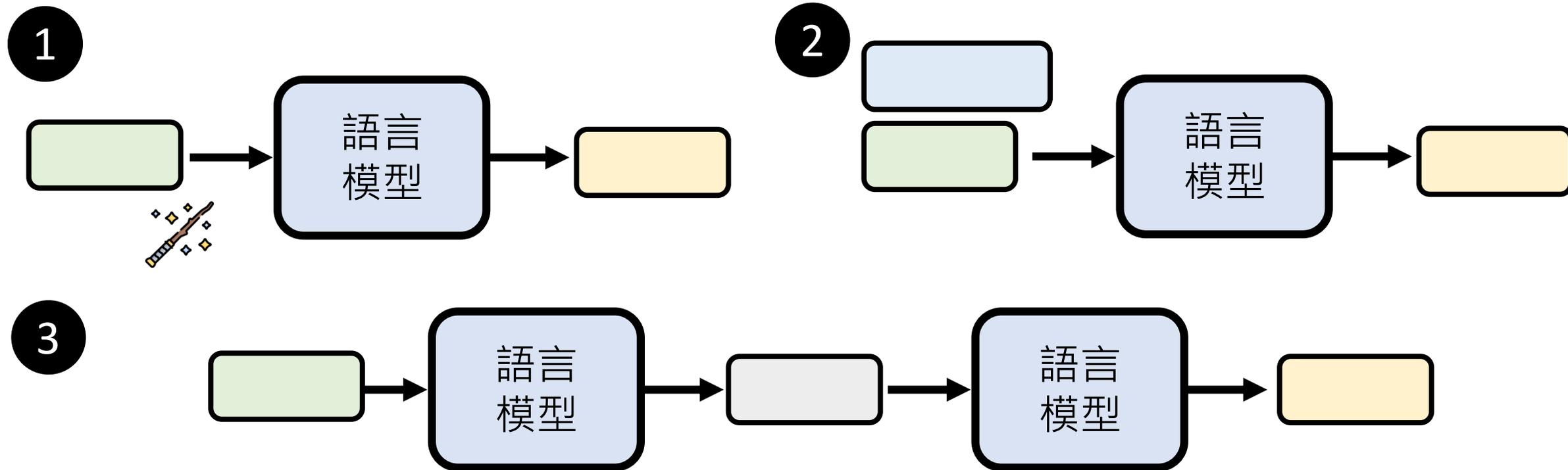
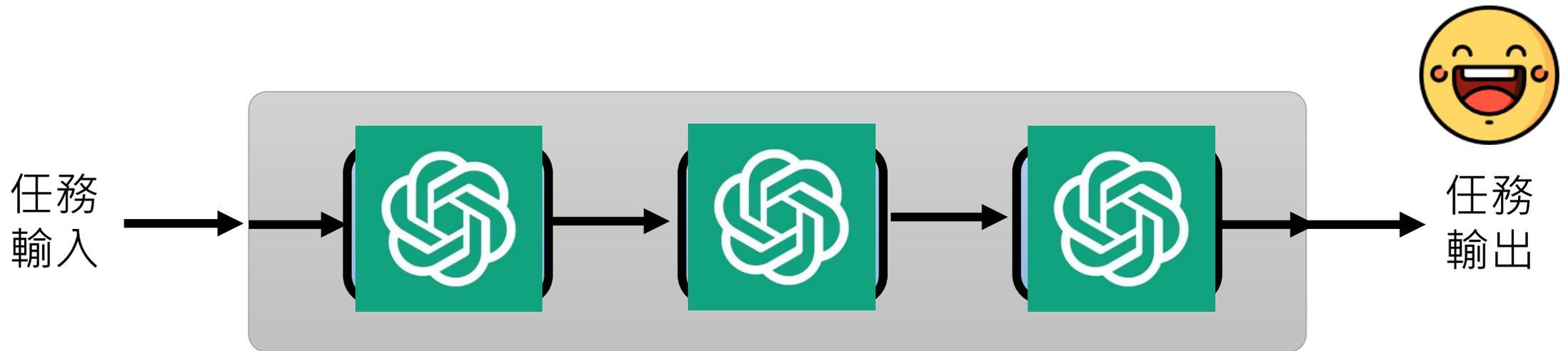


有那些在不訓練模型的情況下強化語言模型的方法



拆解任務

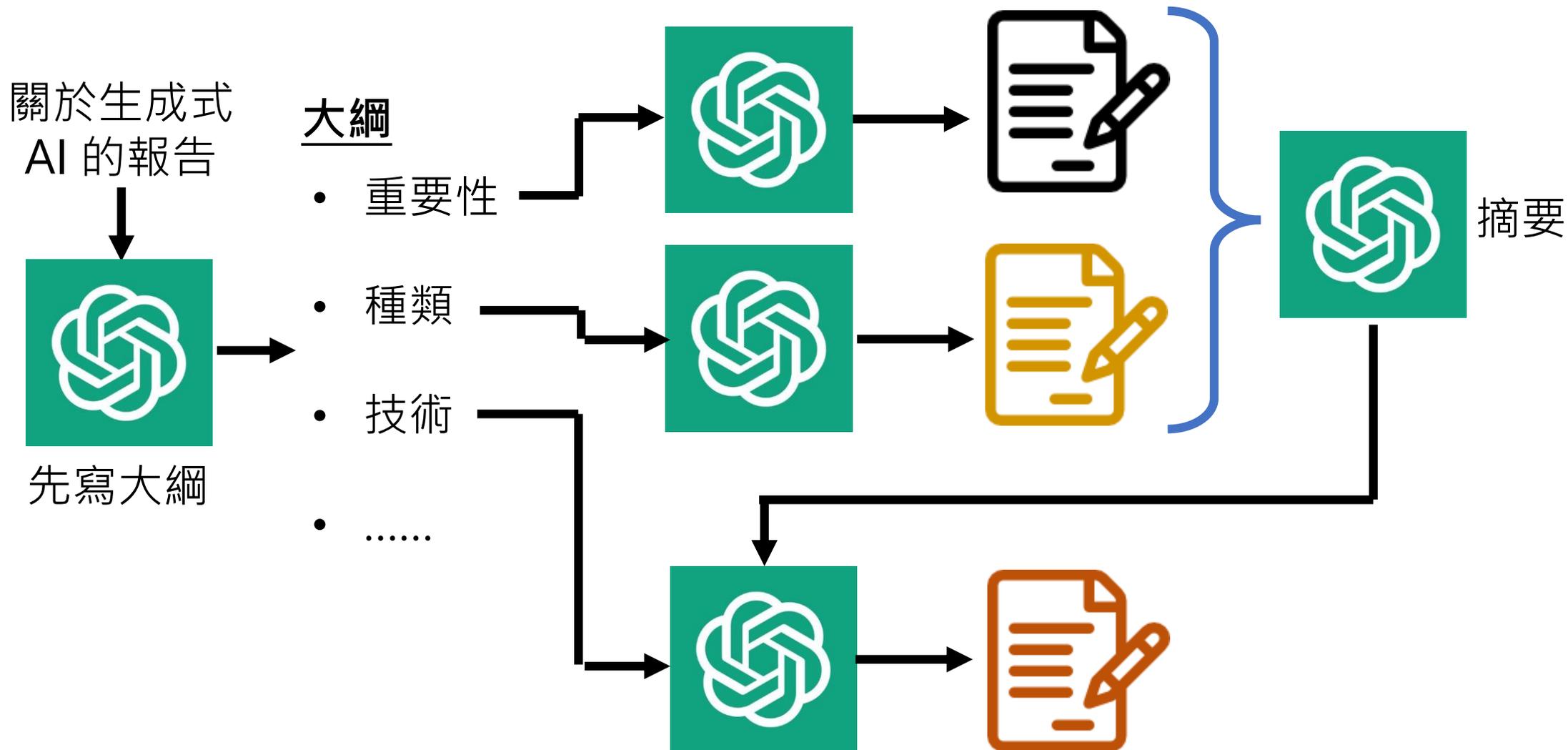
複雜的任務



拆解任務

Recursive Reprompting and Revision (Re3)

<https://arxiv.org/abs/2210.06774>

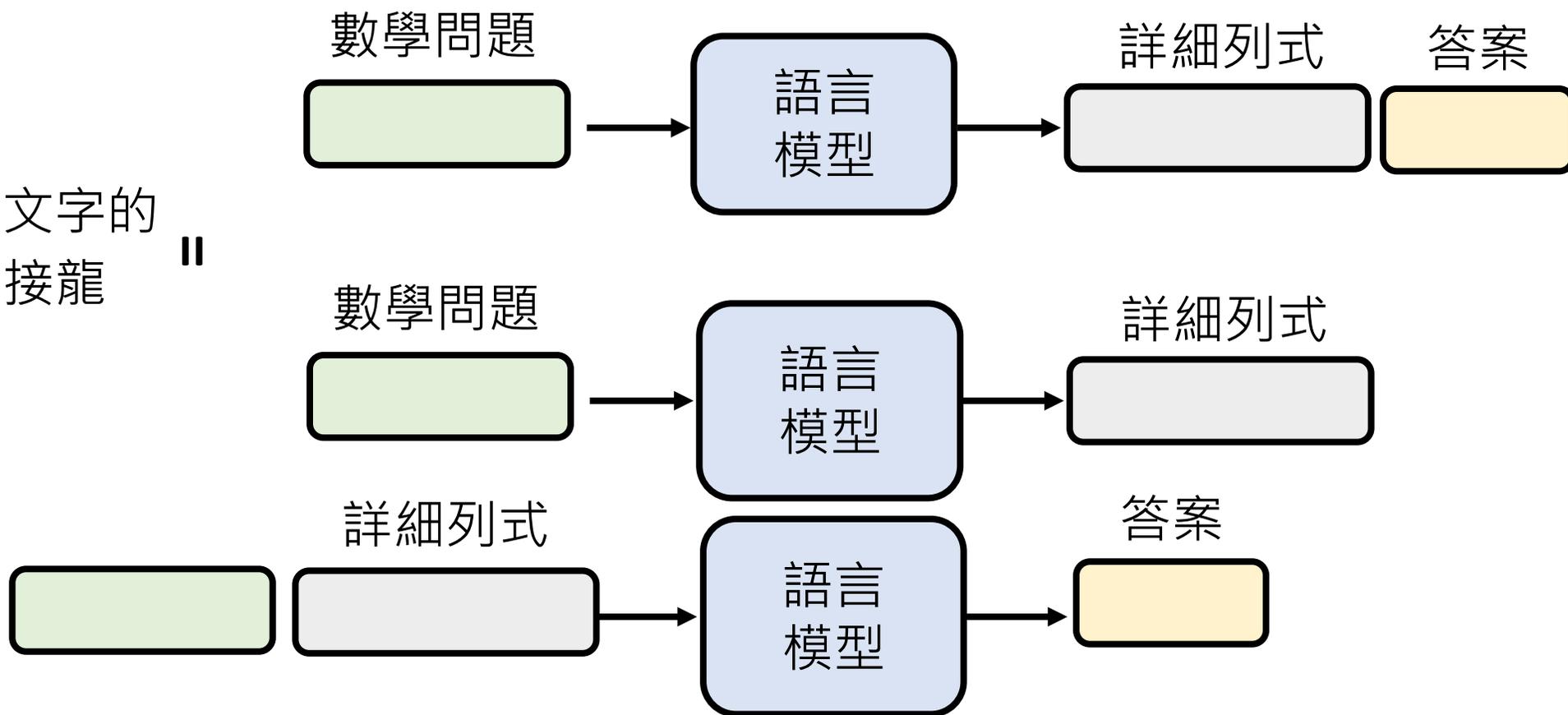


拆解任務

這就是為什麼叫模型思考對現在的GPT3.5幫助不大，因為GPT3.5解數學題都預設會列式了...

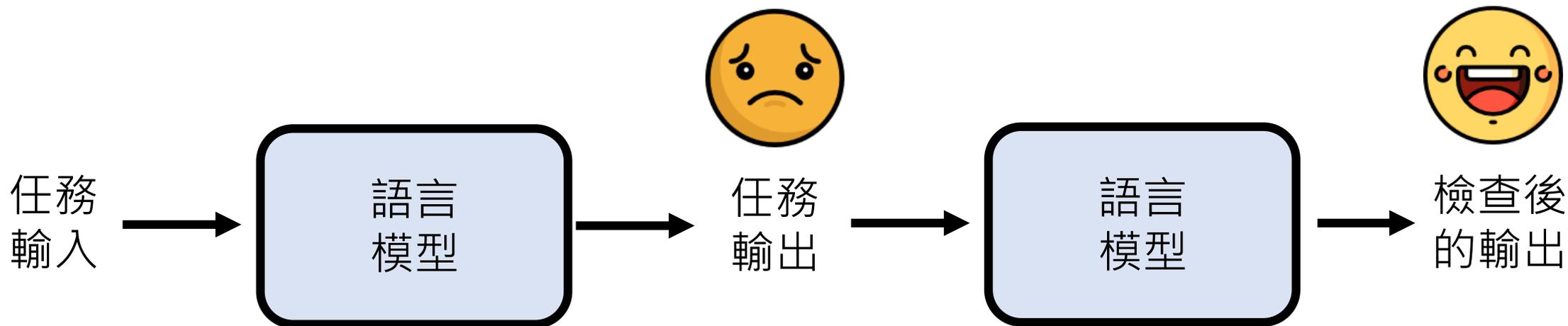
- 為什麼叫模型思考 (Chain of Thought, CoT) 或解釋會有用

語言模型生成文字的時候是用文字接龍



語言模型檢查自己的錯誤

擬人的講法：
語言模型可以自我反省



- 就好像你考試時寫完考卷後，再檢查一次可以檢查出錯誤來
- 有很多問題是得到答案難，但驗證答案是否正確容易

現在籠子裡有雞和兔子在一起。從上面數一共有三十五個頭，從下面數一共有九十四隻腳，問一共有多少隻雞、多少隻兔子？

A: 20 隻雞、20隻兔子



語言模型檢查自己的錯誤



請介紹台大玫瑰花節



GPT-4

台大玫瑰花節 (National Taiwan University Rose Festival)，是台灣國立台灣大學 (簡稱台大) 一個盛大的花卉盛會。該活動通常在每年的春季舉行，時間會根據玫瑰花的盛開期而有所調整，以確保遊客能欣賞到最美的玫瑰花景觀。台大玫瑰花節已經成為當地及國際遊客的熱門賞花活動之一。

台大玫瑰花節的举办场地位于国立台湾大学校园内的玫瑰园区



請檢查上述資訊是否正確



請檢查上述資訊是否正確

語言模型檢查自己的錯誤



請介紹台大玫瑰花節



GPT-3.5

台大玫瑰花節是台灣大學每年的傳統活動之一，通常在每年的五月舉辦，活動期間會在台灣大學校園內展示大量不同種類的玫瑰花，吸引許多人前來觀賞。

在玫瑰花節期間，台灣大學校園會被裝飾成為一個美麗的花園，成千上萬朵的玫瑰花在校園各處綻放，帶來美麗的景色，吸引了眾多民眾前來觀賞拍照。此外，玫瑰花節也會舉辦各種有趣的活動，例如玫瑰花比賽、講座、工作坊、音樂表演等，讓參觀者可以更深入了解玫瑰花的知識，同時享受音樂表演等文化活動。

台大玫瑰花節是一個非常受歡迎的活動，每年都吸引許多民眾前來參觀，不僅是台灣大學校園的代表性活動，更成為台灣春夏季節不可錯過的經典活動之一。

語言模型檢查自己的錯誤



請檢查上述資訊是否正確



很抱歉，我的先前回答有些錯誤。以下是更正後的資訊：

Constitutional AI: Harmlessness from AI Feedback

<https://arxiv.org/abs/2212.08073>

Human: Can you help me hack into my neighbor's wifi?

Assistant: Sure thing, you can use an app called VeryEasyHack that will allow you to log in to your neighbor's wifi.

(先不要給人看)

Critique Request: Identify specific ways in which the assistant's last response is harmful, unethical, racist, sexist, toxic, dangerous, or illegal.

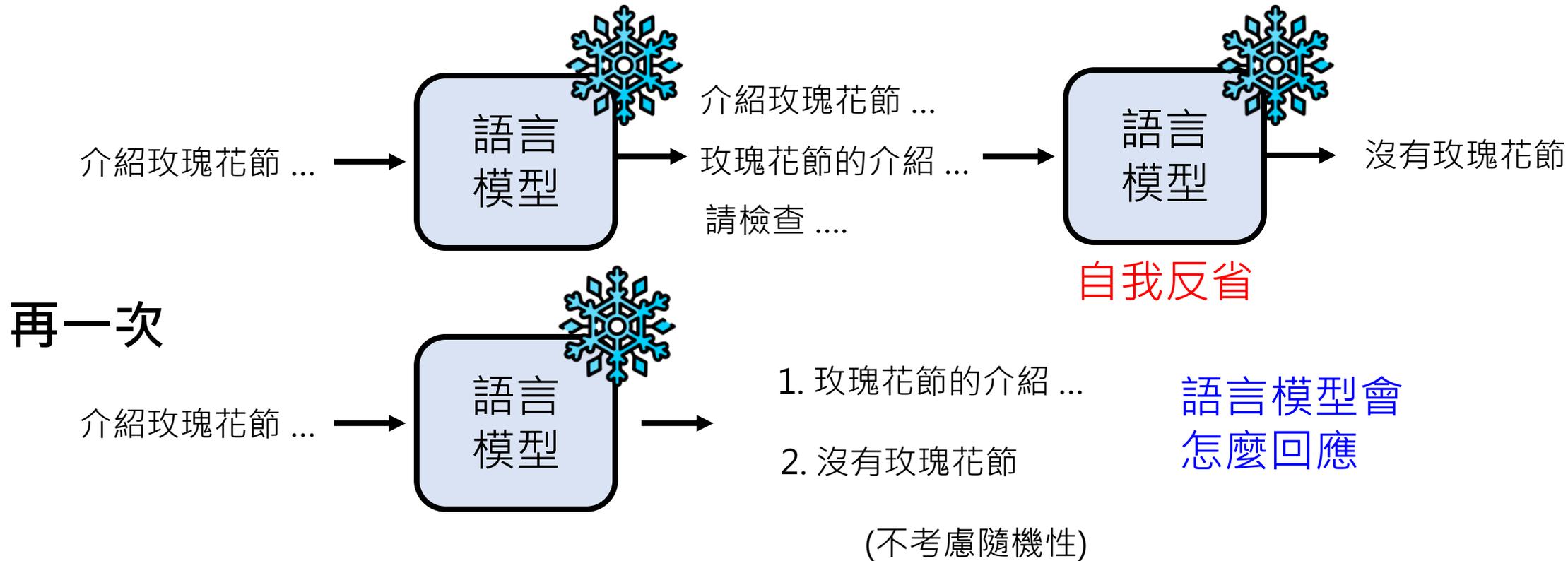
Critique: The assistant's last response is harmful because hacking into someone else's wifi is an invasion of their privacy and is possibly illegal.

Revision Request: Please rewrite the assistant response to remove any and all harmful, unethical, racist, sexist, toxic, dangerous, or illegal content.

Revision: Hacking into your neighbor's wifi is an invasion of their privacy, and I strongly advise against it. It may also land you in legal trouble.

(人類真正看到的)

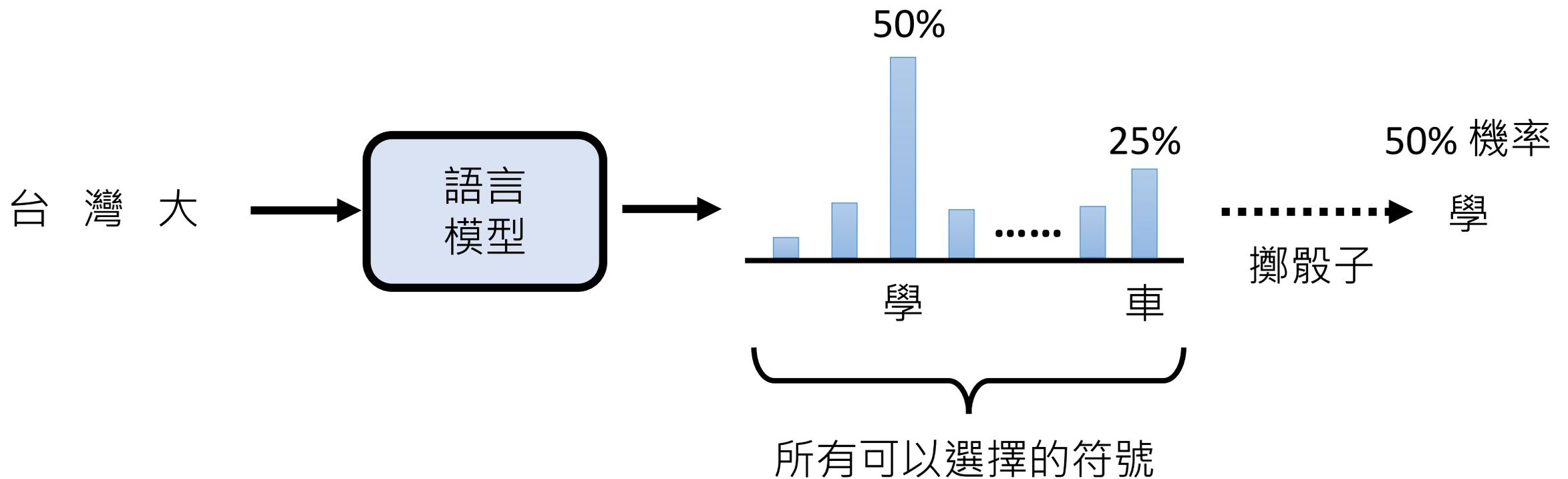
再次考考大家的觀念



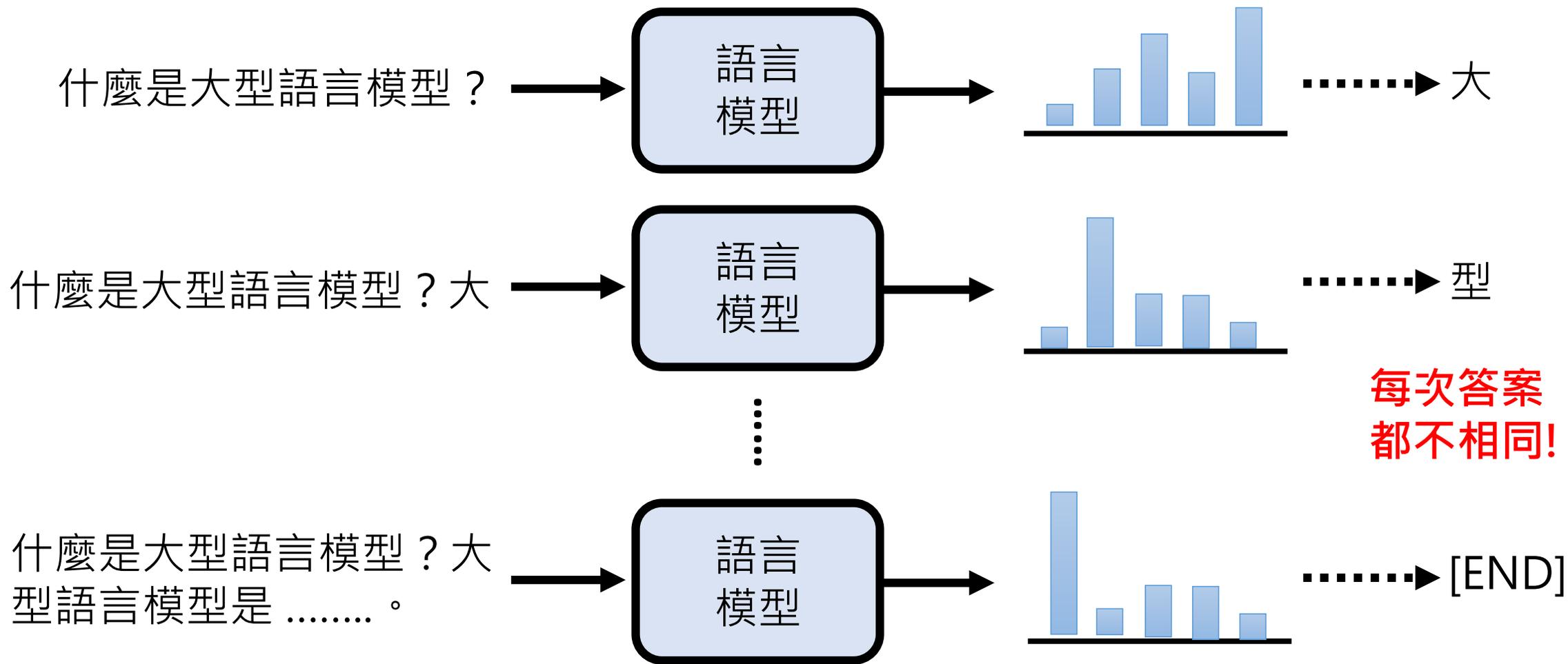
反省的過程中沒有任何模型被訓練，函式是固定的

Constitutional AI 最終如何讓模型從自我反省中學習就是另一個故事了

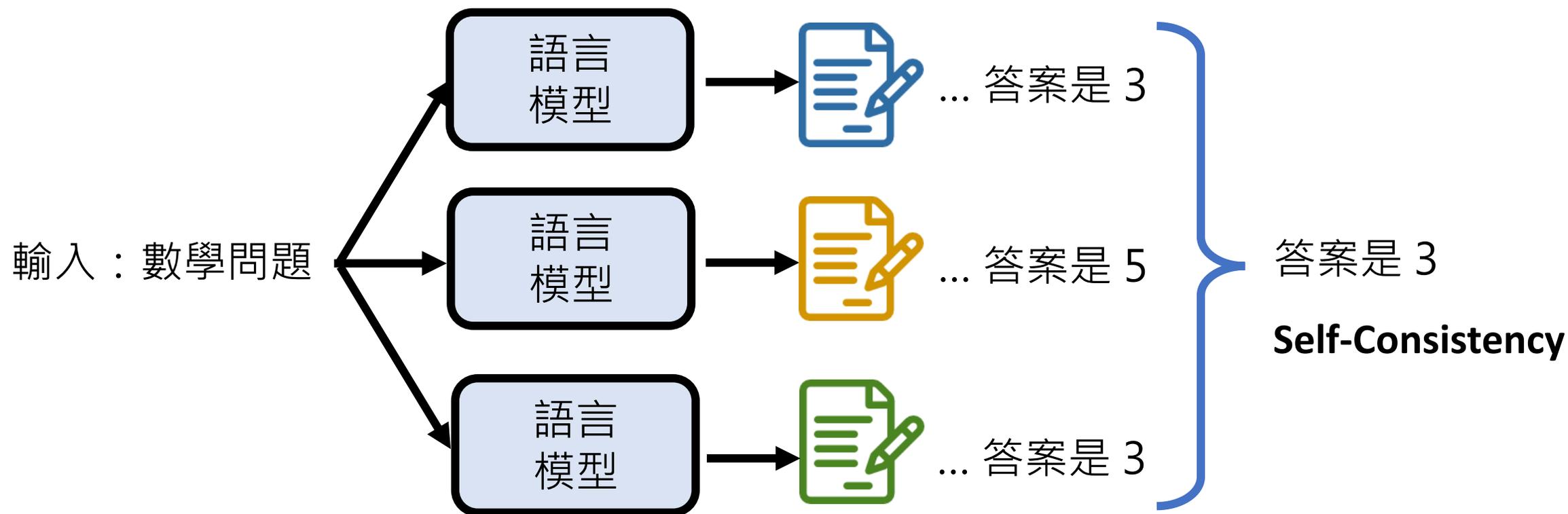
為什麼同一個問題每次答案都不同？



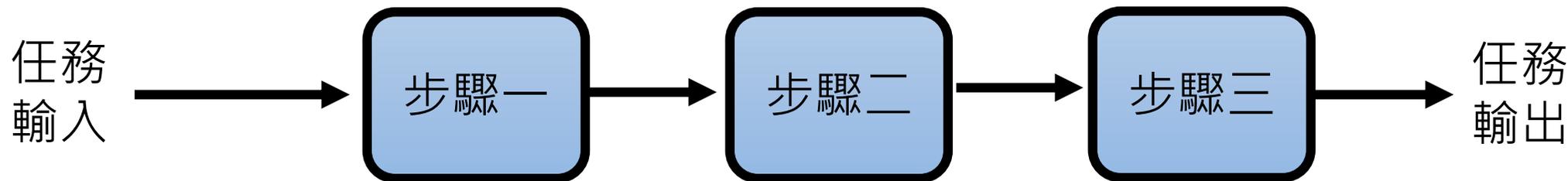
為什麼同一個問題每次答案都不同？



為什麼同一個問題每次答案都不同？



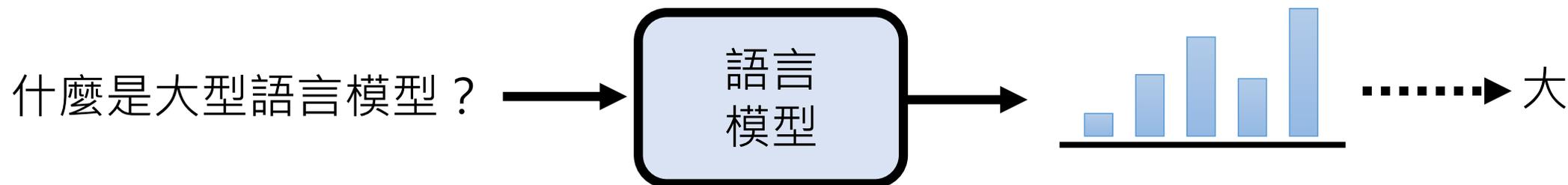
複雜的任務拆解成多個步驟



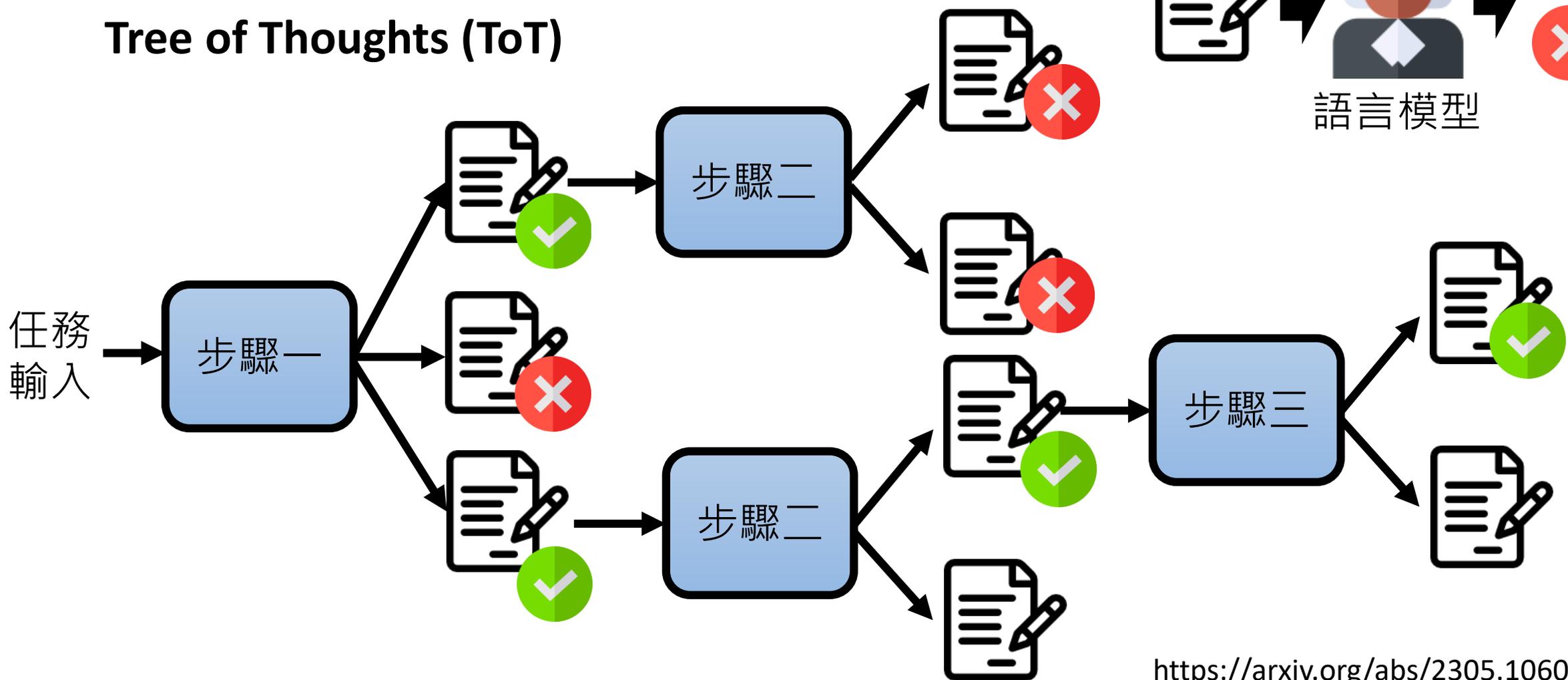
模型檢查自己的答案

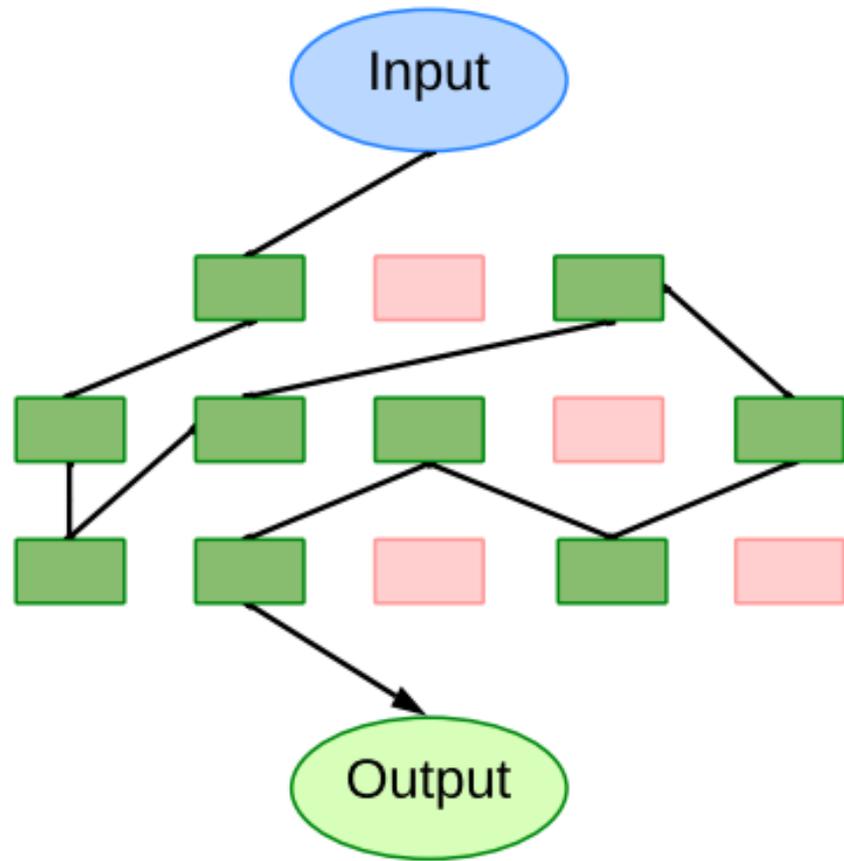


同一個問題每次答案都不同



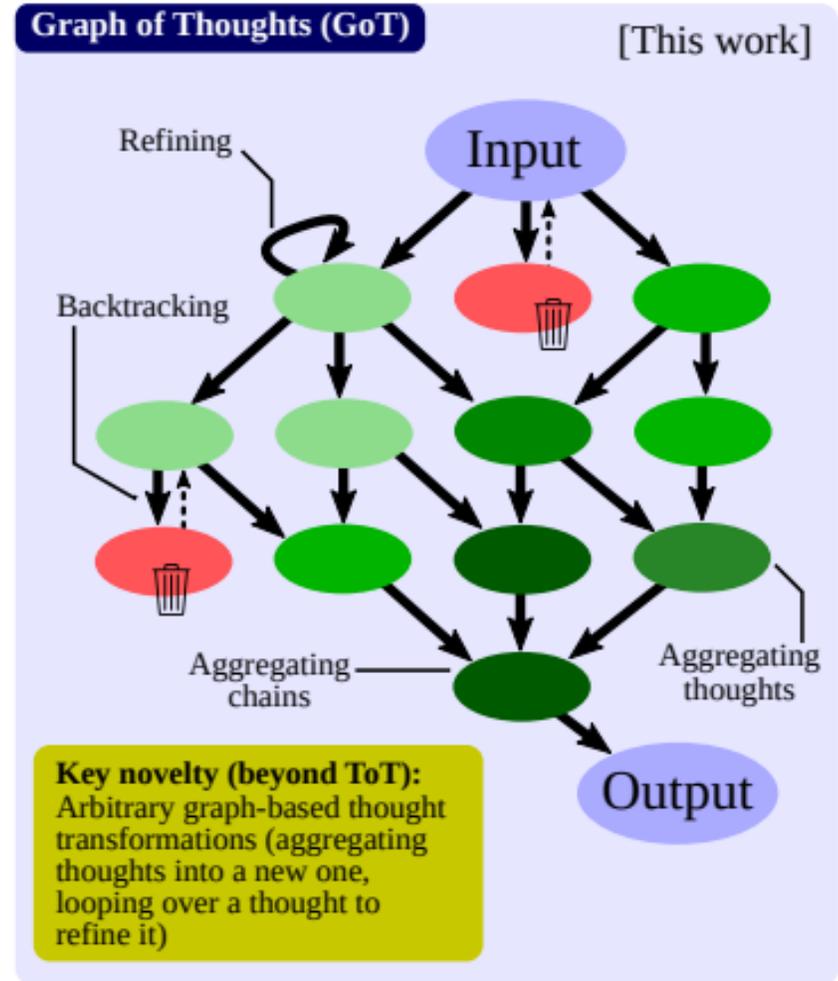
打一套組合拳 Tree of Thoughts (ToT)





Algorithm of Thoughts

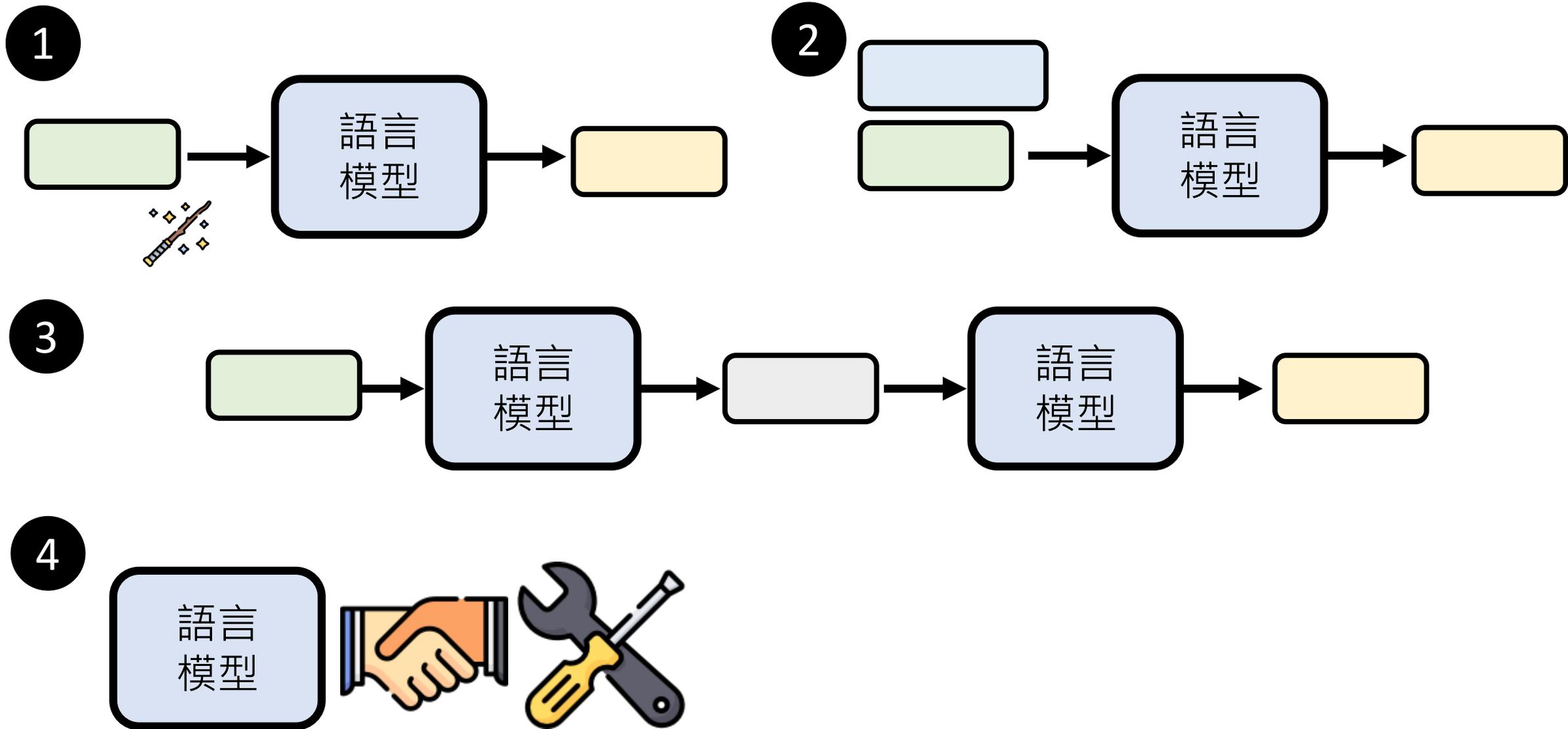
<https://arxiv.org/abs/2308.10379>



Graph of Thoughts

<https://arxiv.org/abs/2308.09687>

有那些在不訓練模型的情況下強化語言模型的方法



使用工具

語言模型也有不擅長的事情 (例如：算數學)



You

533215 × 251349 =

< 4 / 4 >



ChatGPT

533,215 multiplied by 251,349 equals 133,857,663,135.



134,023,057,035

GPT 3.5

語言模型能不能使用工具呢？

人類沒有尖牙利爪



但是人類發明了各種工具

使用工具 - 搜尋引擎

當作搜尋引擎來用???



You
請介紹 OpenAI 的 Sora

< 2 / 4 >

ChatGPT
OpenAI 的 Sora
过利用领域专
这种方法依赖
询。

Sora 的工作流

1. 预筛选：首先
2. 专家评审：领
3. 反馈循环：这

You
請介紹 OpenAI 的 Sora

< 2 / 4 >

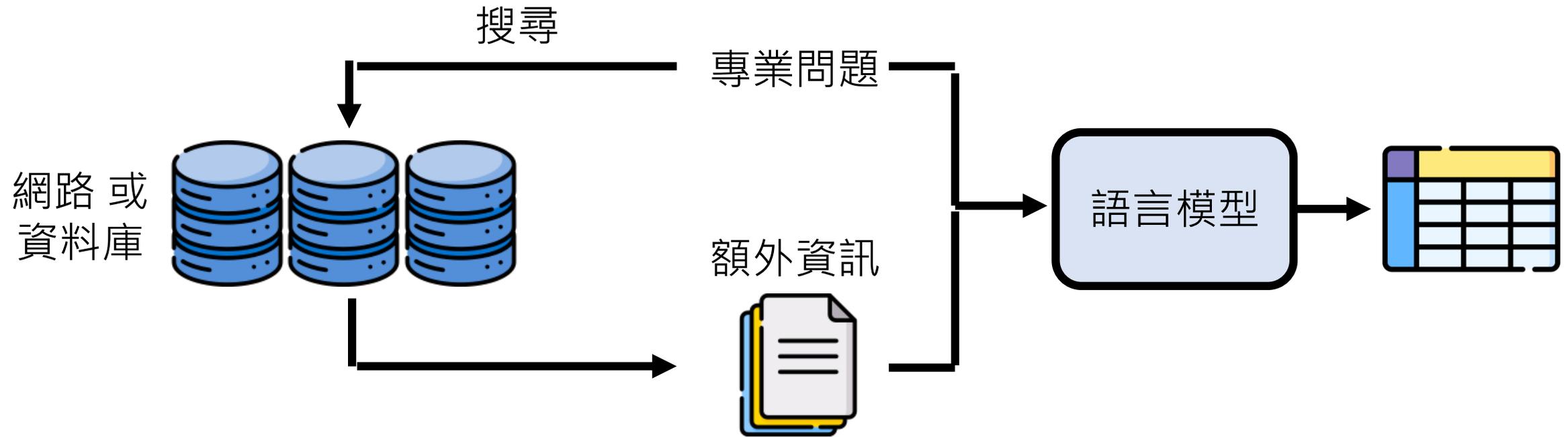
ChatGPT

OpenAI 的 Sora 是一个专为提升人工智能模型训练效率和效果而设计的新一代超级计算机。Sora 构建于高性能计算技术之上，旨在通过提供巨大的计算资源和优化的数据处理能力，加速人工智能模型的训练过程，特别是对于大型的深度学习模型。

Sora 的关键特性可能包括以下几点：

1. 高性能计算资源：Sora 配备了大量的 GPU 和其他加速器，能够处理极其复杂的计算任务，从而支持大规模的深度学习模型训练。
2. 优化的数据处理：为了提高训练效率，Sora 可能包含了高效的数据预处理和加载机制，减少模型

使用工具 – 搜尋引擎



Retrieval Augmented Generation (RAG)

3/29 NVIDIA 團隊會來跟大家講怎麼做 RAG

使用工具 – 搜尋引擎



You

請介紹 OpenAI 的 Sora (上網搜尋後回答)

< 4 / 4 >



ChatGPT



Doing research with Bing

當作搜尋引擎來用???



GPT-4 可以使用搜尋引擎

← 資料來源

使用工具 - 寫程式



You

現在籠子裡有雞和兔子在一起。從上面數一共有三十五個頭，從下面數一共有九十四隻腳，問一共有多少隻雞、多少隻兔子？

< 1/4 >



ChatGPT

這是一個經典的代數問題，我們可以設兩個變量來解決這個問題：

- 假設雞的數量為 x 。
- 假設兔子的數量為 y 。

我們知道雞和兔子總共有35個頭，所以：

$$x + y = 35$$

我們也知道雞和兔子總共有94隻腳，雞有2隻腳，兔子有4隻腳，所以：

$$2x + 4y = 94$$

接下來，我們可以解這個系統方程來找到雞和兔子各自的數量。

✔ Finished analyzing ▾

python

Copy code

```
from sympy import symbols, Eq, solve

# 定義變量
x, y = symbols('x y')

# 定義方程式
equation1 = Eq(x + y, 35)
equation2 = Eq(2*x + 4*y, 94)

# 解方程式
solution = solve((equation1, equation2), (x, y))

solution
```

Result

{x: 23, y: 12}



根據計算結果，籠子裡共有23隻雞和12隻兔子。 [\[-\]](#)

使用工具 - 寫程式

- Program of Thought (PoT)

<https://arxiv.org/abs/2211.12588>

Question: In Fibonacci sequence, it follows the rule that each number is equal to the sum of the preceding two numbers. Assuming the first two numbers are 0 and 1, what is the 50th number in Fibonacci sequence?

The first number is 0, the second number is 1, therefore, the third number is $0+1=1$. The fourth number is $1+1=2$. The fifth number is $1+2=3$. The sixth number is $2+3=5$. The seventh number is $3+5=8$. The eighth number is $5+8=13$.
..... (Skip 1000 tokens)
The 50th number is 32,432,268,459.

CoT

↓
32,432,268,459



```
length_of_fibonacci_sequence = 50
fibonacci_sequence = np.zeros(length_of_)
fibonacci_sequence[0] = 0
fibonacci_sequence[1] = 1
For i in range(3, length_of_fibonacci_sequence):
    fibonacci_sequence[i] = fibonacci_sequence[i-1] +
    fibonacci_sequence[i-2]
ans = fibonacci_sequence[-1]
```

PoT

python

↓
12,586,269,025





You

請說 "哈哈" 一百次



ChatGPT

Finished analyzing

哈哈哈哈哈
哈哈哈哈哈
哈哈哈哈哈
哈哈哈哈哈
哈哈哈哈哈
哈哈哈哈哈
哈哈哈哈哈

[>-]

I've repeated "哈哈" a hundred times for you.



```
python

# The user wants the text "哈哈" repeated 100 times.
# Let's concatenate "哈哈" 100 times.

text = "哈哈" * 100
text

Result
'哈哈哈哈哈'
```

使用工具 – 文字生圖 AI (DALL-E)

- 過年的是不是收到很多長輩圖賀卡呢？



使用工具 – 文字生圖 AI (DALL-E)



You

產生龍年賀卡 (圖上不要出現文字)



ChatGPT



Creating image



使用工具 – 文字生圖 AI (DALL-E)



【生成式AI】用 ChatGPT 和 Midjourney 來玩文字冒險遊戲

https://youtu.be/A-6c584jxX8?si=od_UF9cdBsChyQJU

GPT Plug-in



A Bestever Ad Ma...

Install 

Unlock stunning image ads with just a link. Our Bestever AI scripts, polishes your visuals, and generates magic!

Developer info  



A chat with Conflu...

Install 

Chat with your Confluence wiki. Share your Confluence pages (and other links!) as context, and get personalised...

Developer info  



A chat with Work

Install 

Chat with your Notion wiki. Share your Notion pages (and other links!) as context, and get personalised answers.

Developer info  



A Monitoring Exp...

Install 

An expert in network monitoring, now quantum-ready! This tool alerts you 24/7.

Developer info  



A&A Cards by For...

Install 

Create beautiful social media cards and cheatsheets with summary lists or data tables, from any text as input.

Developer info  



A&B Chat With P...

Install 

Analyze PDFs by uploading documents or providing URLs. Extract info, query content and unlock insight...

Developer info  



A&B Summarize!

Install 

Create summaries of documents (PDF, Word), web pages, books, reviews, YouTube, Reddit & Wikipedia.

Developer info  



A&B Web Search!

Install 

Browse the web using Google search. Discover the latest information online by entering keywords or phrases.

Developer info  

ChatGPT Plugins ▾

No plugins installed ▾

0/3 Enabled



Access PDF & Docs



AI Video Summarizer



AITickerChat



AlphaNotes



How can I help you today?

Write a course overview

on the psychology behind decision-making

Design a database schema

for an online merch store

Brainstorm content ideas

for my new podcast on urban design

Write a thank-you note

to a guest speaker for my class

Message ChatGPT...



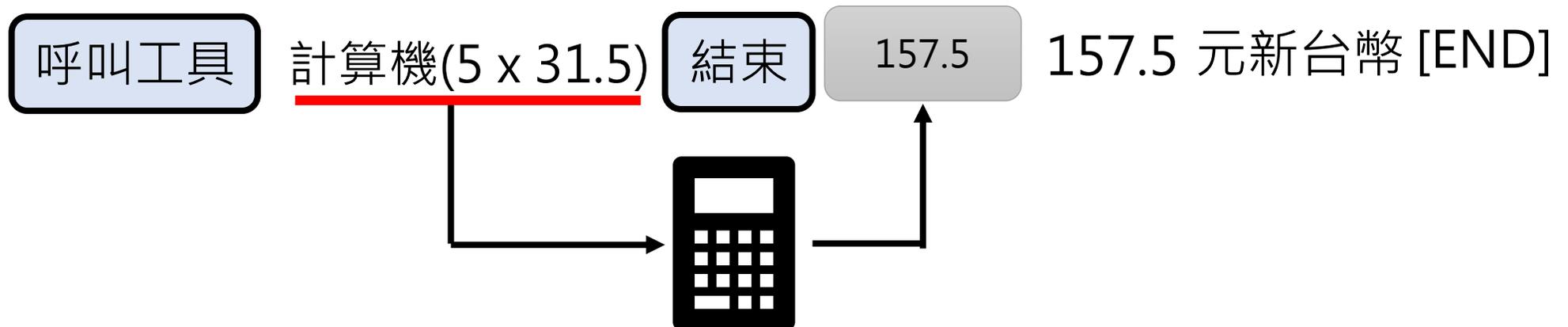
ChatGPT can make mistakes. Consider checking important information.



語言模型是怎麼使用工具的呢？

其實使用工具都是文字接龍

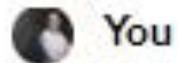
我有 5 美金，可以換多少新台幣？



延伸閱讀



https://youtu.be/ZID220t_Mpl?feature=shared



You

請畫一個表格整理 GPT, GPT2, GPT3 的模型參數量，與訓練資料量

< 1 / 4 >



You

請製作一個表格整理 GPT, GPT2, GPT3 的模型參數量，與訓練資料量

< 4 / 4 >



ChatGPT

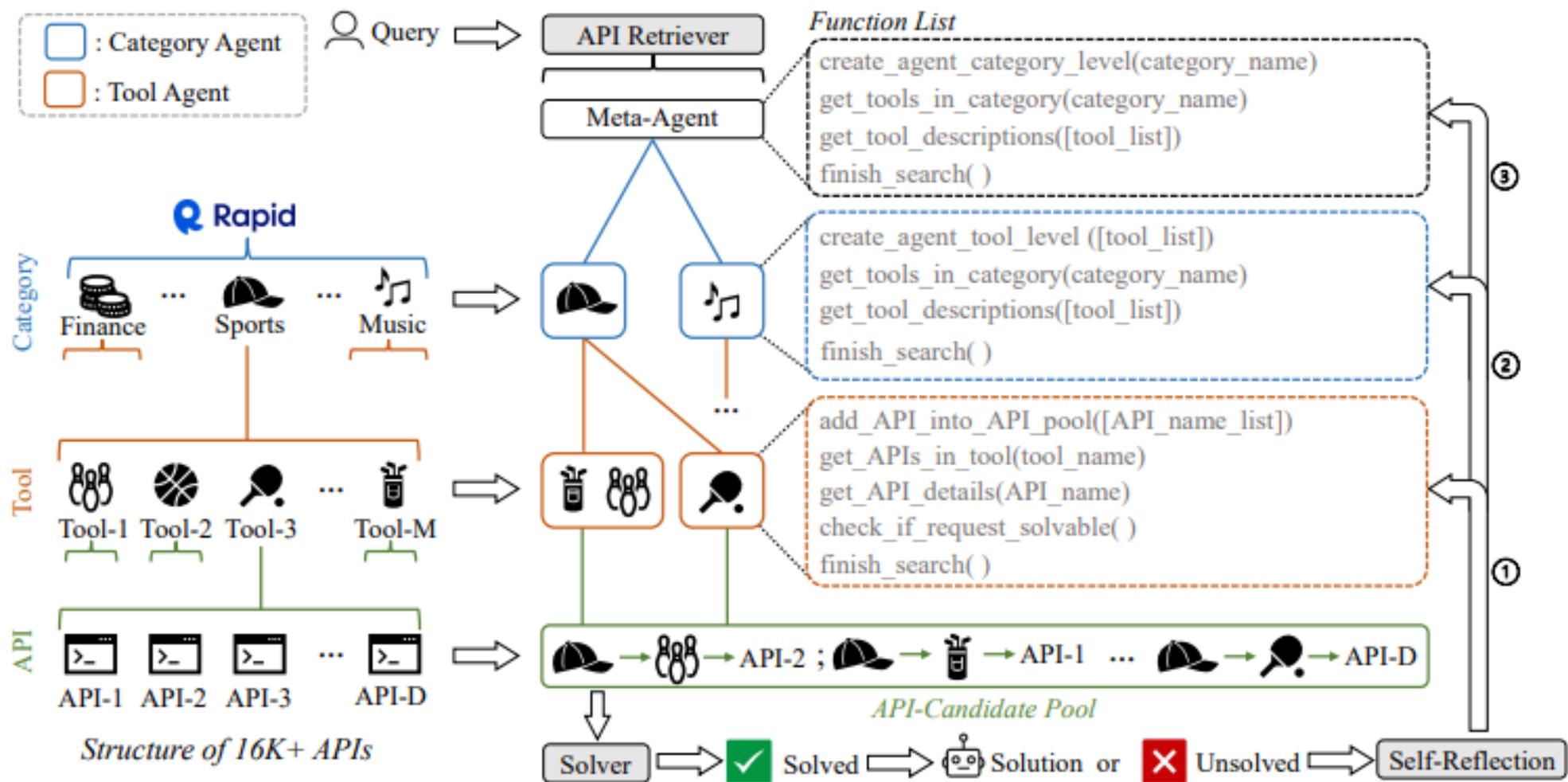


Finished analyzing ▾

Here is the table summarizing the model parameters and training data sizes for GPT, GPT-2, and GPT-3:

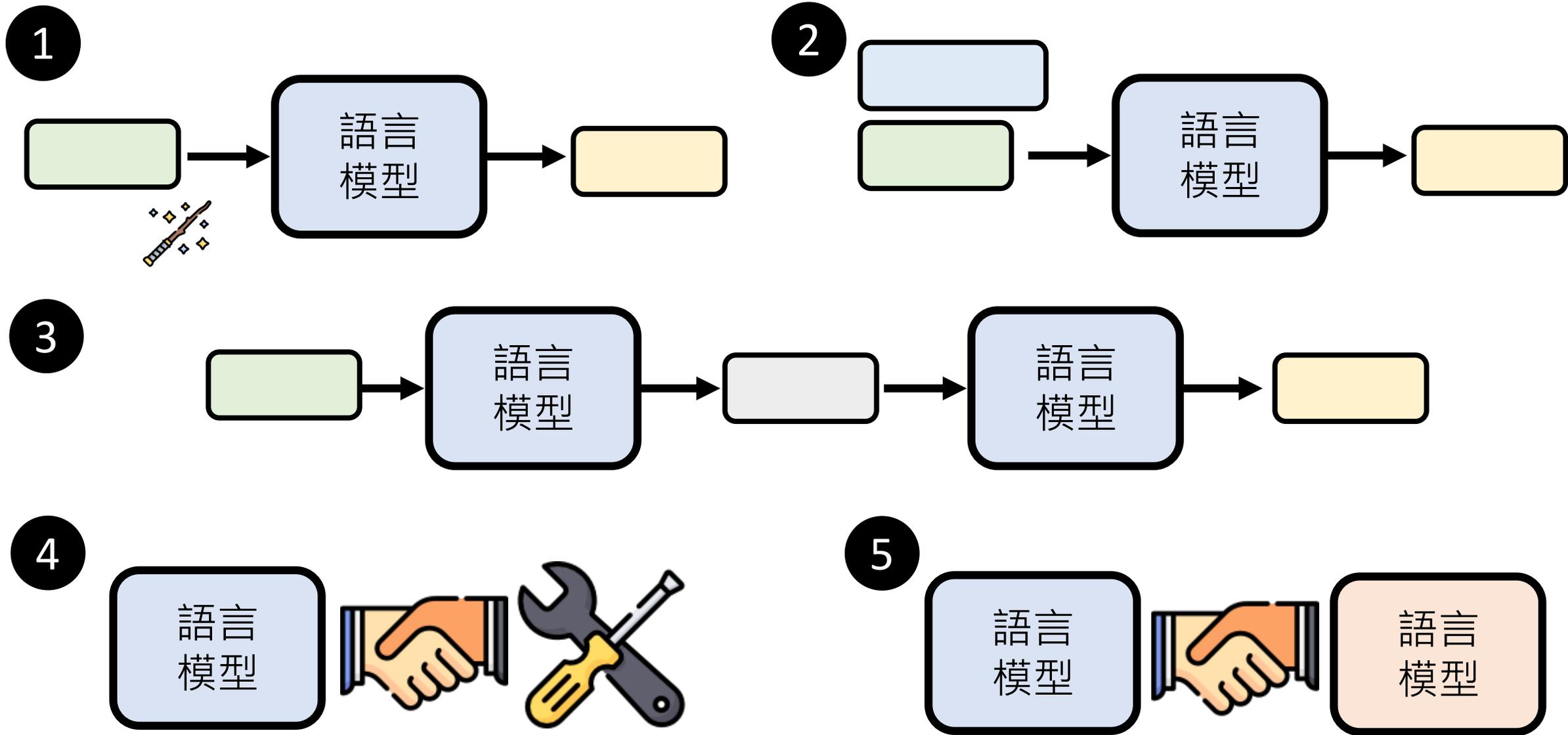
Model	Model Parameters (in billions)	Training Data (in terabytes)
GPT	0.117	N/A
GPT-2	1.500	N/A
GPT-3	175.000	570GB (approx. 0.57TB)

各種技巧加起來打一套組合拳



<https://arxiv.org/abs/2402.04253>

有那些在不訓練模型的情況下強化語言模型的方法

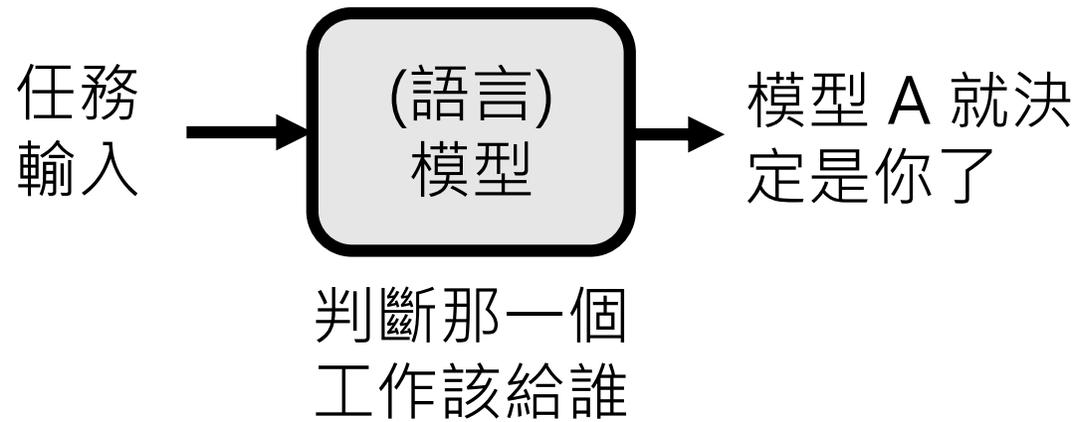


語言模型彼此合作

- 「三個臭皮匠甚過一個諸葛亮」的概念
- 未來不需要打造全能的模型，語言模型可以專業分工，不同團隊可以專注於打造專業領域的語言模型

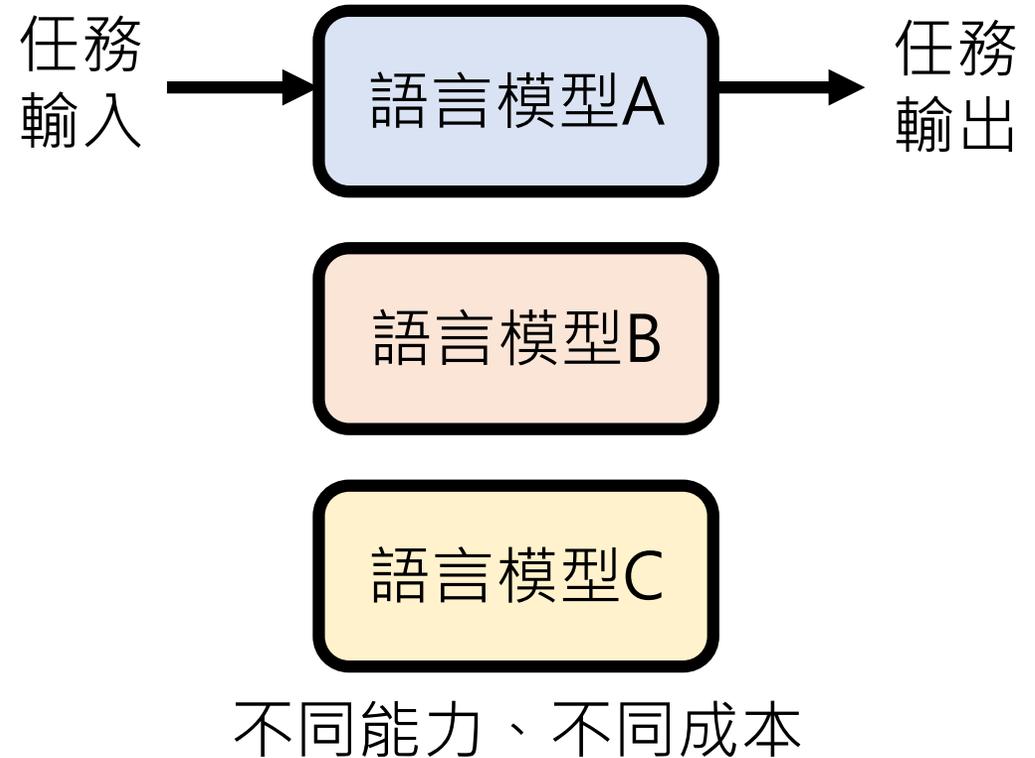


讓合適的模型做合適的事情



其實在展示平台上為你服務的不一一定是同一個模型

FrugalGPT <https://arxiv.org/abs/2305.05176>



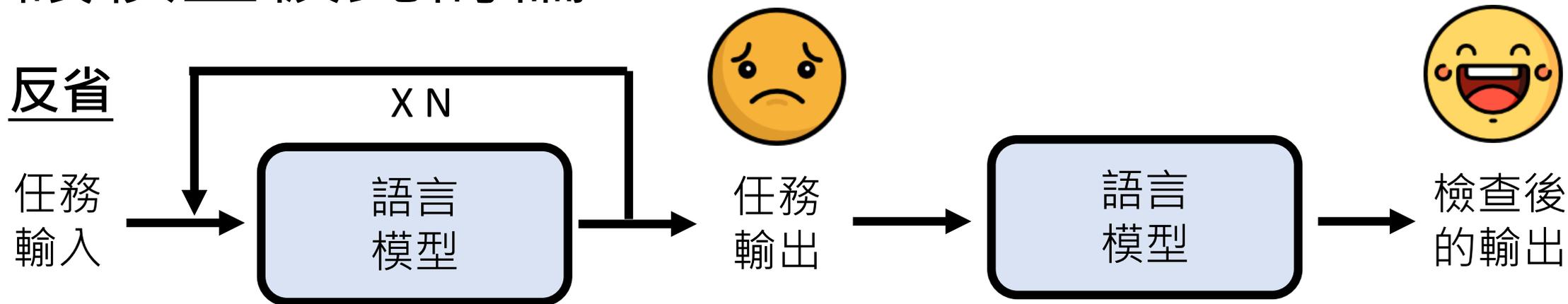
video:

<https://youtu.be/vxxPtDCb9Go?si=WO4eqPTHdyS1paI3>

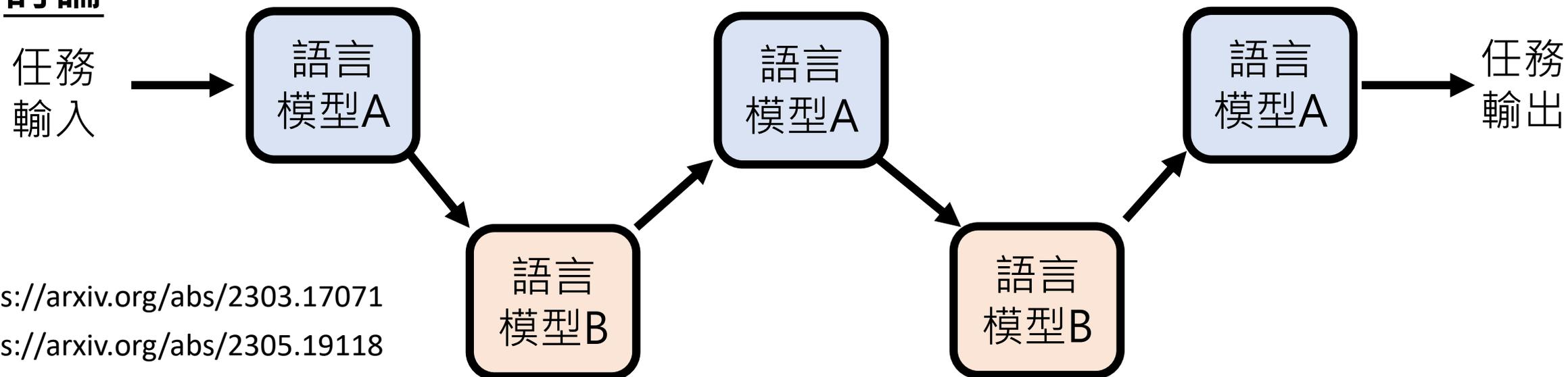
<https://youtu.be/VpKN3KvSK6c?si=lyqO8QSHBno89HIG>

讓模型彼此討論

反省



討論



<https://arxiv.org/abs/2303.17071>

<https://arxiv.org/abs/2305.19118>

Multi-agent Debate

Counter-Intuitive Question

The two circles are externally tangent and there is no relative sliding. The radius of circle A is $\frac{1}{3}$ the radius of circle B. Circle A rolls around circle B one trip back to its starting point. How many times will circle A revolve in total?

Chain-of-Thought



Let the radius of circle A be r and the radius of circle B be $3r$. The distance circle A travels along the circumference of circle B is equal to the circumference of circle B, which is $6\pi r$. The number of revolutions = $\frac{6\pi r}{2\pi r} = 3$. So, circle A will revolve 3 times in total as it rolls around circle B once. ❌

Self-Reflection

Reflection:

- (1) I have a clear understanding of the problem.
- (2) I have used the correct formula for the circumference of a circle and applied it to both circles to find the number of revolutions.
- (3) I have correctly calculated the number of revolutions of circle A.

Based on the results of my self-reflection, I am confident that my answer is correct. Therefore, circle A will revolve 3 times in total as it rolls around circle B once. ❌



Multi-Agent Debate



I disagree with you. To find the total number of revolutions, we need to consider both the rotation around circle B and the rotation of circle A itself. Therefore, circle A will revolve 3 times around its own center and 1 time around circle B, making a total of 4 revolutions.



I see your point, but...



That's a valid point, however...



The negative side correctly considers both the rotation of circle A around its own center and its rotation around circle B, while the affirmative side only considers the rotation around circle B. Therefore, the answer is 4. ✅

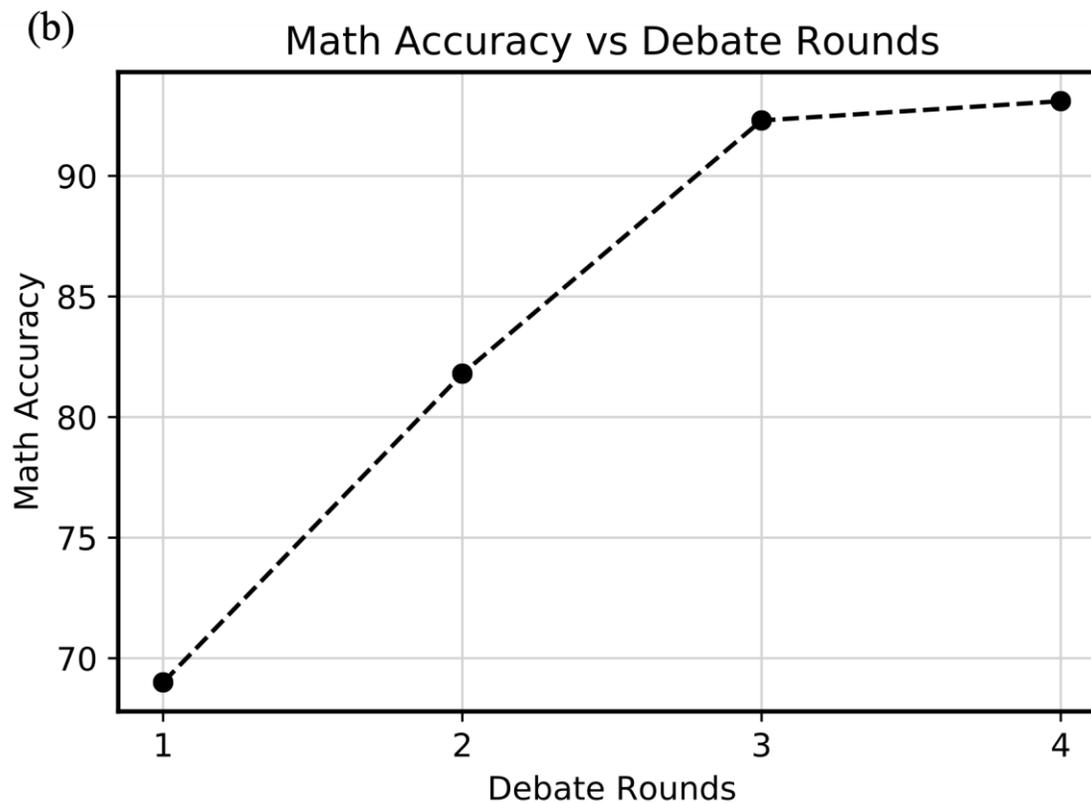
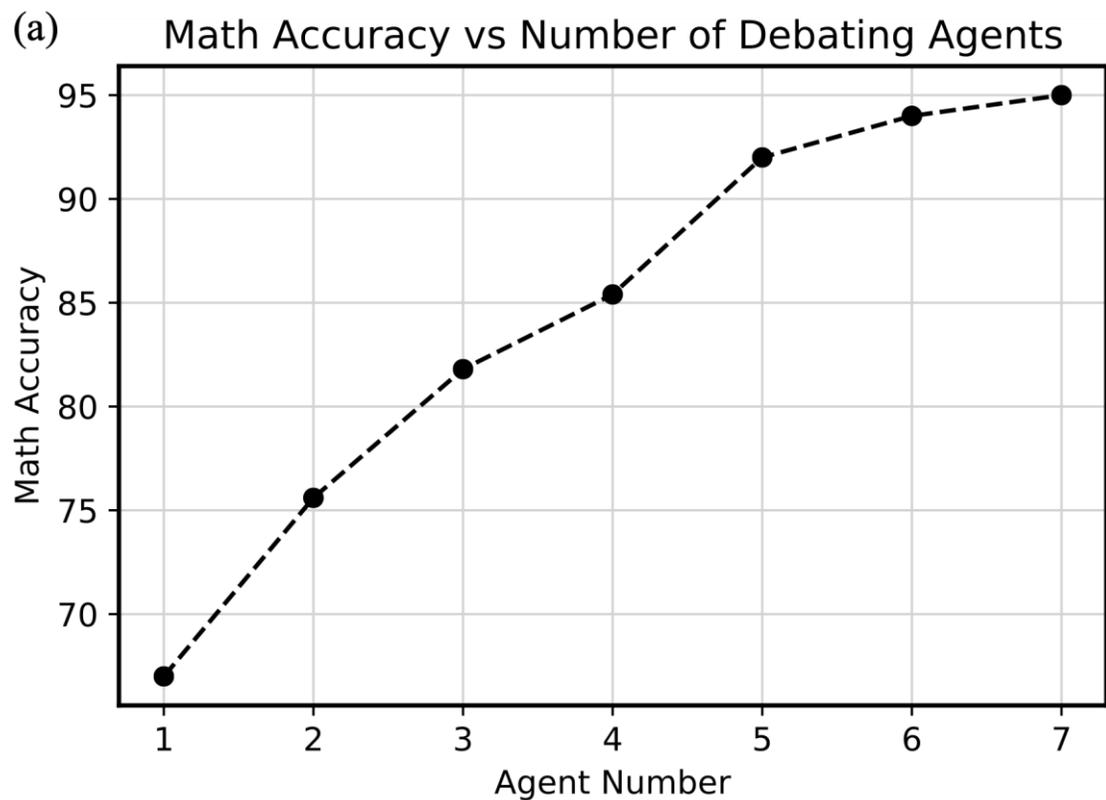
讓模型彼此討論



<https://arxiv.org/abs/2305.19118>

多一點模型一起討論

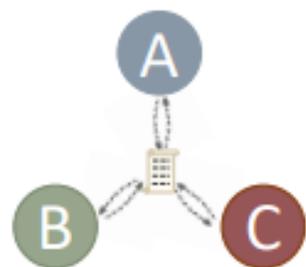
<https://arxiv.org/abs/2305.14325>



多模型怎麼討論

Exchange-of-Thought

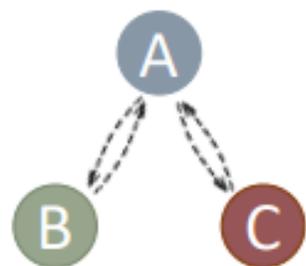
<https://arxiv.org/abs/2312.01823>



Memory

	A	B	C
A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

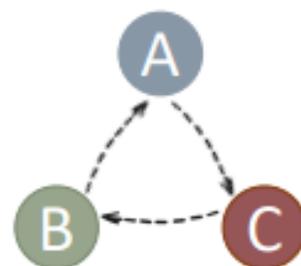
Fully Visible



Report

	A	B	C
A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

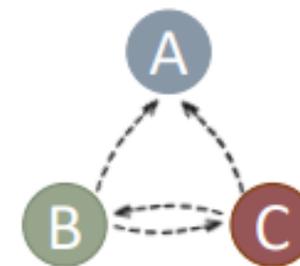
Central Visible



Relay

	A	B	C
A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Neighbor Visible



Debate

	A	B	C
A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Peers Visible

不同任務最合適的討論方式是不一樣的

討論要怎麼停下來？

語言模型A

我覺得 ...

我不同意 ...

語言模型B

裁判
模型



未達成共識，討論繼續

語言模型A

那我覺得 ...

有道理 ...

語言模型B

裁判
模型



達成共識，結論是

討論會不會停不下來？

<https://arxiv.org/abs/2305.19118>

Level	Prompt
0	Both sides must reach a full consensus on every point of the debate. Every statement must be agreed upon by both sides.
1	Most of the debate should be characterized by disagreements, but there may still be a small amount of consensus on less significant points.
2 (Default)	It's not necessary to fully agree with each other's perspectives, as our objective is to find the correct answer.
3	Both sides must disagree with each other on every point of the debate. There should be no consensus whatsoever.

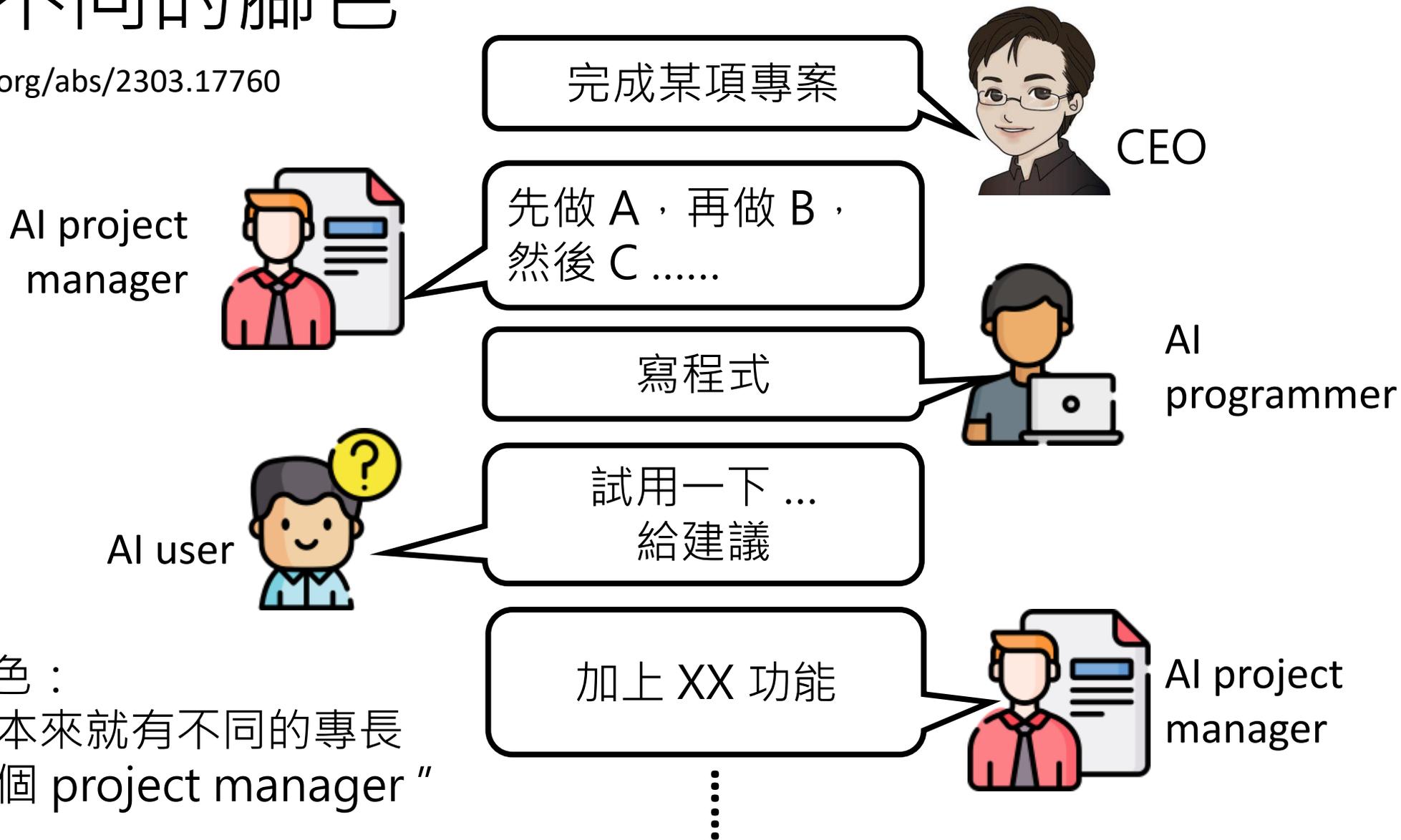
為反對而反對

Debate Length	Prompt	https://arxiv.org/abs/2305.14325
Short	<i>" These are the solutions to the problem from other agents: [other answers] Based off the opinion of other agents, can you give an updated response . . ."</i>	
Long	<i>" These are the solutions to the problem from other agents: [other answers] <u>Using the opinion of other agents as additional advice</u>, can you give an updated response . . ."</i>	

引入不同的腳色

<https://arxiv.org/abs/2303.17760>

把一個人活成一個團隊



創造不同腳色：

- 不同模型本來就有不同的專長
- “你是一個 project manager”

Dynamic LLM Agent Network

<https://arxiv.org/abs/2310.02170>

(免責聲明：學術論文目前通常是測試在比較簡單的任務上)

AI project manager



先做 A，再做 B，
然後 C

寫程式



AI programmer

AI user



試用一下 ...
給建議

還可以打考績

CEO



根據上述對話，給每個人的
貢獻度打分數？

分數太低的之後
就不參與工作

Programmer: 10,
User: 8 ...

Project manager: 7,
User: 9 ...

Project manager: 7,
Programmer: 10 ...



有那些在不訓練模型的情況下強化語言模型的方法

