3) is also shown.

1750亿个参数 是什么？

- So we're finally ready to discuss what's inside ChatGPT. And, yes, ultimately, it's a giant neural net—currently a version of the so-called GPT-3 network with 175 billion weights.



真正理解ChatGPT

ChatGPT 真正做的事 – 文字接龍 (語言模型)

同一則對話過去的历史紀錄

請給我三週的規劃



f

非常複雜

可能有 1700 億個以上的參數!

$$f(x) = ax + b$$

2 個參數

Ask the knowledge base

Question:

what's the probability of Fed raise interest in next meeting?

Answer with up to 100 words using 5 references

[Get Answer](#) (estimated cost \$0.01 - [check balance](#))

Answer:

The probability of the Fed raising interest rates in the next meeting is low.

References:

As a result of the latest turmoil, Goldman Sachs Group Inc. economists said they no longer expect the Fed to deliver a rate increase next week.

"The market is likely to remain very cautious despite regulators stepping in," said Marija Veitmane, senior multi-asset strategist at State Street Global Markets. "This is a difficult position Fed is in, on the one hand it needs to keep hiking to arrest inflation, but also it needs to protect the financial system. Feels like a lose-lose situation for the Fed and the market."

The unwind is especially brutal because investors had piled into banks on the assumption they would benefit from the aggressive tightening by the Federal Reserve that sent interest rates up to 4.5% from zero in just under a year. But while higher rates are often thought to buttress interest income, the issue is complicated in 2023 by a steeply inverted yield curve that depresses yields on longer-dated assets versus short-term liabilities.

回到实际例子

局限及弱点： 语料来源



简单概述一下目前你的训练模型采用的是哪些数据？



我是由OpenAI训练的大型语言模型ChatGPT。我的训练数据来自多个领域和来源，包括维基百科、新闻文章、文学作品、科技论文、社交媒体等。其中最主要的数据集是由WebText爬虫程序自动收集的网页文本，涵盖了广泛的主题和语言风格。此外，还使用了一些其他公开数据集，如BookCorpus和Gutenberg语料库。所有这些数据集一起用于训练我的模型，以提高我的语言理解和生成能力。



GPT3实际训练的 语料库

Dataset	Quantity (tokens)
Common Crawl (filtered)	410 billion
WebText2	19 billion
Books1	12 billion
Books2	55 billion
Wikipedia	3 billion

<http://arxiv.org/abs/2005.14165>

局限：语料准确性

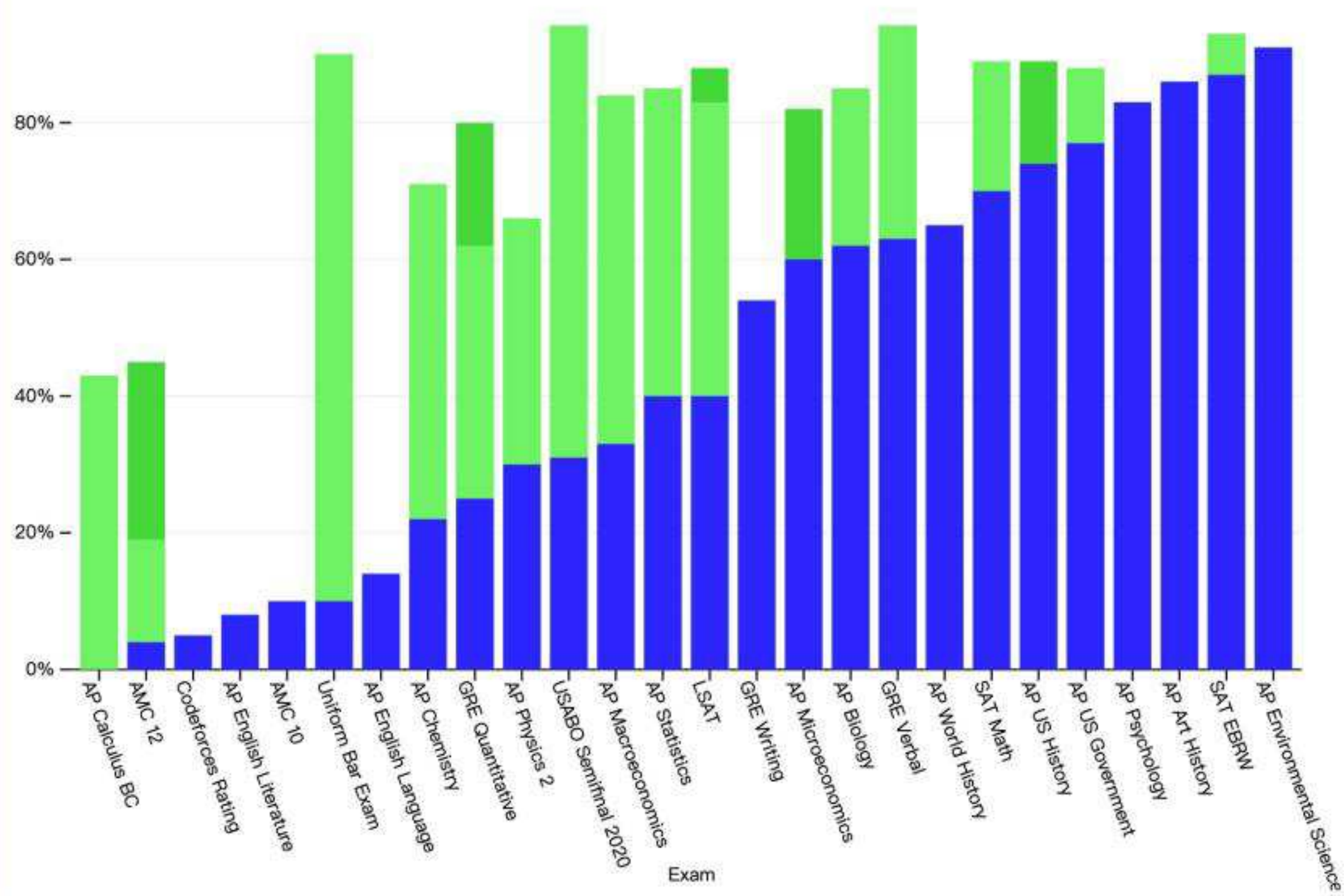
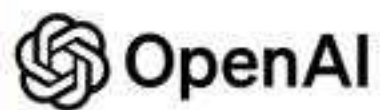


1985年，索罗斯做空日元的理由是什么？



1985年，索罗斯做空日元的主要理由是日本政府的宽松货币政策。当时，日本政府一直采取高度宽松的货币政策来刺激本国经济增长，但这导致了日元的贬值。索罗斯看准了这个机会，利用他的投机技巧，在外汇市场上大举卖出日元，最终赚得了数亿美元的利润。这次事件被称为“索罗斯对日本的袭击”。





GPT-4正在
补足短板

训练时间的局限性



请告诉今天重大的经济数据发布时间和市场影响



很抱歉，作为一个人工智能语言模型，我的知识储备是截止至2021年9月，无法提供最新的经济数据和市场影响。建议您查看相关新闻和经济咨询网站以获取最新信息。



记忆长度的局限



目前你的最大输出是多少？



我的最大输出是 2048 个字符。如果您需要更长的输出，您可以分成多个请求进行处理。



目前你的最大输入是多少？



目前我能够处理的最大输入长度取决于具体的任务和模型架构，通常情况下在几千到几万个字符之间。但是，我也有一个输入的最大长度限制，这取决于我的训练数据和模型架构，一般在几百到几千个字符之间。如果您的输入超过了我的最大长度限制，我可能无法完整地处理您的请求。



GPT4的改进部分

- 语言精度大幅提高
- 回答问题准确性提高
- 目前没有看到参数的大幅提高
- 多模态输入
- 专业性大幅提升，包括经济学、化学、生物学等领域



尽管 GPT-4 具备强大的能力，但它仍然存在着与之前的 GPT 模型类似的限制。最重要的是，它仍然不是完全可靠的（会“幻觉”事实并且会出现推理错误）。在使用语言模型输出时应该非常谨慎，特别是在高风险的情况下，确切的使用方案（例如人工审查、附加上下文的基础、或完全避免高风险的使用）应该与特定的用例需求相匹配。



Limits of GPT Models

- **Limitations**
- Despite its capabilities, GPT-4 has similar limitations as earlier GPT models. Most importantly, it still is not fully reliable (it “hallucinates” facts and makes reasoning errors). Great care should be taken when using language model outputs, particularly in high-stakes contexts, with the exact protocol (such as human review, grounding with additional context, or avoiding high-stakes uses altogether) matching the needs of a specific use-case.
-

基础模型无法处理批量数据

- 📄 (Bloomberg Financial) Richard Lehman, Lawrence G. McMillan-Options for Volat...Protecting Against Catastrophic Risk, 2nd Edition -Bloomberg Press (2011).pdf
- 📄 (Markets and Governments in Economic History) Douglas A. Irwin-Clashing over Commerce_ A History of US Trade Policy-University of Chicago Press (2017).pdf
- 📄 (McGraw-Hill finance & investing) James Bittman-Trading Options as a Professi...Techniques for Market Makers and Experienced Traders-McGraw-Hill (2008).pdf
- 📄 (Wiley Finance) Rajay Bagaria - High Yield Debt_ An Insider's Guide to the Marketplace-Wiley (2016).pdf
- 📄 (Wiley Investment Classics) Henry Clews, Victor Niederhoffer-Fifty Years in Wall Street-Wiley (2006).pdf
- 📄 (Wiley trading series) W. A. Beagles-Equity and Index Options Explained-Wiley (2009).pdf
- 📄 (Wiley Trading, 98) Marty Kearney-LEAPS Trading Strategies_ Powerful Techniques for Options Trading Success-Wiley (2009).pdf
- 📄 (Wiley Trading) Michael C. Khouw, Mark W. Guthner-The Options Edge_ An Intui...onsistent Profits for the Novice to the Experienced Practitioner-Wiley (2016).pdf
- 📄 (Wiley Trading) Russell Rhoads-Trading VIX Derivatives_ Trading and Hedging S...gies Using VIX Futures, Options, and Exchange Traded Notes-Wiley (2011).mobi
- 📄 [Alexander_Davidson]_How_the_Global_Financial_Mark(z-lib.org).pdf
- 📄 [Alfred_Maizels,_World_Institute_for_Development_E(b-ok.org).pdf
- 📄 [Edward_Yardeni]_Predicting_the_Markets__A_Profess.pdf
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- 📄 [Shalendra_Sharma]_The_Asian_financial_crisis(z-lib.org).pdf
- 📄 [William_Maxwell,_Mark_Shenkman]_Leveraged_Financi(z-lib.org).pdf
- 📄 1987 Crash and Fed Discussions.pdf

网络可访问性



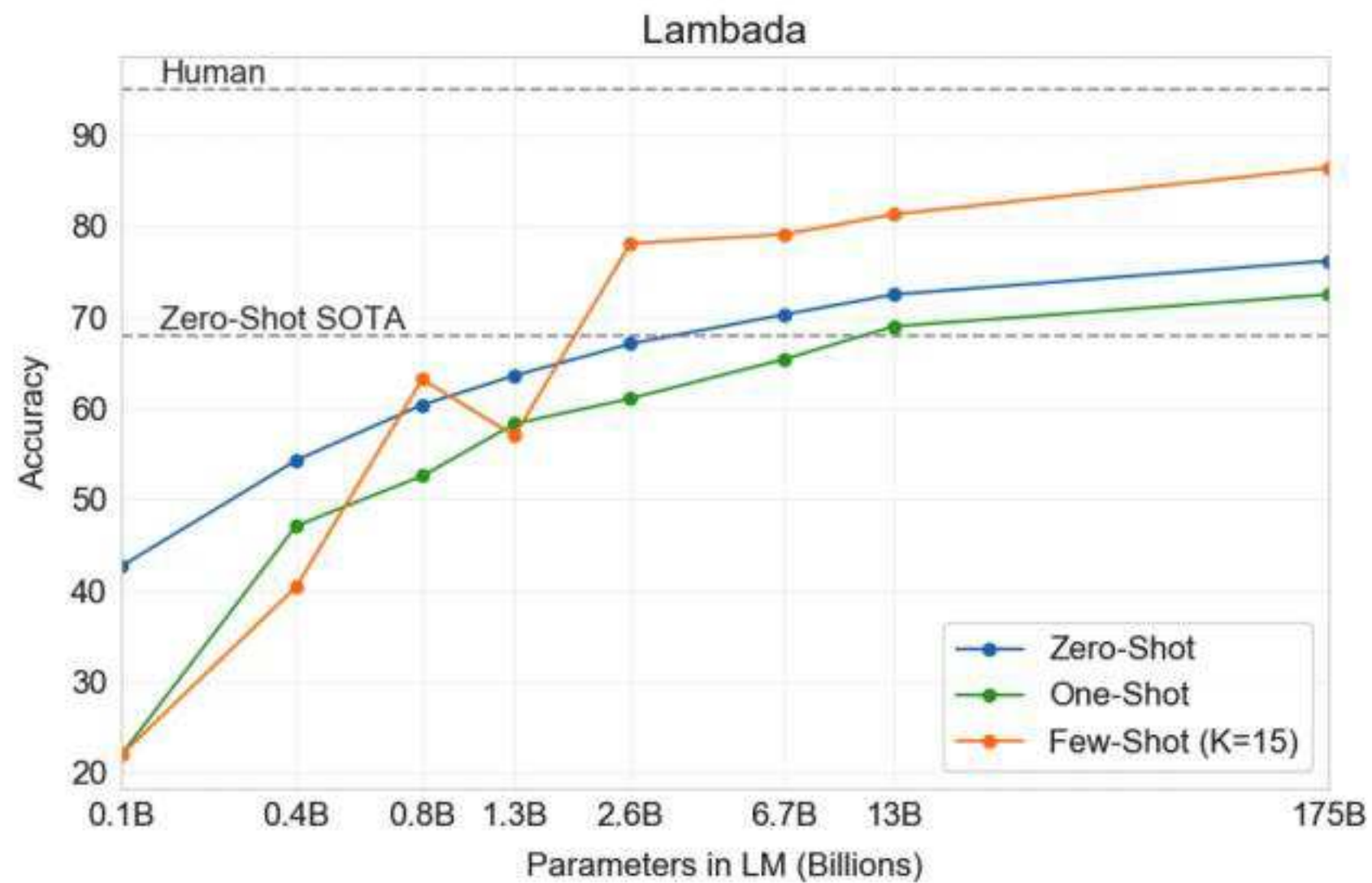
无法使用

OpenAI 的服务在您所在的国家/地区不可用。

ChatGPT能做什么?

- Content generation
- Summarization
- Classification, categorization, and sentiment analysis
- Data extraction
- Translation
- Many more!

入门容易精通难



Prompt Engineering

Task	Zero-shot	One-shot	Few-shot
Question Answering	28.7%	71.9%	83.8%
Natural Language Generation	6.0 BLEU	13.8 BLEU	21.8 BLEU
Sentiment Analysis	54.2%	83.5%	91.6%
Named Entity Recognition	31.6 F1	65.6 F1	81.3 F1

These results are taken from the paper "Language Models are Few-Shot Learners" by Brown et al. (2020).

文本生成—基金产品介绍



现在你是一个资深的投资顾问，网红人物艾多分。请以艾多分的名义写如下内容。人工智能已经是目前的市场和行业热点。请结合chatGPT的市场热度，写一段适合在微博、微信朋友圈和推特上推广人工智能ETF的宣传材料，在200字以内。



大家好，我是你们的投资顾问艾多分。随着科技的发展，人工智能已经成为当下市场和行业的热点之一。ChatGPT是一个备受瞩目的人工智能模型，它能够理解并回答各种问题，成为了人工智能技术的代表之一。



如果你也认同人工智能的前景，那么人工智能ETF就是你不能错过的投资选择。作为一种集中投资于人工智能产业的交易型基金，它能够在你不具备深入了解人工智能企业的情况下，实现分散投资的目的，让你轻松获得人工智能产业的红利。

现在正是投资人工智能ETF的好时机。不仅ChatGPT的市场热度居高不下，人工智能技术的应用领域也在不断拓展，未来发展前景不可限量。因此，不要犹豫，赶快行动起来，让你的资产也分享人工智能产业的发展红利！



Classify the sentiment in these tweets:



1. "I can't stand homework"
2. "This sucks. I'm bored 😡"
3. "I can't wait for Halloween!!!"
4. "My cat is adorable ❤️❤️"
5. "I hate chocolate"

Tweet sentiment ratings:



1. Negative sentiment: The tweet expresses a dislike for homework, indicating a negative sentiment.
2. Negative sentiment: The tweet uses negative language ("this sucks") and an angry emoji to convey a negative sentiment about being bored.
3. Positive sentiment: The tweet expresses excitement and anticipation for Halloween, indicating a positive sentiment.
4. Positive sentiment: The tweet uses positive language ("adorable") and a heart emoji to convey a positive sentiment about the cat.
5. Negative sentiment: The tweet expresses a dislike for chocolate, indicating a negative sentiment.



Brainstorm some ideas establishing Geopolitical Risk index

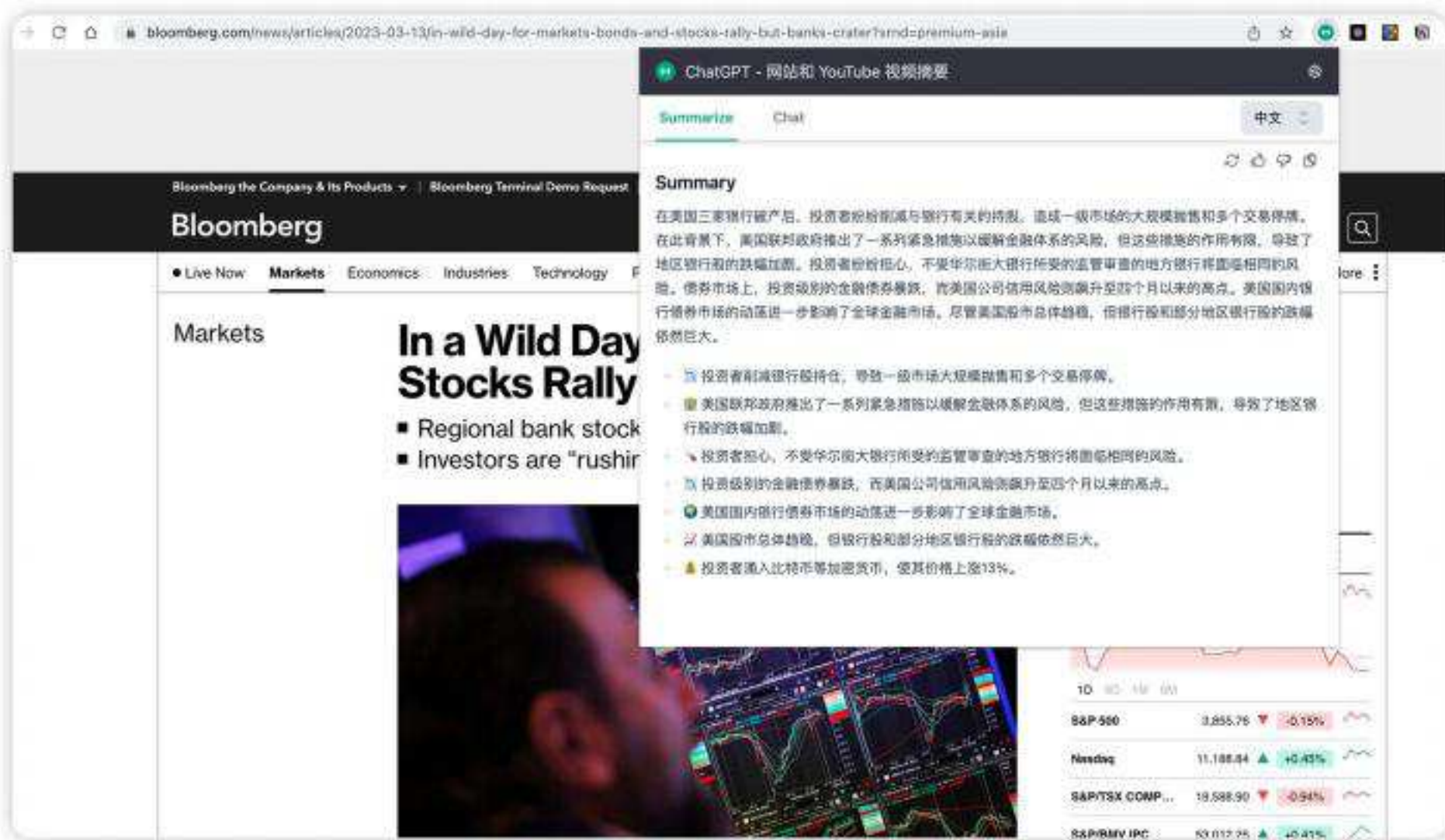


Geopolitical risk index is a measure of the potential political and economic risks that may arise from geopolitical events such as wars, political instability, terrorism, trade disputes, and natural disasters. Here are some ideas on how to establish a geopolitical risk index:

1. Identify key geopolitical risks: Start by identifying the most significant geopolitical risks that can impact global economies, such as military conflicts, terrorism, political instability, natural disasters, and economic sanctions.
2. Gather data: Collect data on geopolitical risks from reputable sources such as government agencies, news outlets, and research institutions. The data should cover a wide range of factors, including political stability, economic indicators, and social unrest.
3. Develop a scoring system: Develop a scoring system that assigns a value to each geopolitical risk factor based on its potential impact on the global economy. For instance, a military conflict may have a higher score than a trade dispute.
4. Weight the risks: Assign weights to each factor based on their relative importance to the overall risk index. For example, political stability may have a higher weight than natural disasters.
5. Calculate the index: Calculate the geopolitical risk index by aggregating the scores for

内容生成及情绪识别

新闻及研报摘要



初步研究



My first question is "What factors determine the Japanese Yen?"



日元的汇率受多种因素影响。其中最重要的因素包括：



1. 日本经济状况：日本的经济表现对日元的汇率有着重要影响。例如，如果日本经济增长强劲，通货膨胀率上升，那么日元的汇率可能会走强。
2. 国际贸易：日本是一个重要的贸易国家，其汇率还会受到对外贸易的影响。如果日本出口增加，进口减少，那么可能会导致日元汇率升值。
3. 利率水平：日本央行的货币政策和利率水平也会影响日元的汇率。如果日本央行加息，那么通常会导致日元升值。
4. 地缘政治风险：全球地缘政治风险的变化也会影响日元的汇率。例如，如果中东局势紧张，那么可能会导致避险情绪升温，使得日元升值。
5. 外汇市场需求：外汇市场中对日元的需求和供应也会影响其汇率。例如，如果投资者对日本市场有信心，那么可能会引起对日元的买盘。

这些因素在不同的时期和情况下可能会产生不同的影响，因此需要根据具体情况进行分析 and 判断。

公司财务报表研究



According to the information from <https://app.quotemedia.com/data/downloadFiling?webmasterId=90423&ref=117200676&type=HTML&symbol=TSLA&companyName=Tesla+Inc.&formType=10-K&formDescription=Annual+report+pursuant+to+Section+13+or+15%28d%29&dateFiled=2023-01-31&CK=1318605> give one financial analysis in tables



Certainly, I'd be happy to provide a financial analysis in tables based on the information provided in the link:

Metric	2022	2021	% Change
Revenue (in millions)	77,550	55,408	40.00%
Gross Profit (in millions)	21,520	14,961	43.80%
Operating Income (in millions)	8,304	3,754	121.00%
Net Income (in millions)	6,325	1,878	237.00%
Earnings per Share	24.10	7.28	231.00%

From the table above, we can see that Tesla's revenue, gross profit, operating income, and net income all increased significantly in 2022 compared to the previous year. Revenue increased by 40%, gross profit increased by 43.8%, operating income increased by 121%, and net income increased by 237%. The earnings per share also increased significantly.

Results of Operations

Automotive

	Year Ended December 31			2022 vs. 2021 Change		2022 vs. 2020 Change	
	2022	2021	2020	\$	%	\$	%
Automotive sales	\$ 47,219	\$ 44,221	\$ 34,664	\$ 13,097	30%	\$ 12,555	36%
Automotive regulatory credits	1,715	1,869	1,000	111	21%	1,119	117%
Automotive leasing	2,476	2,947	3,802	454	15%	300	8%
Total automotive sales	51,410	49,037	39,466	14,361	29%	13,974	35%
Services and other	6,091	1,693	1,994	2,398	142%	1,699	85%
Total automotive & services and other	57,501	50,730	41,460	16,771	33%	15,673	38%
Energy generation and storage segment	1,969	1,769	1,964	1,139	58%	764	39%
Total	\$ 59,470	\$ 52,499	\$ 43,424	\$ 16,910	32%	\$ 16,437	38%

Automotive & Services and Other Segment

Automotive sales includes sales of new Model S, Model X, Model 3, and Model Y vehicles, including access to our FSD Software, Autopilot (optional), Full Self-Driving (beta) program and over-the-air software updates. These sales are subject to trade-in restrictions.

再次凸显提示的专业性



According to the information from <https://app.quotemedia.com/data/downloadFiling?webmasterId=90423&ref=117200676&type=HTML&symbol=TSLA&companyName=Tesla+Inc.&formType=10-K&formDescription=Annual+report+pursuant+to+Section+13+or+15%28d%29&dateFiled=2023-01-31&CK=1318605> your answers are only from the above file



Understood, I will ensure that my answers are based solely on the information provided in the document you have linked to. Please let me know if you have any questions or concerns.



list tesla's revenue in tables from 2020 to 2022



Certainly, here are the tables of Tesla's revenue for the years 2020 to 2022, based on the information provided in the 10-K annual report filed with the SEC on January 31, 2023:



Table 1: Tesla's Revenue in 2020

Category	Revenue (in millions)
Automotive	\$27,646
Energy Generation	\$1,949
Services and Other	\$1,942

通用模型的又一个不足



According to the information from <https://app.quotemedia.com/data/downloadFiling?webmasterId=90423&ref=117200676&type=HTML&symbol=TSLA&companyName=Tesla+Inc.&formType=10-K&formDescription=Annual+report+pursuant+to+Section+13+or+15%28d%29&dateFiled=2023-01-31&CK=1318605> give me numbers of revenues by China



Based on the information provided in the link, Tesla Inc. did not provide a specific breakdown of revenues by country, including China. However, the company did disclose that its automotive sales accounted for the majority of its revenues. It is worth noting that Tesla has a significant presence in China, as it operates multiple factories in the country and has been actively expanding its market share in the region.



实际上

	Year Ended December 31,		
	2022	2021	2020
United States	\$ 40,553	\$ 23,973	\$ 15,207
China	18,145	13,844	6,662
Other	22,764	16,006	9,667
Total	\$ 81,462	\$ 53,823	\$ 31,536

The following table presents long-lived assets by geographic area (in millions):

	December 31, 2022	December 31, 2021
United States	\$ 21,667	\$ 19,026
Germany	3,547	2,606
China	2,978	2,415
Other international	845	602
Total	\$ 29,037	\$ 24,649



According to the information from <https://app.quotemedia.com/data/downloadFiling?webmasterId=90423&ref=117200676&type=HTML&symbol=TSLA&companyName=Tesla+Inc.&formType=10-K&formDescription=Annual+report+pursuant+to+Section+13+or+15%28d%29&dateFiled=2023-01-31&CK=1318605> list the facts in tables about tesla's long lived assets by geographic area



Sure, I can provide the information you requested.



The following table lists the long-lived assets of Tesla by geographic area, as reported in their 2022 annual report:

Geographic Area	Long-Lived Assets (in millions)
United States	22,236
China	11,688
Europe	4,954
Rest of World	3,149

Please note that the information provided is based on Tesla's 2022 annual report, and may be subject to change in future reports.

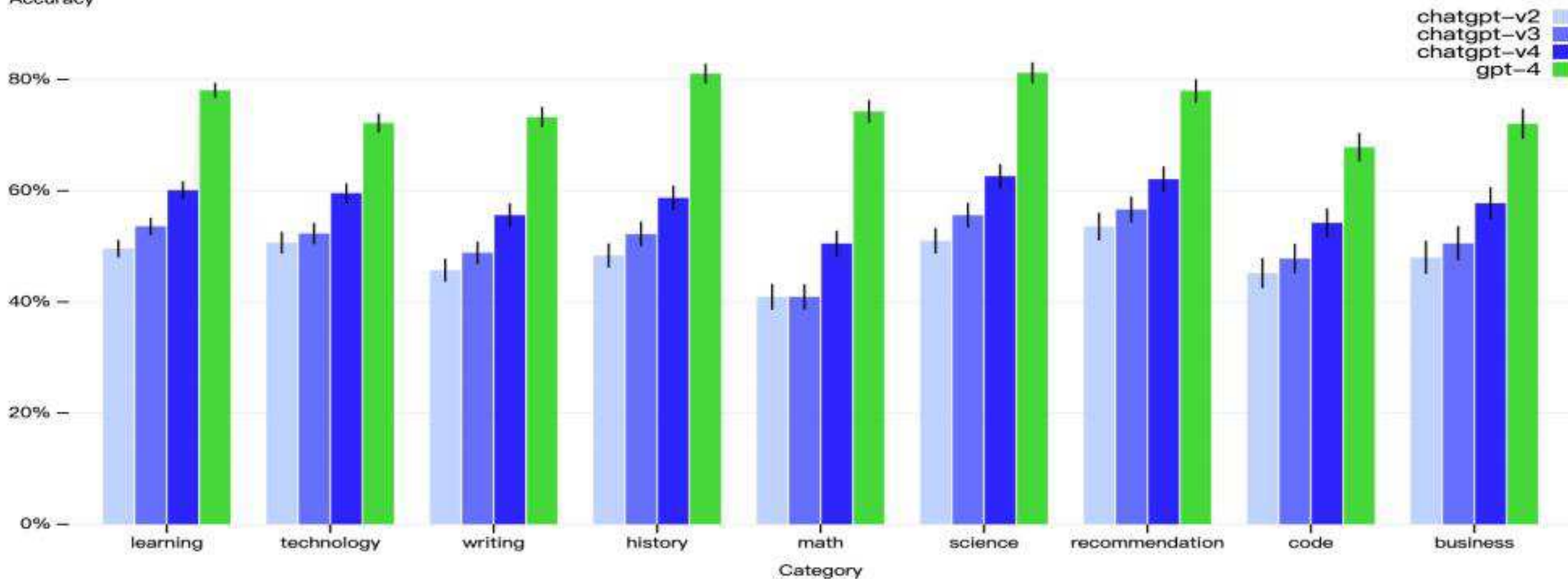
另一个Bug

准确性始终是一个问题



Internal factual eval by category

Accuracy



On nine categories of internal adversarially-designed factual evals, we compare GPT-4 (green) to the first three ChatGPT versions. There are significant gains across all topics. An accuracy of 1.0 means the model's answers are judged to be in agreement with human ideal responses for all questions in the eval.

各种比较



3

请按照下面四个维度，列出特斯拉与比亚迪的对比表：盈利能力、偿债能力、成长能力和现金流量，做出可以让我复制到EXCEL格式的报表。

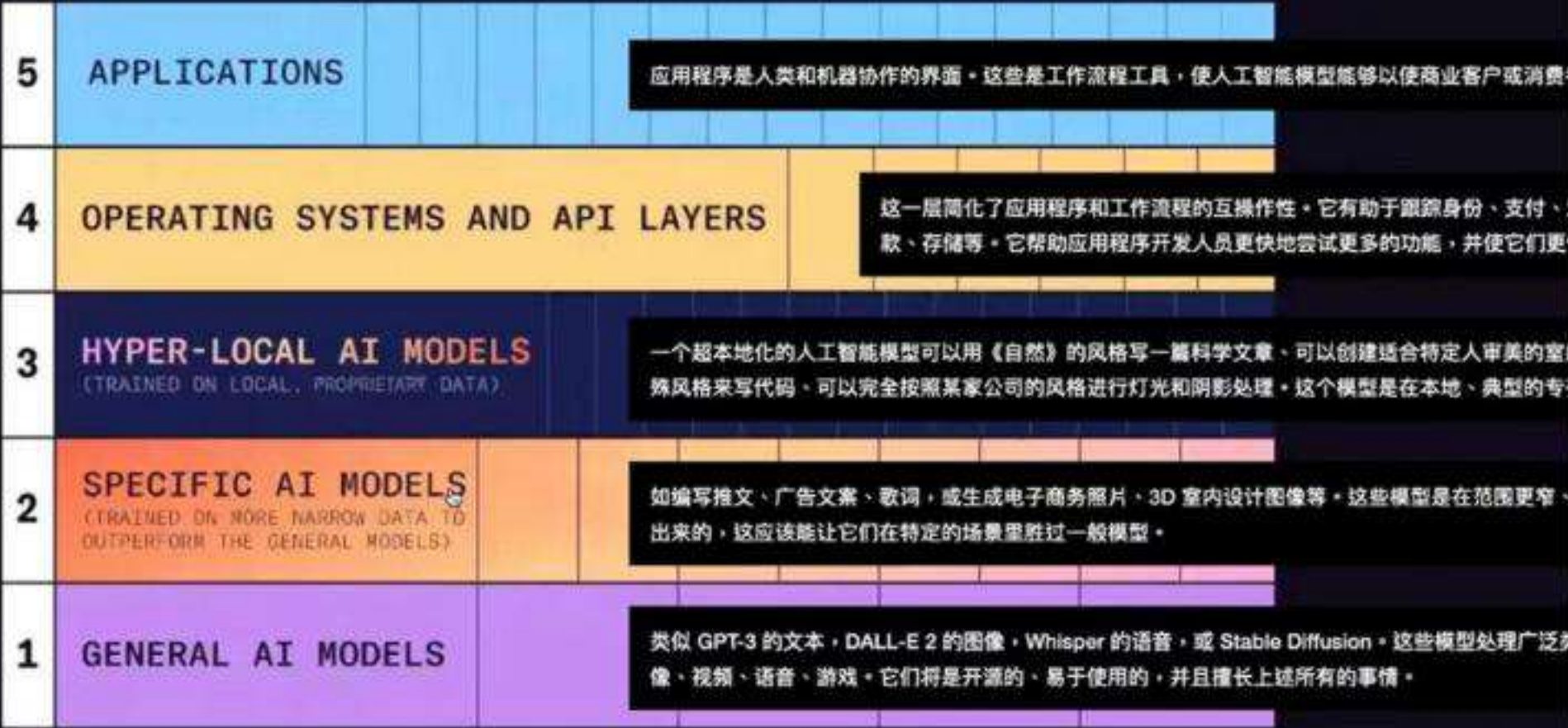


特斯拉与比亚迪的对比表



维度	指标	特斯拉	比亚迪
盈利能力	净利润率	5.8%	6.9%
盈利能力	毛利率	24.3%	18.6%
盈利能力	营收增长率	57.5%	30.4%
偿债能力	资产负债率	53.4%	68.2%
偿债能力	流动比率	1.5	1.3
成长能力	净资产增长率	50.3%	18.8%
成长能力	EPS增长率	92.7%	46.1%
现金流量	自由现金流	238.3亿美元	112.8亿人民币
现金流量	经营现金流	183.5亿美元	138.4亿人民币

The 5-Layer Generative Tech Stack



SOURCE: NFX.COM

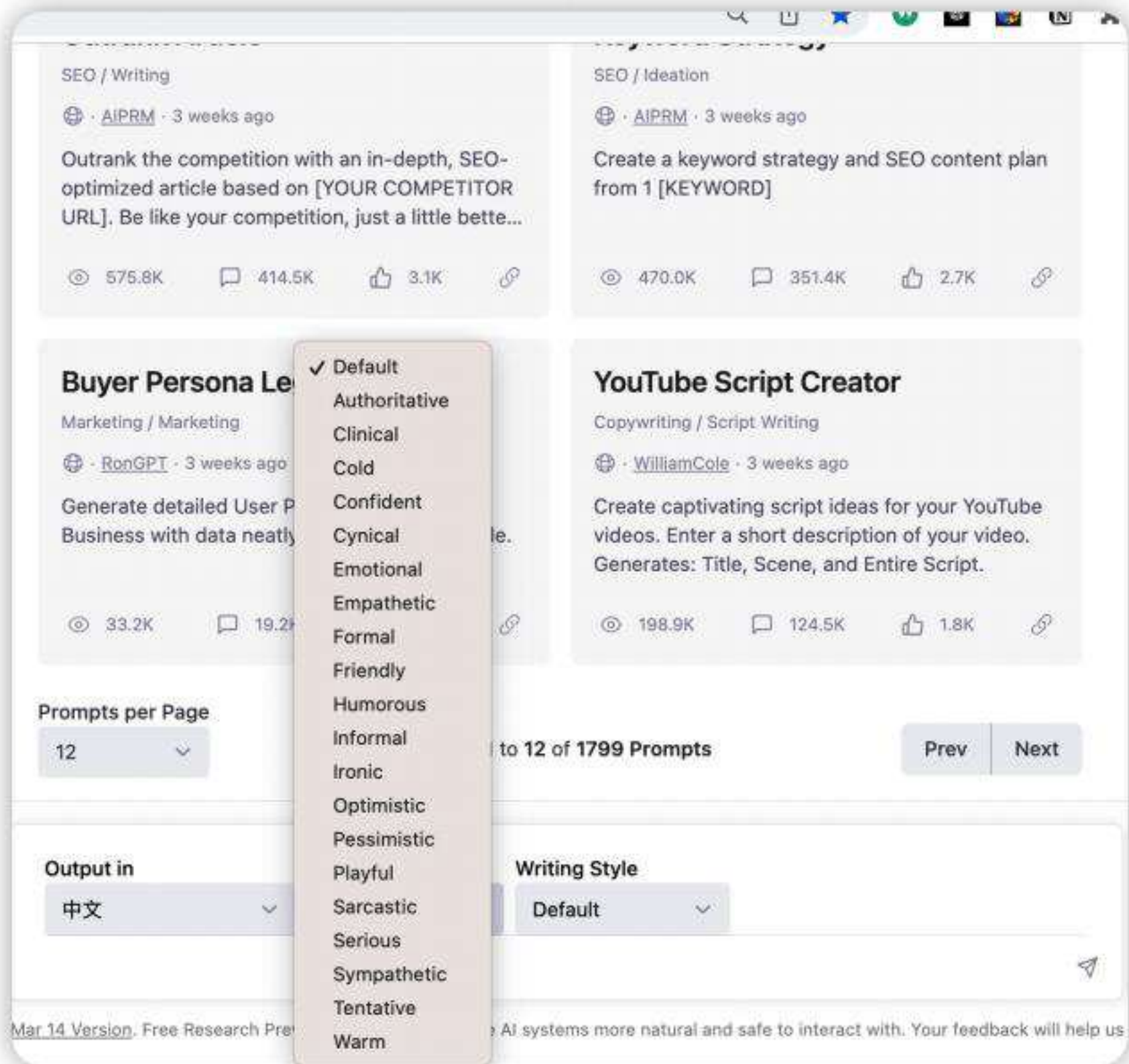
NfX

关于广义的
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- 风控：基于ChatGPT强大的类比和分类功能，将来实时的风控系统
- 投顾：智能投顾时代终于来临，融合数千万份研究报告和专业数据库，构造真正的智能投顾

人性化机器人



嘉宾讨论

