



80分鐘快速全面 了解大型語言模型

李宏毅

Powered by Midjourney

7. (10%) **True & False: (No explanation is necessary)**

- (a) If a matrix A is a coefficient matrix of equation $A\mathbf{x} = \mathbf{0}$ that has only one solution, then $A^T \mathbf{x} = \mathbf{0}$ has only one solution.
- (b) Every column of a matrix is a linear combination of its pivot columns.
- (c) The null space of a matrix equals the null space of its reduced row echelon form.
- (d) For any $m \times n$ matrix A and $n \times m$ matrix B , $\det(AB) = \det(BA)$.
- (e) Consider an $m \times n$ matrix A . If $A\mathbf{x} = \mathbf{b}$ is consistent for all $\mathbf{b} \in \mathcal{R}^m$, then $n \geq m$.



You

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(a) If a matrix A is a coefficient matrix of an equation $Ax=0$ that has only one solution, then $A^T x=0$ has only one solution.



- **False.** If $Ax = 0$ has only one solution, it means A is an invertible square matrix (since the only solution is $x = 0$). However, $A^T x = 0$ has only one solution if and only if A is invertible. The key is that A must be square and invertible. If A is not square, $Ax = 0$ can have only one solution (the trivial solution) even if A is not invertible. For example, if A is a tall matrix with full column rank, $Ax = 0$ has only the trivial solution, but $A^T x = 0$ has infinitely many solutions.

(b) Every column of a matrix is a linear combination of its pivot columns.



- **True.** In row echelon form, every column is a linear combination of the pivot columns. Therefore, every column of the original matrix is a linear combination of the pivot columns.

(c) The null space of a matrix equals the null space of its reduced row echelon form.



- **True.** The process of row reducing a matrix to its reduced row echelon form does not change the null space of the matrix. The set of solutions to the homogeneous equation $Ax = 0$ is the same as the set of solutions to the corresponding equation after the matrix A has been reduced.

7. (10%) **True & False: (No explanation is necessary)**

(a) If a matrix A is a coefficient matrix of equation $A\mathbf{x} = \mathbf{0}$ that has only one solution, then $A^T\mathbf{x} = \mathbf{0}$ has only one solution.

(b) Every column of a matrix is a linear combination of its pivot columns.

5 題中答對 4 題

(c) The null space of a matrix equals the null space of its reduced row echelon form.

(d) For any $m \times n$ matrix A and $n \times m$ matrix B , $\det(AB) = \det(BA)$.



- **True.** This statement is correct due to a property of determinants. When A is an $m \times n$ matrix and B is an $n \times m$ matrix, then the determinants of the products AB and BA are equal. This is a notable result.

(e) Consider an $m \times n$ matrix A . If $A\mathbf{x} = \mathbf{b}$ is consistent for all $\mathbf{b} \in \mathbb{R}^m$, then $n \geq m$.



- **True.** For the equation $A\mathbf{x} = \mathbf{b}$ to be consistent for every \mathbf{b} in \mathbb{R}^m , the matrix A must be able to span \mathbb{R}^m . This requires that the column rank of A (which is at most $\min(m, n)$) be equal to m . Therefore, n must be greater than or equal to m for A to have enough columns to span \mathbb{R}^m .



請用英文出一個跟線性代數考題，該考題是要測驗學生有關 linear independent 的觀念



Certainly! Here's a linear algebra exam question in English that tests students' understanding of the concept of linear independence:

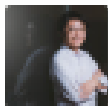
Linear Algebra Exam Question: Understanding Linear Independence

Problem:

Consider the following vectors in \mathbb{R}^3 :

$$\mathbf{v}_1 = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}, \quad \mathbf{v}_2 = \begin{bmatrix} -4 \\ 2 \\ -6 \end{bmatrix}, \quad \mathbf{v}_3 = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$$

Determine whether the set of vectors $\{\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3\}$ is linearly independent or linearly dependent. Justify your answer with appropriate calculations.



以下為五條體的範例，請以五條體描述線性代數期中考

<https://disp.cc/b/ACG/gvCf>



GPTs: 打造AI應用只要一瞬間



大金線代助教

線性代數助教，負責回答學生問題

By 李宏毅



Message 大金線代助教...



<https://chat.openai.com/g/g-j0XhyY6FD-da-jin-xian-dai-zhu-jiao>

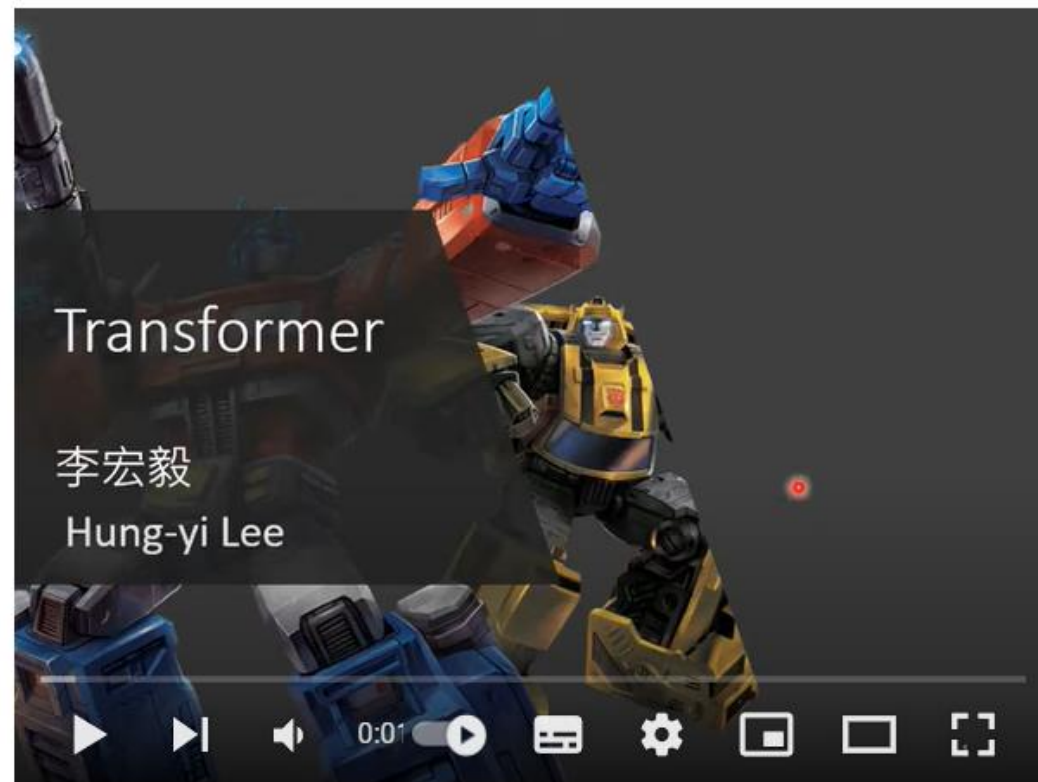
ChatGPT

G: Generative 生成

P: Pre-trained 預訓練

T: Transformer

- 由 OpenAI 開發
- Google Bard、Anthropic Claude 等等也是類似的技術

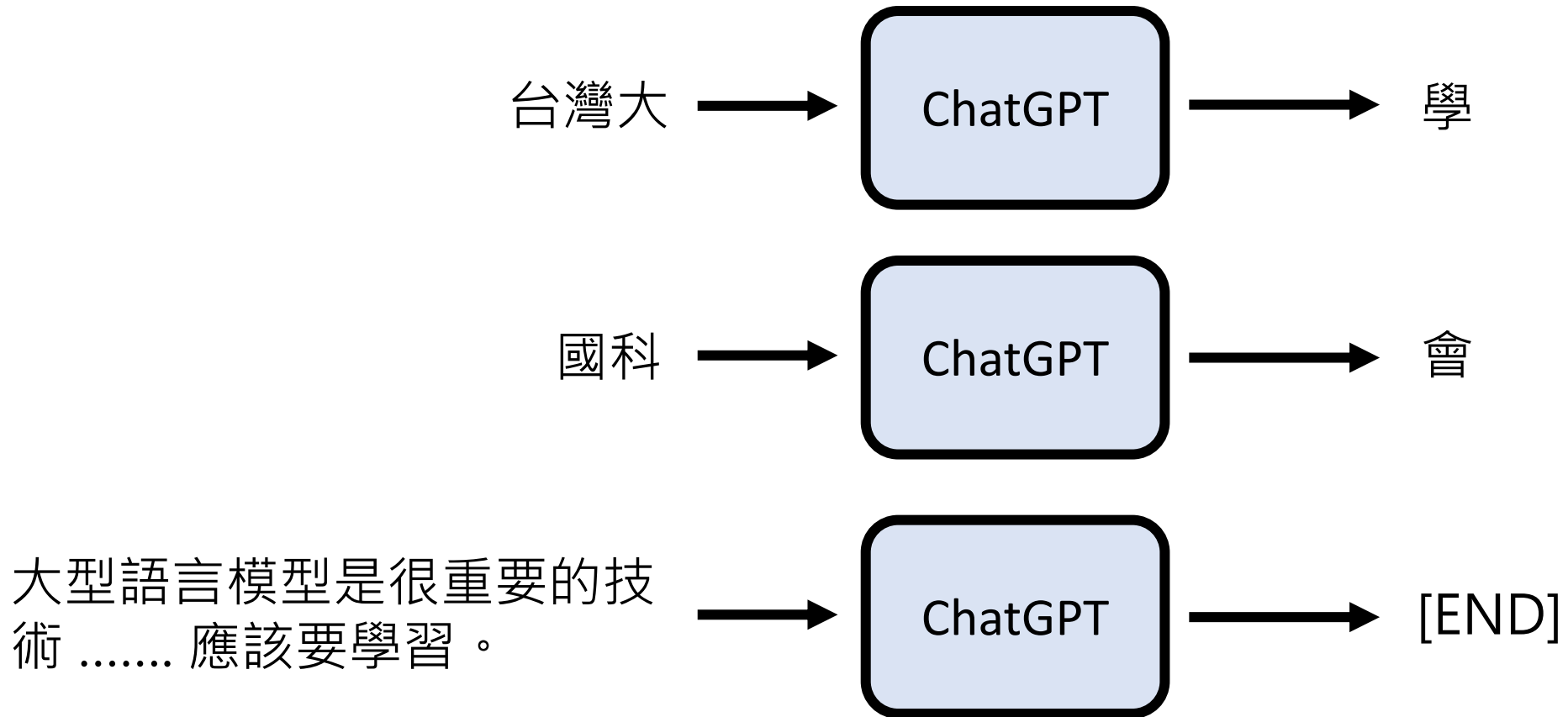


【機器學習2021】(中文版)

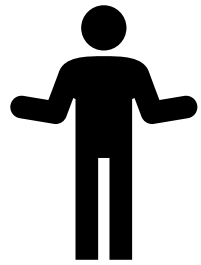
【機器學習2021】Transformer (上)

<https://youtu.be/n9TlOhRjYoc>

ChatGPT 真正做的事 – 文字接龍 **語言模型**



ChatGPT 真正做的事 – 文字接龍 語言模型



臺灣最高的山是哪座？



ChatGPT



玉

臺灣最高的山是哪座？玉



ChatGPT



山

答案

臺灣最高的山是哪座？玉山

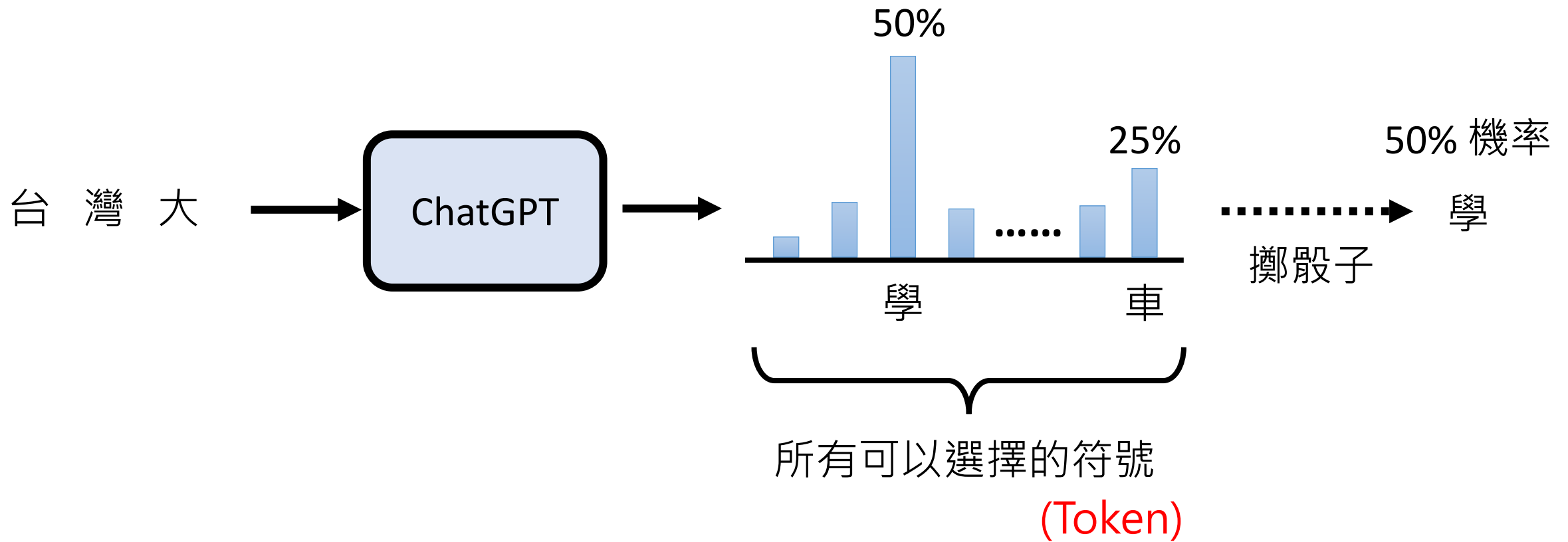


ChatGPT



[END]

ChatGPT 真正做的事 – 文字接龍



GPT-3 Codex

I am unkillable|.

un kill able ➡ unkillable



Clear

Show example

Tokens

6

Characters

16

I am unkillable.

TEXT

TOKEN IDS

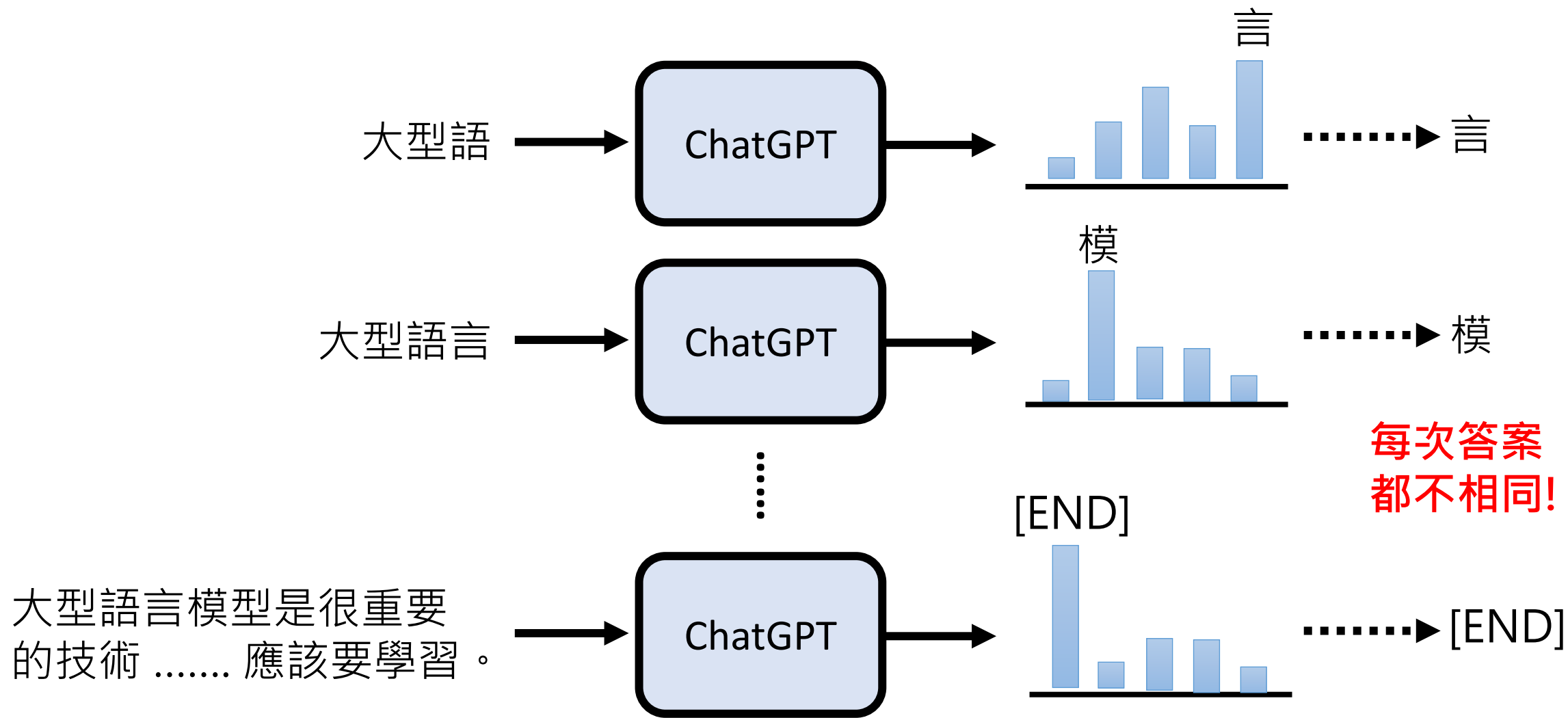
<https://platform.openai.com/tokenizer>

為甚麼英文 Token 不是單字？

因為英文單字無法窮舉

不同語言模型的
Token 通常不會相同

ChatGPT 真正做的事 – 文字接龍



為甚麼要擲骰子？

- The Curious Case of Neural Text Degeneration

<https://arxiv.org/abs/1904.09751>

Context: In a shocking finding, scientist discovered a herd of unicorns living in a remote, previously unexplored valley, in the Andes Mountains. Even more surprising to the researchers was the fact that the unicorns spoke perfect English.

Beam Search, $b=32$:

"The study, published in the Proceedings of the National Academy of Sciences of the United States of America (PNAS), was conducted by researchers from the Universidad Nacional Autónoma de México (UNAM) and the Universidad Nacional Autónoma de México (UNAM/Universidad Nacional Autónoma de México/Universidad Nacional Autónoma de México/Universidad Nacional Autónoma de México/Universidad Nacional Autónoma de México/Universidad Nacional Autónoma de México..."

Pure Sampling:

They were cattle called Bolivian Cavalleros; they live in a remote desert uninterrupted by town, and they speak huge, beautiful, paradisiacal Bolivian linguistic thing. They say, 'Lunch, marge.' They don't tell what the lunch is," director Professor Chuperas Omwell told Sky News. "They've only been talking to scientists, like we're being interviewed by TV reporters. We don't even stick around to be interviewed by TV reporters. Maybe that's how they figured out that they're cosplaying as the Bolivian Cavalleros."

每次選機率最大的

擲骰子

ChatGPT 真正做的事 – 文字接龍

這就是為什麼 ChatGPT 常常唬爛



請用 100 字簡介台大玫瑰花節，並提供網址



台大玫瑰花節是台灣最大的花卉盛事之一，每年在台大校園舉辦。活動期間，校園充滿了各種色彩繽紛的玫瑰花，吸引著數以萬計的遊客。節慶包括精彩的表演、展覽、花藝比賽和環境教育活動，使人們能夠欣賞到美麗的花朵和豐富的文化藝術。這是一個讓人心曠神怡的活動，無論是花卉愛好者還是家庭遊客都能在這裡享受美好時光。更多資訊，請參考台大玫瑰花節的官方網站：<https://www.ntu.edu.tw/roes/>

這個網址並不存在!

ChatGPT 真正做的事 – 文字接龍



請用 30 字介紹大型語言模型



大型語言模型是基於深度學習技術的AI系統，透過龐大數據訓練，可生成文本、回答問題，
具高度語境理解能力。



請翻成英文



Large language models are AI systems based on deep learning techniques, trained with vast
data, capable of generating text and answering questions with a high level of contextual
understanding.

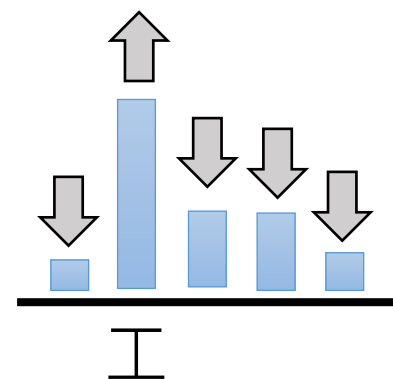
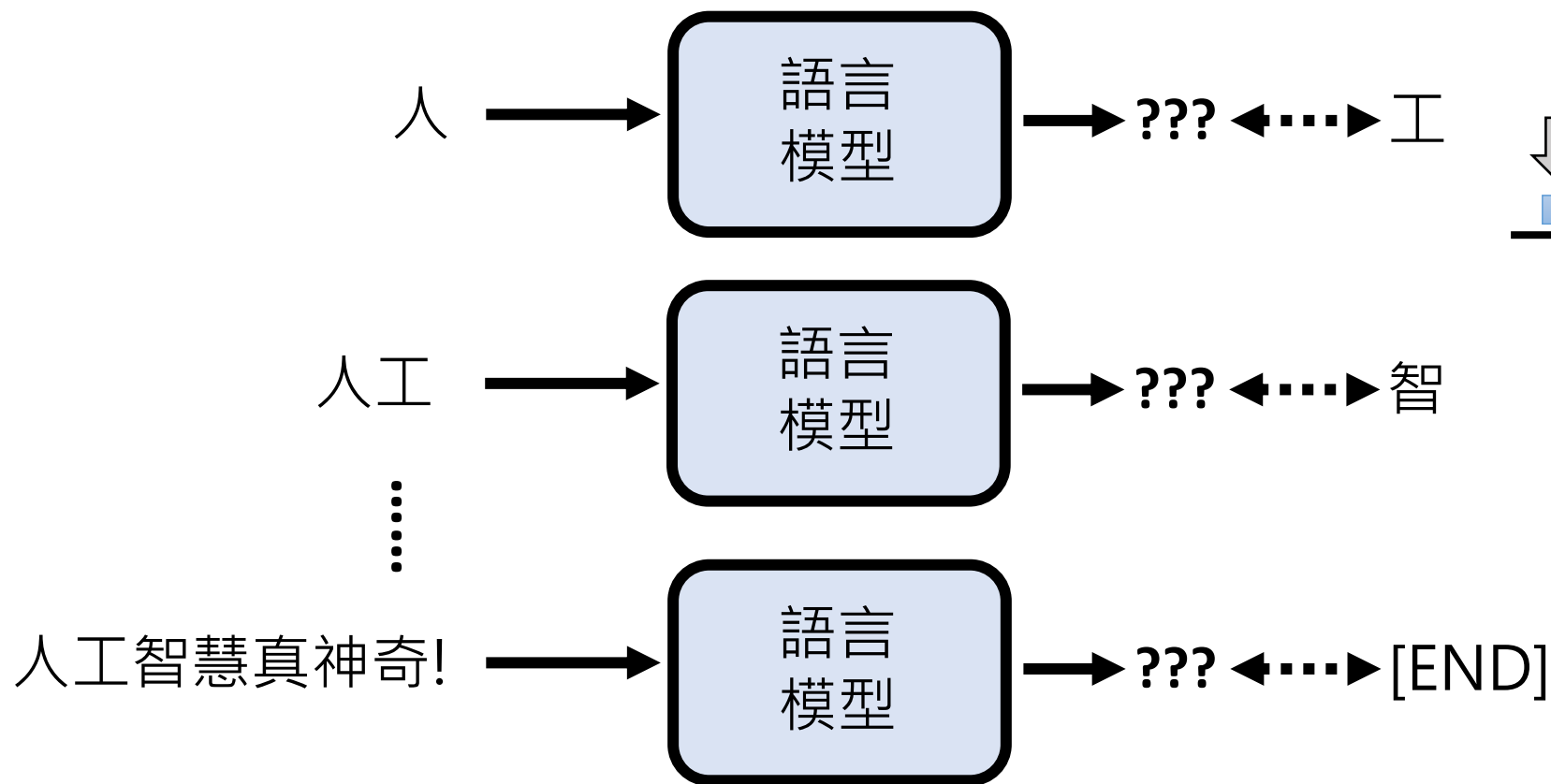


🔄 Regenerate

語言模型怎麼學習文字接龍？

任何文句都可以是教材！

“人工智慧真神奇！”

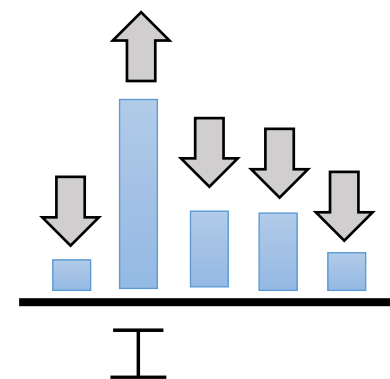
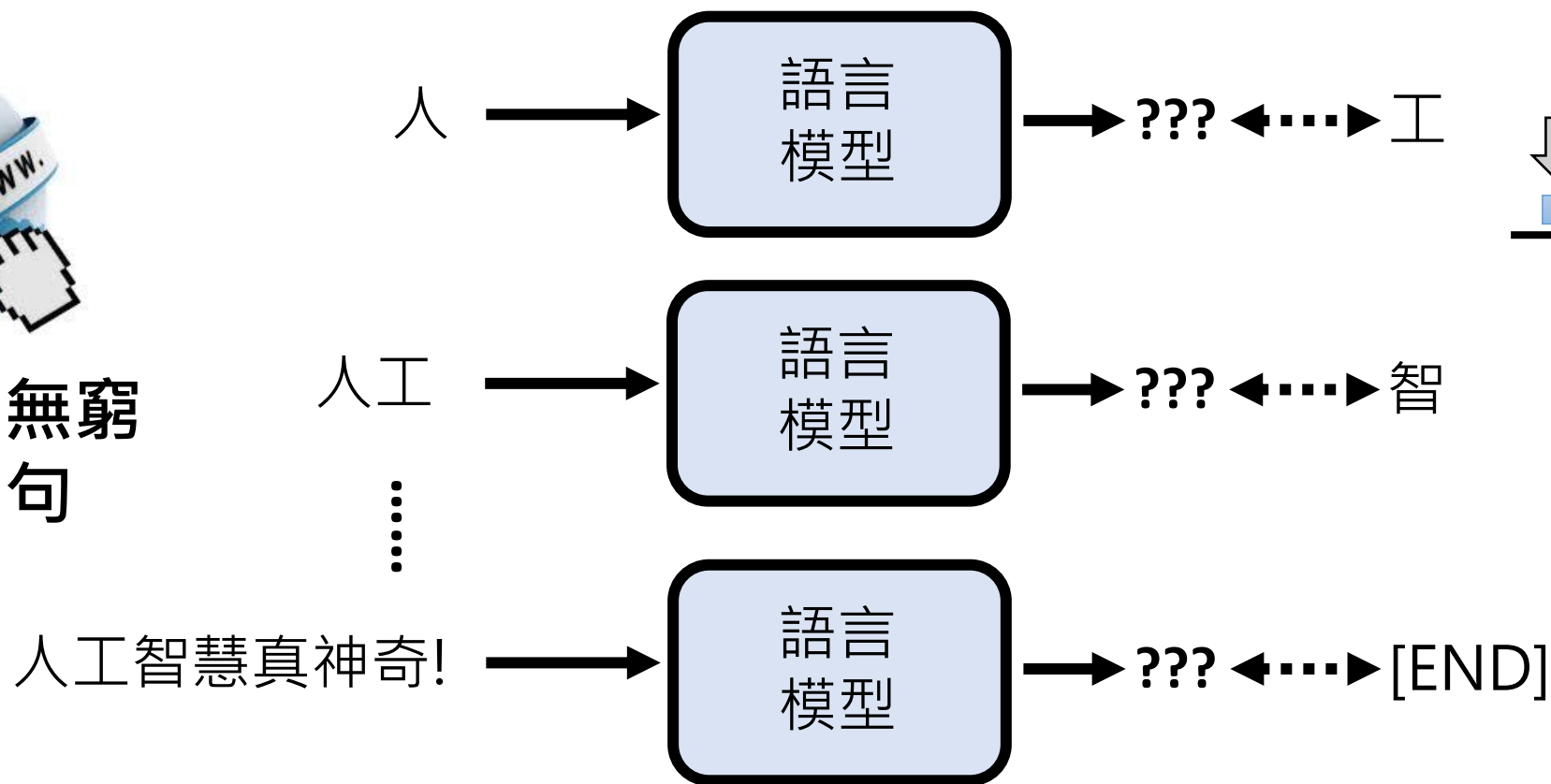


語言模型怎麼學習文字接龍？

任何文句都可以是教材！



網路上有無窮
無盡的文句



大型語

語言
模型

50%

25%

言

句

類神經網路

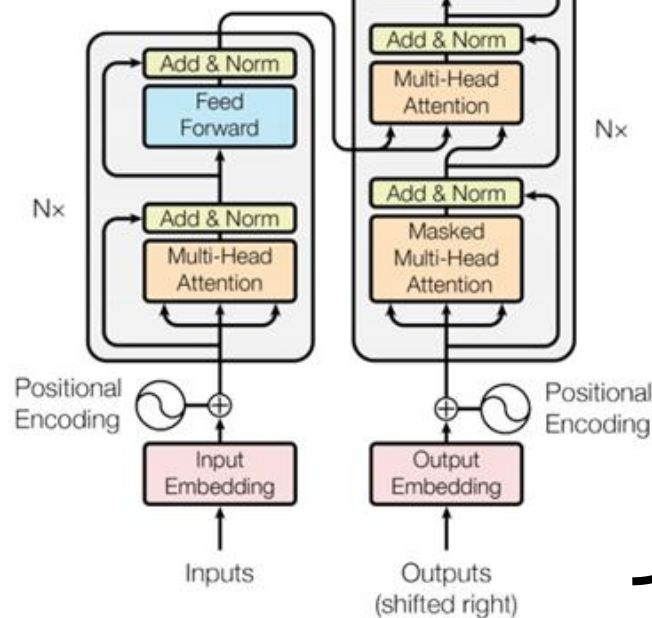
Transformer

就是個函式 f

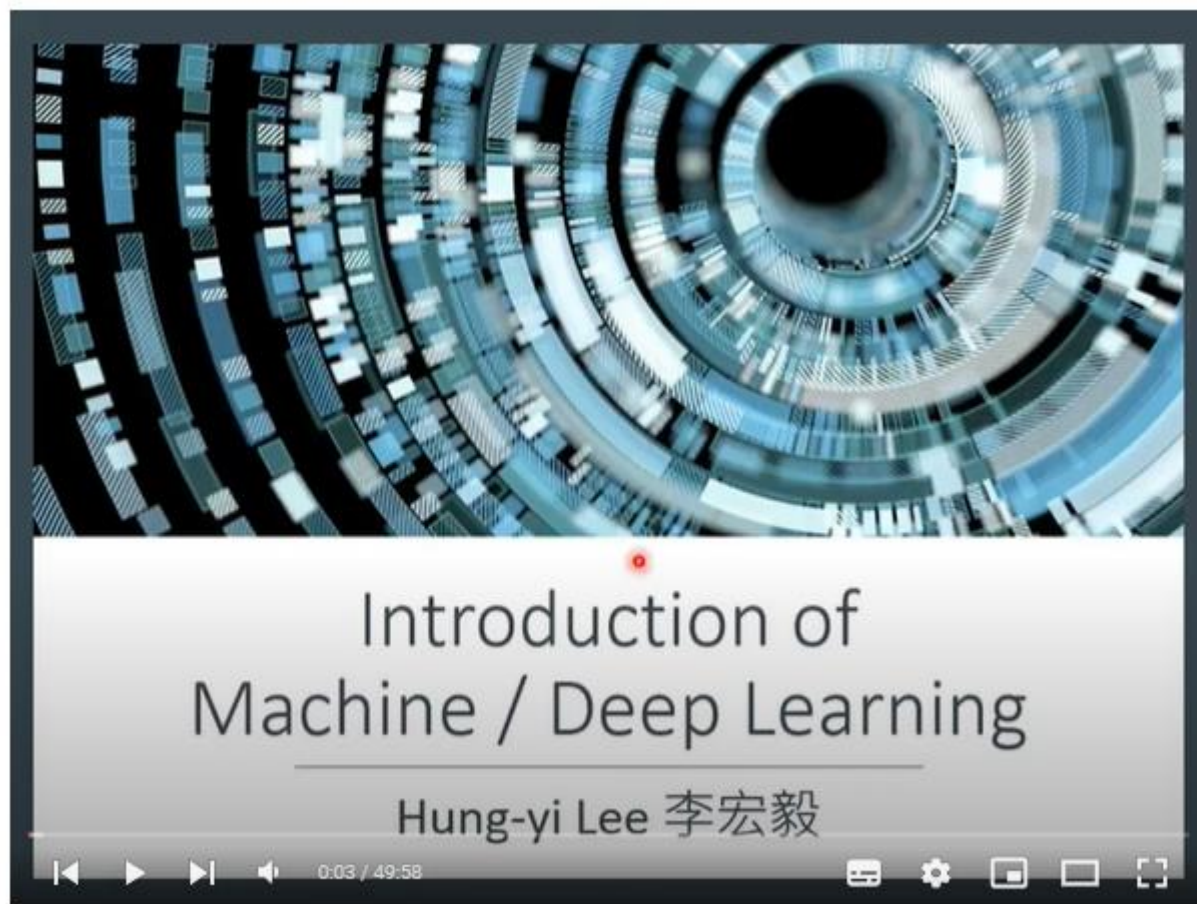
$$f(x) = ax + b$$

2 個參數

上億個參數



欲知詳情請見機器學習課程



【機器學習2021】預測本頻道觀看人數 (上) - 機器學習基本概念簡介

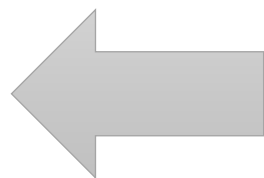


https://www.youtube.com/watch?v=Ye018rCVvOo&list=PLJV_el3uVTsMhtt7_Y6sgTHGHP1Vb2P2J

在 ChatGPT 之前的 GPT 系列

Model size:

**GPT-1
(2018)** 
117M

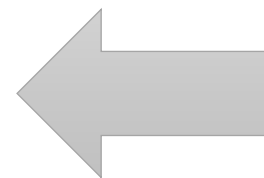


函式的參數量(複雜程度)

人工智慧的天資

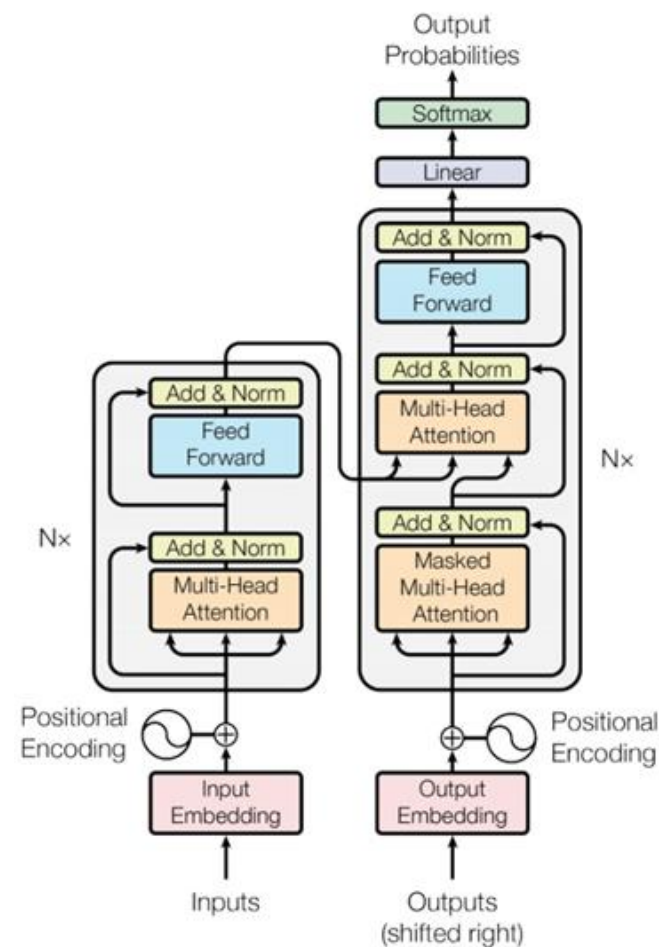
Data size:


1GB



拿來學文字接龍的資料量

後天的努力



在 ChatGPT 之前的 GPT 系列

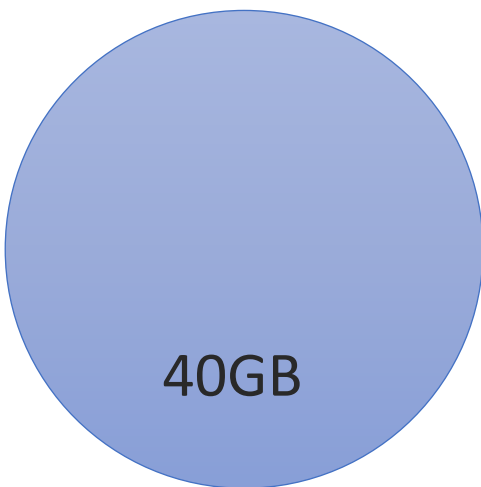
Model size:

GPT-1
(2018) 
117M

GPT-2
(2019) 
1542M

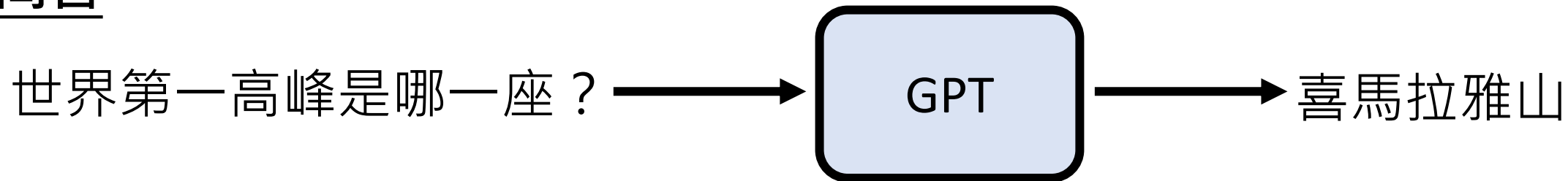
Data size:


1GB

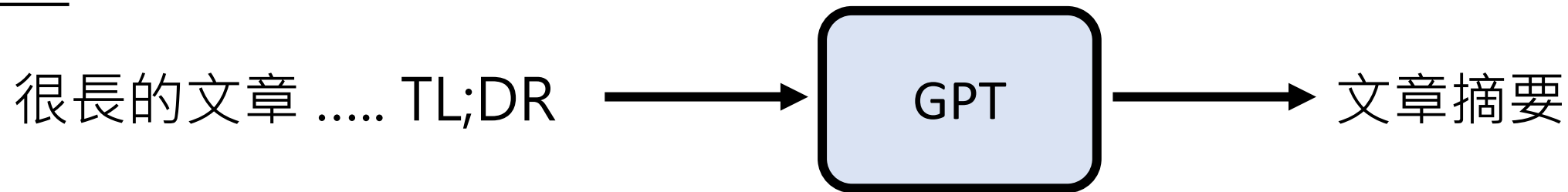

40GB

GPT-2 也是可以回答問題的!

問答



摘要

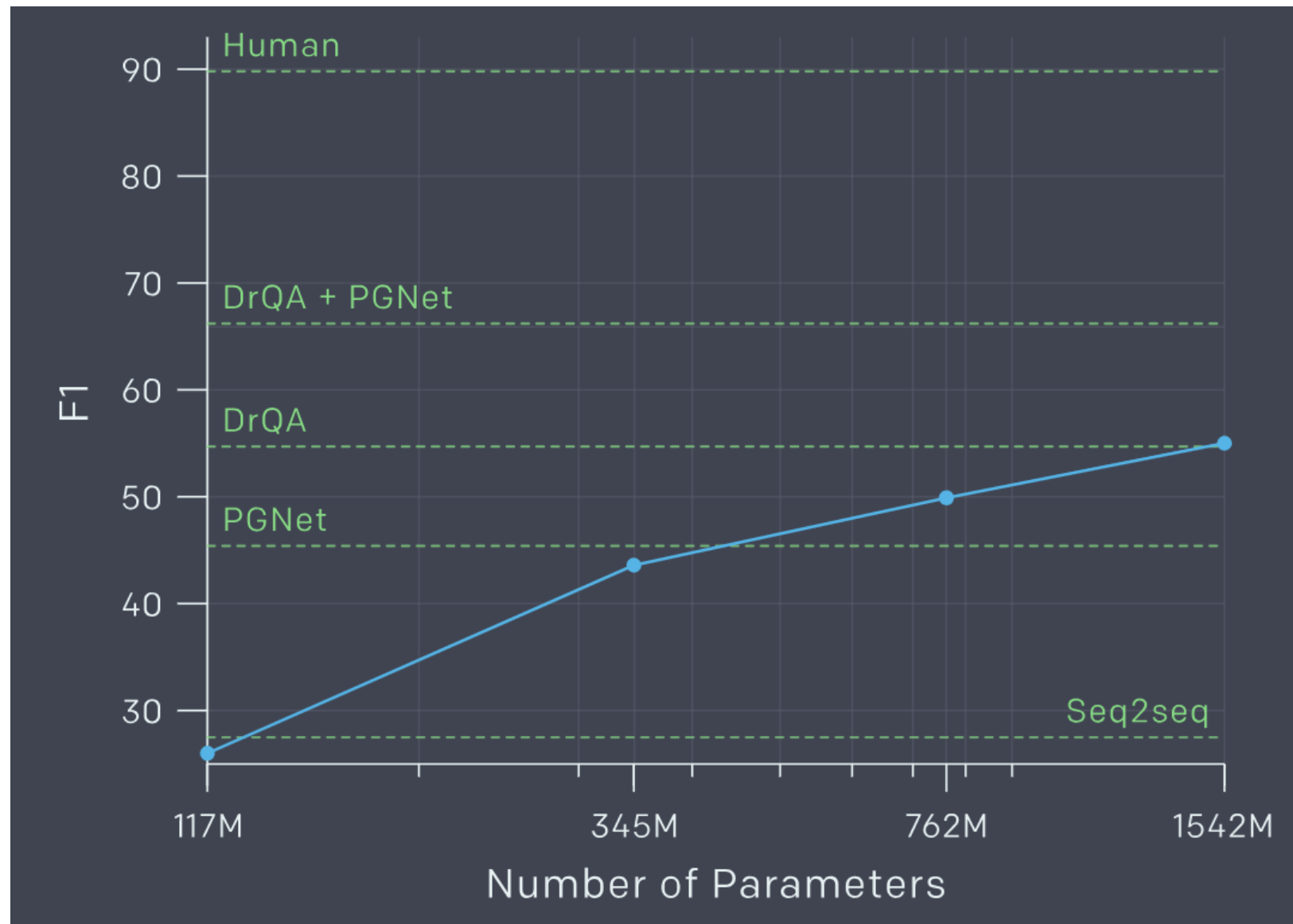


GPT-2

<https://openai.com/blog/better-language-models/>

問答上表現
如何？

CoQA



在 ChatGPT 之前的 GPT 系列

Model size:


GPT-1
(2018) 
117M

GPT-2
(2019) 
1542M

GPT-3
(2020)
175B

Data size:

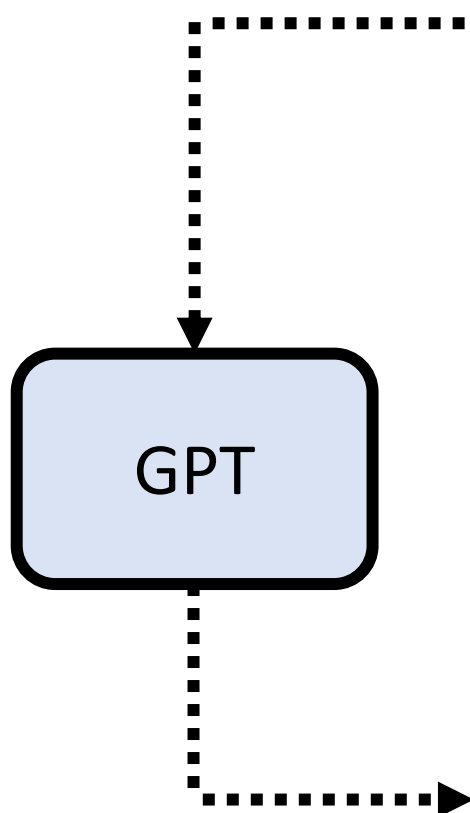

1GB


40GB

580GB

閱讀哈利波特全集 30 萬遍

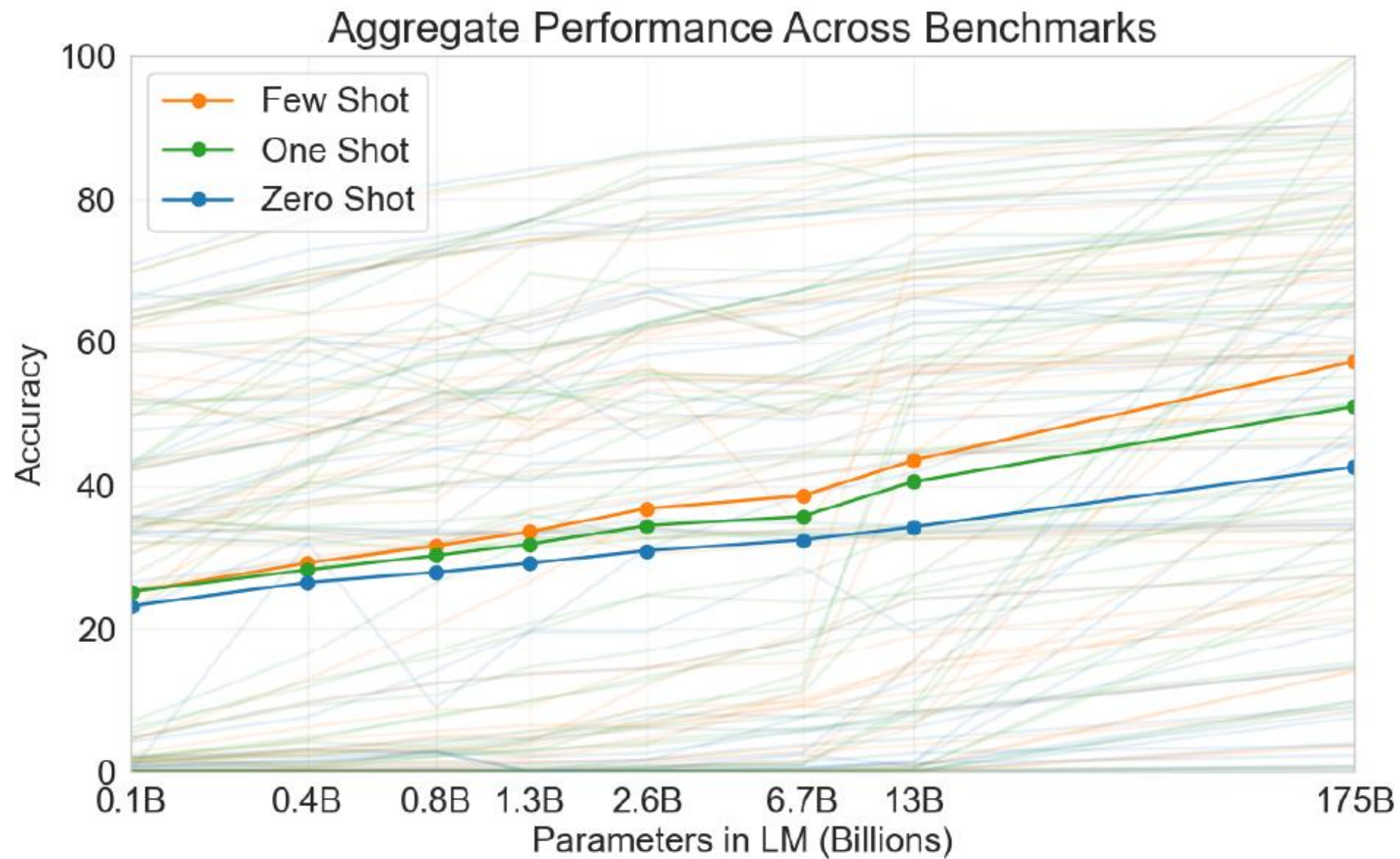
GPT-3



有機會根據指令
寫程式!

```
# perform adversarial attack and generate adversarial examples
def gen_adv_examples(model, loader, attack, loss_fn):
    model.eval()
    adv_names = []
    train_acc, train_loss = 0.0, 0.0
    for i, (x, y) in enumerate(loader):
        x, y = x.to(device), y.to(device)
        x_adv = attack(model, x, y, loss_fn) # obtain adversarial
        yp = model(x_adv)
        loss = loss_fn(yp, y)
        train_acc += (yp.argmax(dim=1) == y).sum().item()
        train_loss += loss.item() * x.shape[0]
        # store adversarial examples
        adv_ex = ((x_adv) * std + mean).clamp(0, 1) # to 0-1 scale
        adv_ex = (adv_ex * 255).clamp(0, 255) # 0-255 scale
        adv_ex = adv_ex.detach().cpu().data.numpy().round() # round
        adv_ex = adv_ex.transpose((0, 2, 3, 1)) # transpose (bs,
        adv_examples = adv_ex if i == 0 else np.r_[adv_examples,
    return adv_examples, train_acc / len(loader.dataset), train_loss /
```

GPT-3



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

Average of **42** tasks

GPT 只從網路資料學習的缺點

What is the purpose of the list C in the code below?

```
def binomial_coefficient(n, r):  
    C = [0 for i in range(r + 1)];  
    C[0] = 1;  
    for i in range(1, n + 1):  
        j = min(i, r);  
        while j > 0:  
            C[j] += C[j - 1];  
            j -= 1;  
    return C[r]
```

GPT

- A. to store the value of C[0]
- B. to store the value of C[1]
- C. to store the value of C[i]
- D. to store the value of C[i - 1]

預訓練 (自督導式學習)

網路上有無窮
無盡的文句



世界第一高峰是

GPT

喜馬拉雅山

繼續學習

微調 (finetune)

基石模型

督導式學習

台灣最高的山是那座？

ChatGPT

玉山



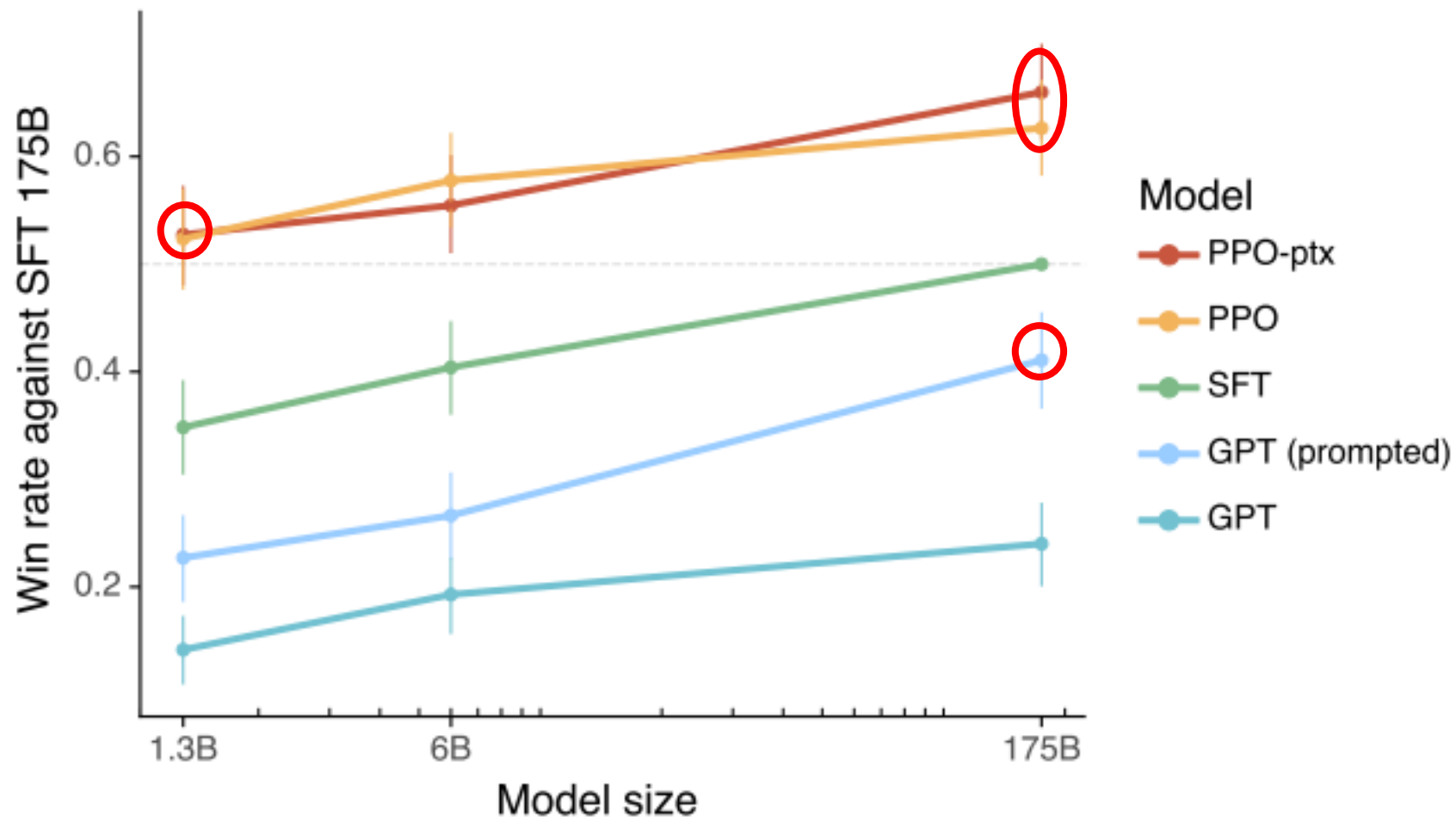
「玉山」



督導式學習的重要性

InstructGPT

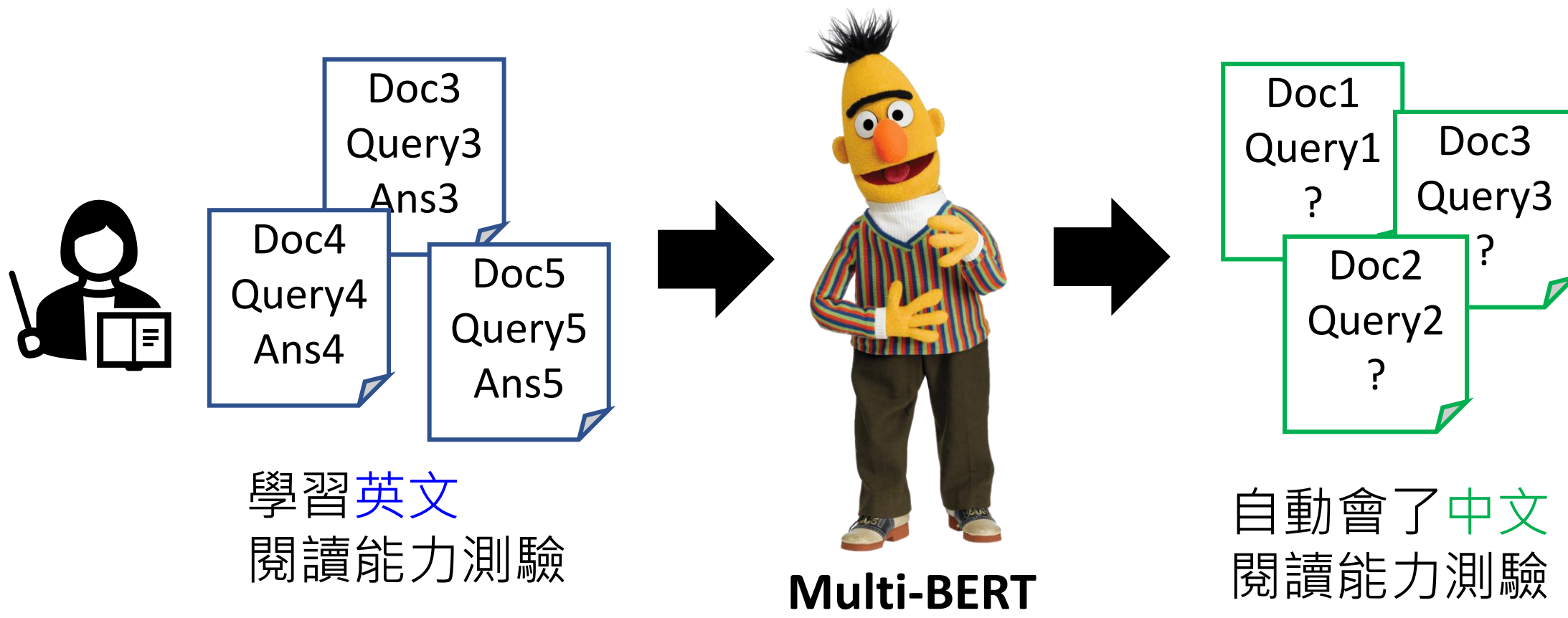
<https://arxiv.org/abs/2203.02155>



有預訓練後，督導式學習不用大量資料！

在多種語言上做預訓練後，只要教某一個語言的某一個任務，自動學會其他語言的同樣任務

Pre-training on 104 languages



有預訓練後，督導式學習不用大量資料！

- English: SQuAD, Chinese: DRCD

Model	Pre-train	Fine-tune	Testing	EM	F1
QANet	none	Chinese QA	Chinese QA	66.1	78.1
BERT	Chinese	Chinese QA		82.0	89.1
	104 languages	Chinese QA		81.2	88.7
		English QA		63.3	78.8
		Chinese + English		82.6	90.1

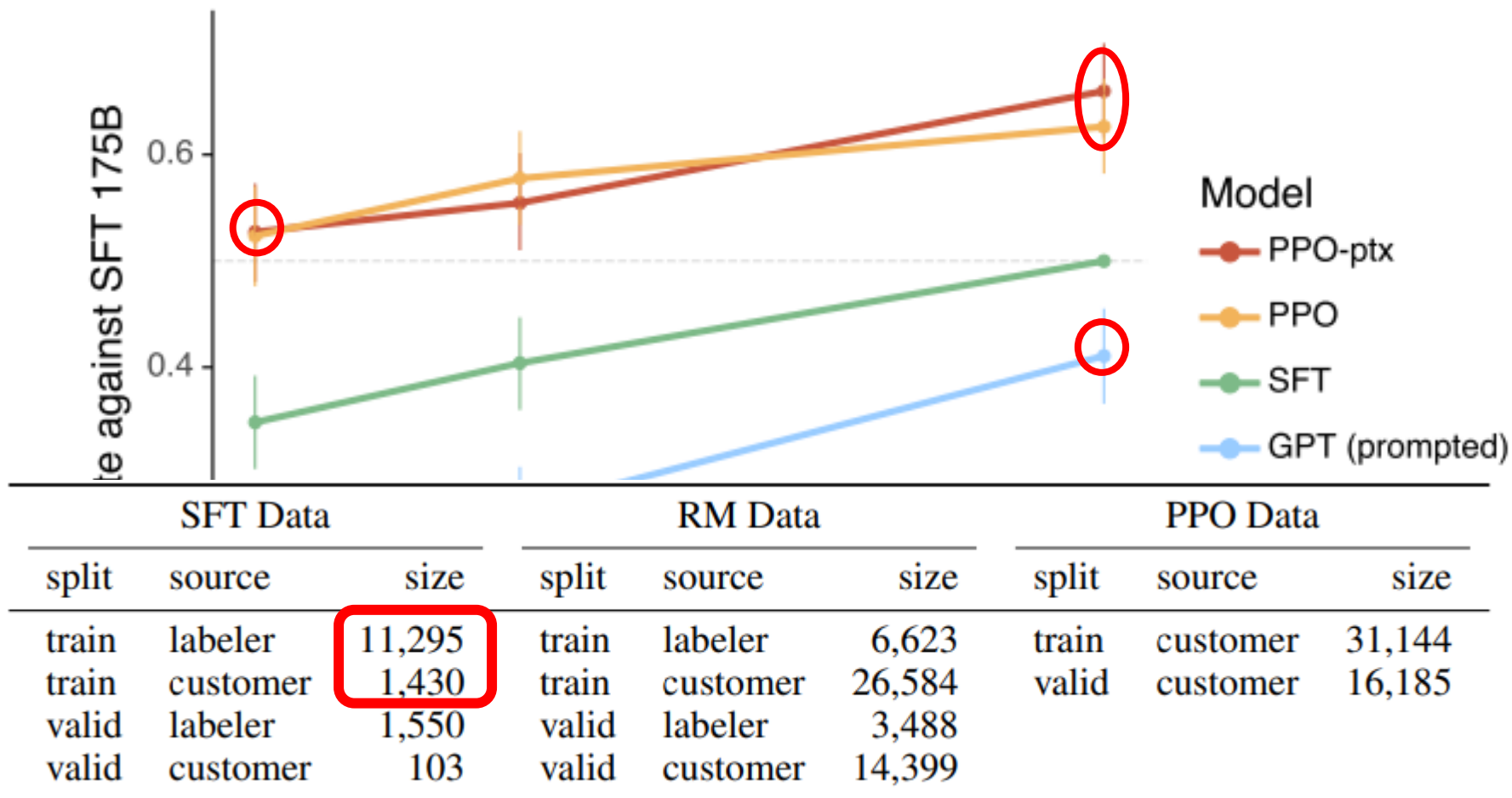
F1 score of Human performance is 93.30%

This work is done by 劉記良、許宗嫻
<https://arxiv.org/abs/1909.09587>

督導式學習是畫龍點睛

InstructGPT

<https://arxiv.org/abs/2203.02155>



預訓練

網路上有無窮
無盡的文句



世界第一高峰是

GPT

喜馬拉雅山

督導式學習

台灣最高的山是那座？

ChatGPT

「玉山」

.....

辛苦



增強式學習

(Reinforcement Learning, RL)

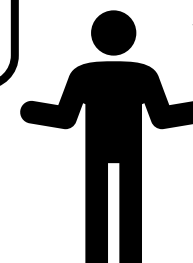
請幫我寫詩讚美AI

ChatGPT

.....



省力



從人類的回饋學習 → 增強式學習

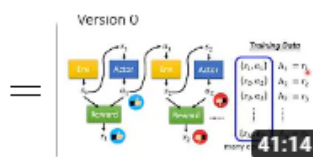
Reinforcement Learning from Human Feedback (RLHF)

To learn more about
Reinforcement Learning (RL):



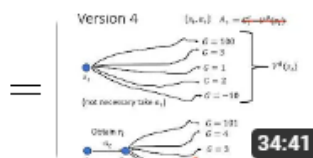
【機器學習2021】概述增強式學習 (Reinforcement Learning, RL) (一) - 增強式學習跟機器學習一樣都是三個步驟

Hung-yi Lee • 觀看次數：3.5萬次 • 1 年前



【機器學習2021】概述增強式學習 (Reinforcement Learning, RL) (二) - Policy Gradient 與修課心情

Hung-yi Lee • 觀看次數：2.4萬次 • 1 年前



【機器學習2021】概述增強式學習 (Reinforcement Learning, RL) (三) - Actor-Critic

Hung-yi Lee • 觀看次數：1.9萬次 • 1 年前



【機器學習2021】概述增強式學習 (Reinforcement Learning, RL) (四) - 回饋非常罕見的時候怎麼辦？機器的望梅止渴

Hung-yi Lee • 觀看次數：1.2萬次 • 1 年前

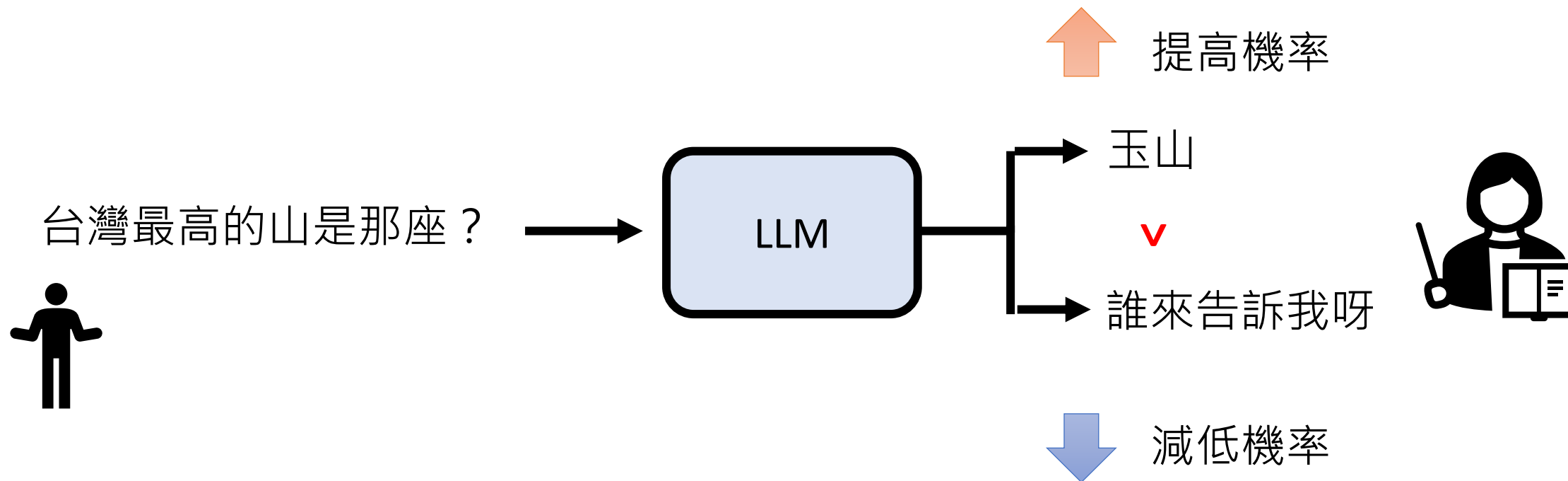


【機器學習2021】概述增強式學習 (Reinforcement Learning, RL) (五) - 如何從示範中學習？逆向增強式學習 (Inverse RL)

Hung-yi Lee • 觀看次數：1.2萬次 • 1 年前

https://www.youtube.com/watch?v=XWukX-aylrs&list=PLJV_el3uVTsMhtt7_Y6sgTHGHP1Vb2P2J&index=29

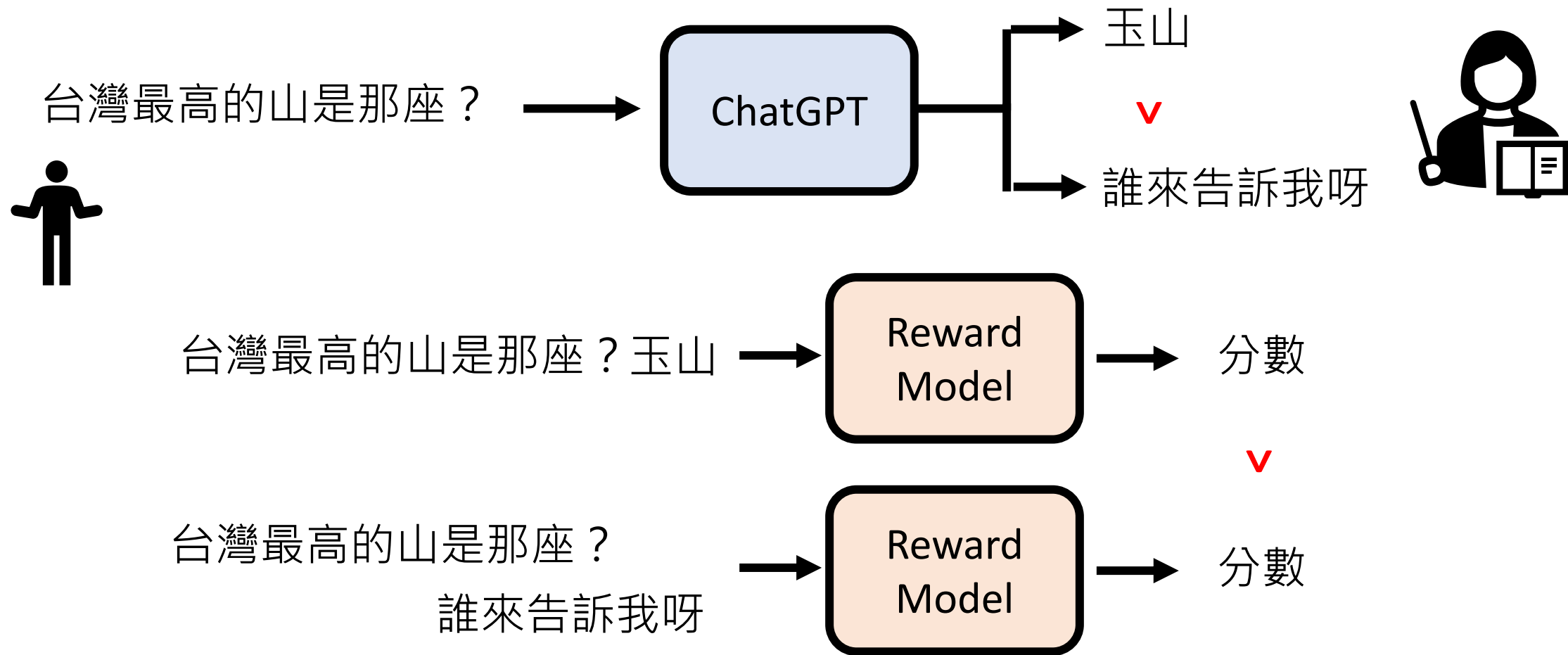
增強式學習基本概念



提醒：模型要有一定程度的能力才適合進入 RLHF

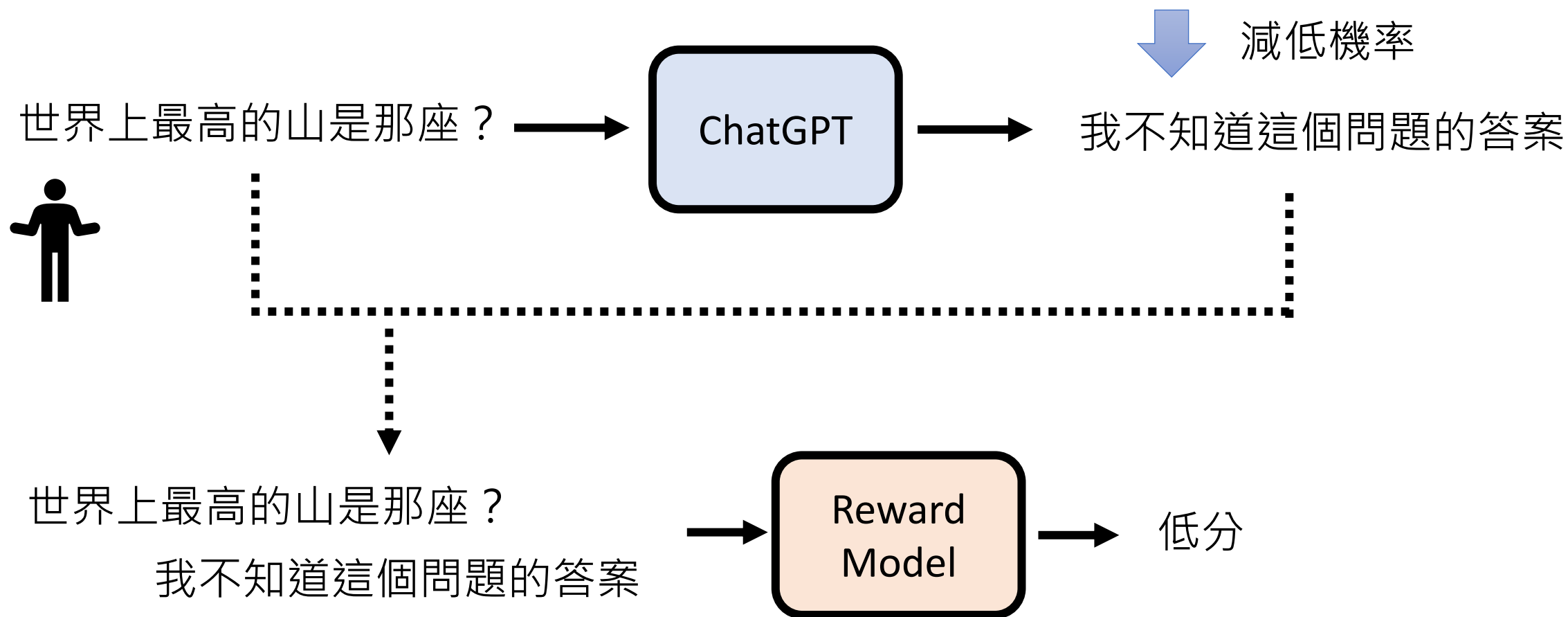
ChatGPT 的增強式學習

1. 模仿人類老師的喜好



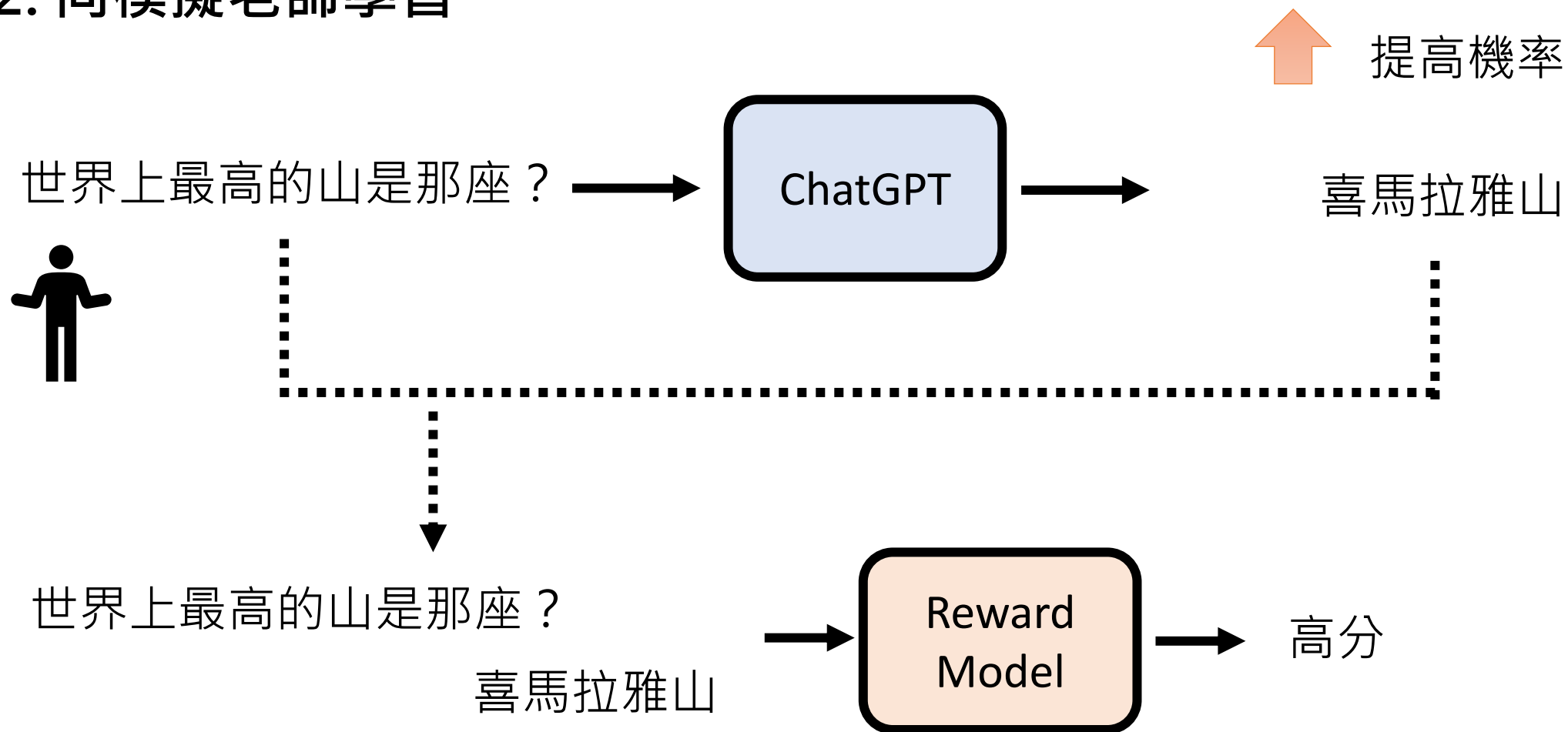
ChatGPT 的增強式學習

2. 向模擬老師學習



ChatGPT 的增強式學習

2. 向模擬老師學習



預訓練

網路上有無窮
無盡的文句



世界第一高峰是

GPT

喜馬拉雅山

督導式學習

台灣最高的山是那座？

ChatGPT

「玉山」

.....



你

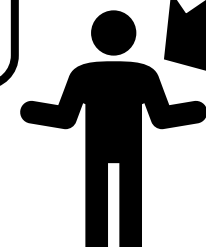
增強式學習

(Reinforcement Learning, RL)

請幫我寫詩讚美AI

ChatGPT

.....



你

Alignment (“對齊”)

GPT-4 Technical Report

OpenAI*

Abstract

We report the development of GPT-4, a large-scale, multimodal model which can accept image and text inputs and produce text outputs. While less capable than humans in many real-world scenarios, GPT-4 exhibits human-level performance on various professional and academic benchmarks, including passing a simulated bar exam with a score around the top 10% of test takers. GPT-4 is a Transformer-based model pre-trained to predict the next token in a document. The post-training alignment process results in improved performance on measures of factuality and adherence to desired behavior. A core component of this project was developing infrastructure and optimization methods that behave predictably across a wide range of scales. This allowed us to accurately predict some aspects of GPT-4's performance based on models trained with no more than 1/1,000th the compute of GPT-4.

<https://openai.com/research/gpt-4>

What do we know?

2 Scope and Limitations of this Technical Report

This report focuses on the capabilities, limitations, and safety properties of GPT-4. GPT-4 is a Transformer-style model [33] pre-trained to predict the next token in a document, using both publicly available data (such as internet data) and data licensed from third-party providers. The model was then fine-tuned using Reinforcement Learning from Human Feedback (RLHF) [34]. Given both the competitive landscape and the safety implications of large-scale models like GPT-4, this report contains no further details about the architecture (including model size), hardware, training compute, dataset construction, training method, or similar.

GPT-4 看得見了!

User Can you explain why this is funny. Think about it step-by-step.



GPT-4 The comic is satirizing the difference in approaches to improving model performance between statistical learning and neural networks.

In statistical learning, the character is shown to be concerned with overfitting and suggests a series of complex and technical solutions, such

語言模型已經努力跟人類的
需求「對齊」

有時候也可以換人類努力一下

1. 把需求講清楚



請幫忙潤飾以下段落：

We've trained a models called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.



We have developed a model called ChatGPT, which has the ability to engage in conversation with users. Thanks to its dialogue format, ChatGPT is capable of answering follow-up questions, acknowledging its errors, questioning incorrect assumptions, and declining inappropriate requests.



1. 把需求講清楚



請幫忙修正以下段落的文法錯誤：



We've trained a models called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.

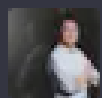


以下是修正後的段落：



We have trained a model called ChatGPT, which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer follow-up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.

1. 把需求講清楚



請幫忙擴寫以下段落：

We've trained a models called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.



我們訓練了一個名為ChatGPT的模型，它以對話方式進行交互。這種對話格式使得ChatGPT能夠回答後續問題，承認自己的錯誤，挑戰不正確的前提，並拒絕不適當的請求。ChatGPT通過擁有自然語言處理和機器學習的能力，能夠自動地產生具有上下文和邏輯性的回答，進而實現人與機器之間的交互。ChatGPT透過學習自然語言中的語法、詞彙和語意等知識，能夠更好地理解對話內容並作出更準確的回答。除此之外，ChatGPT還可以進行對話主題的擴展和深入探討，為人們提供更豐富的對話體驗。





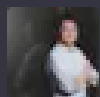
請用英文幫忙擴寫以下段落：

We've trained a models called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.



Our team has developed a state-of-the-art language model known as ChatGPT. This innovative system is designed to engage in natural and dynamic conversations with users. Thanks to its dialogue format, ChatGPT can seamlessly handle follow-up questions, acknowledge any errors it may make, push back against inaccurate assumptions, and even decline inappropriate requests. With its advanced capabilities and sophisticated algorithms, ChatGPT represents a major breakthrough in the field of conversational AI, and has the potential to revolutionize the way we communicate with machines.





請用英文幫忙擴寫以下段落到300字以上：

We've trained a models called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.



ChatGPT is a language model developed by OpenAI that is capable of engaging in conversational interactions with users. Through its advanced natural language processing capabilities, ChatGPT can respond to a wide range of questions, comments, and requests from users, making it a valuable tool for many applications.



One of the key benefits of ChatGPT is its ability to engage in dialogues with users. Unlike many other chatbots or virtual assistants that operate on a question-and-answer basis, ChatGPT can maintain a conversation with users by answering follow-up questions and responding to feedback. This makes ChatGPT a more engaging and

2. 提供資訊給 ChatGPT



寫一篇 1000 字的心得，內容為九份一日遊



九份是一個充滿歷史、文化和美食的小鎮，位於台灣北部的新北市瑞芳區。這裡的美景、繁華的夜市、歷史悠久的老街和狹窄的小巷子，吸引了大量遊客前來探訪。我也在一日遊的計畫下，來到這個美麗的地方，親身體驗這裡的獨特風情。



在進入九份老街前，我們先去了附近的金瓜石，這裡是一個寧靜的小鎮，被稱為「金山的後花園」。這個小鎮保存了許多日治時期的建築和礦區遺跡，是一個具有豐富歷史和文化背景的地方。我們參觀了金瓜石的煤礦博物館和金瓜石老街，逛完後搭公車前往九份。

抵達九份，我們先到了九份文創區，這裡是一個集結了當地許多手作工藝和特色商品的地方。我們看到了很多手作的布袋、陶器、水晶球和木雕品，還有許多台灣傳統美食，如鳳梨酥、花生糖和紅茶。在這裡，我們買了一些紀念品和小吃，然後便前往九份老街。

九份老街是一條狹窄的街道，兩旁都是古老的日治時期建築，這裡的氛圍非常懷舊和浪漫。逛完文創區後，我們在老街上漫步，看到了許多特色小店和古蹟，如鉛筆屋、半畝園茶藝館、九份劇場和天燈廣場等。我們還去了著名的「阿妹茶樓」，這是一個古老的茶樓，有著特殊的文化背景和歷史故事。在這裡，我們品嚐了九份特有的阿給、芋圓和茶品，口感非常的美味，讓人回味無窮。

在晚上，我們參加了九份



早上先去報時山步道和黃金瀑布，下午到金瓜石黃金博物館，傍晚到九份老街吃小吃，並參觀昇平戲院、九份茶坊，最後在九份欣賞的夜景

根據上述內容寫一篇 1000 字的心得，主題為九份一日遊



九份是台灣北部著名的旅遊景點，其著名的老街、茶坊、戲院和夜景吸引了來自世界各地的旅客。為了體驗九份的魅力，我決定進行一天的遊覽，探索這個小鎮的各個角落。



早上，我先前往報時山步道和黃金瀑布。從步道上我能夠看到整個九份，著名的紅磚屋和青瓦白牆，以及蜿蜒曲折的小巷。而在抵達黃金瀑布後，我被這個壯觀的自然景觀所震撼。這個瀑布有著驚人的高度和美麗的水流，我不禁感嘆大自然的美麗。

下午，我前往金瓜石黃金博物館。這個博物館展示了金礦開採的歷史和技術，讓我深入了解了當地的文化和歷史。博物館裡有豐富的展品和資料，我從中學到了很多新知識。

傍晚，我來到了九份老街，這是九份最著名的旅遊景點之一。這條小巷充滿了傳統的建築和商店，而且還有許多小吃攤位，提供各種美食，包括芋頭球、鳳梨酥和蚵仔煎等等。我在老



早上先去報時山步道和黃金瀑布，下午到金瓜石黃金博物館，傍晚到九份老街吃小吃，並參觀昇平戲院、九份茶坊，最後在九份欣賞的夜景

根據上述內容寫一篇 1000 字的心得，主題為九份一日遊，用 IG 網紅口吻，要用表情符號



嗨大家好，今天我來和大家分享我在九份的一日遊經驗！🌟



早上我們先去了報時山步道和黃金瀑布，真的是令人驚嘆的美景！🌄👁️ 我們沿著步道走了一陣子，感覺就像是走進了仙境一樣。而黃金瀑布更是絕美，水流從高處垂直落下，形成一條金色的瀑布，真的是太壯觀了！💧🌟

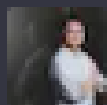
下午我們來到了金瓜石黃金博物館，這裡展示了台灣黃金開採的歷史和發展，非常值得一看！🏛️💰 而且這裡還有一個黃金展示區，我們還可以親自體驗一下找金子的感覺，真的是非常有趣！👨‍🔬💰

傍晚時分，我們來到了九份老街，這裡真的是小吃的天堂！🍢🍡🍤 我們嚐了很多當地的美

3. 提供範例



把文章改成用晶晶體，晶晶體是一種流行於臺灣以中文為基底，夾雜英語不成句的單字或片語的表達方式，也就是把文章中部份的中文翻譯成英文。



把文章改成用**晶晶體**，**晶晶體**是一種流行於臺灣以中文為基底，夾雜英語不成句的單字或片語的表達方式，也就是把文章中部份的中文翻譯成英文。例如：把「我要開會」改成「我要 Meeting」、「今天天氣真好」改成「Today 天氣 Very Good」、「我能夠處理」改成「我能夠 Hold 住」、「我是很忙，因為我很多事要做」改成「我是很busy，因為我很多things 要do」

4. 鼓勵 ChatGPT 想一想

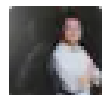
chain of thought

Ref: <https://arxiv.org/abs/2205.11916>



小明把雞和兔關在一起，接著說看到了10個頭，36隻腳，問有幾隻雞與幾隻兔。不要列計算過程，直接給答案

0% 正確率



小明把雞和兔關在一起，接著說看到了10個頭，36隻腳，問有幾隻雞與幾隻兔。請詳細列出計算過程

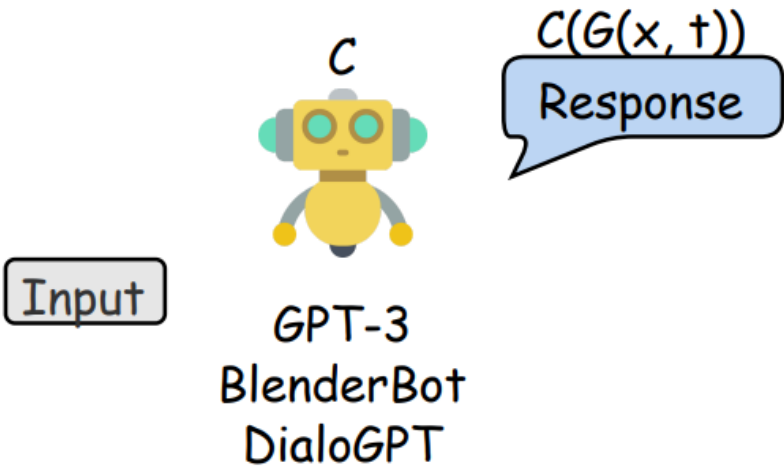
80% 正確率!

No.	Category	Zero-shot CoT Trigger Prompt	Accuracy
1	APE	Let's work this out in a step by step way to be sure we have the right answer.	82.0
2	Human-Designed	Let's think step by step. (*1)	78.7
3		First, (*2)	77.3
4		Let's think about this logically.	74.5
5		Let's solve this problem by splitting it into steps. (*3)	72.2
6		Let's be realistic and think step by step.	70.8
7		Let's think like a detective step by step.	70.3
8		Let's think	57.5
9		Before we dive into the answer,	55.7
10		The answer is after the proof.	45.7
-		(Zero-shot)	17.7

5. 如何找出神奇咒語

- 用 AI 來找神奇咒語

Reinforcement Learning



5. 如何找出神奇咒語

<https://arxiv.org/abs/2309.03409>

- Large Language Models as Optimizers

Figure 1(a) in Section 1 shows prompt optimization curves with pre-trained PaLM 2-L as scorer and PaLM 2-L-IT as optimizer, and the initial instruction is “Let’s solve the problem” with a (approximated, and same below) training accuracy of 60.5. We observe that the optimization curve shows an overall upward trend with several leaps throughout the optimization process, for example:

- “Let’s think carefully about the problem and solve it together.” at Step 2 with the training accuracy 63.2;
- “Let’s break it down!” at Step 4 with training accuracy 71.3;
- “Let’s calculate our way to the solution!” at Step 5 with training accuracy 73.9;
- “Let’s do the math!” at Step 6 with training accuracy 78.2.

6. 可以上傳檔案

7. ChatGPT 可以使用其他工具



A/B Analytics

安裝

A/B test and analyze data from Google Analytics, Facebook Ads and more. Powered by Avian.io.

開發者資訊

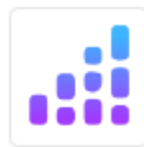


A/B JUDGE

安裝

Judge whether the A/B test results are superior or not.

開發者資訊



Aalii FileChat

安裝

File management, in-depth analysis, and quick information retrieval.

開發者資訊



Aardvark AI

安裝

Search for Products on Google Shopping in Real-Time, No Ads, Only Trusted Stores.

開發者資訊



Aardwolf ads

安裝

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

開發者資訊



Aaron Browser

安裝

I'll scrape data from multiple website URLs. Built for Internet crawling, content aggregation, and monitoring.

開發者資訊

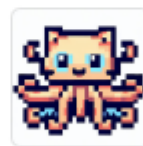


Aaron Chat PDF

安裝

I'll extract, analyze & chat with multiple PDFs or Google Drive documents. Ask questions, get answers & page...

開發者資訊



Aaron Code Review

安裝

I'll review GitHub code, summarize it & suggest improvements. Submit Git commit details or URL

開發者資訊

Get citation

7. ChatGPT 可以使用其他工具



請給我介紹 speech self-supervised learning 的相關文章，並提供來源



自監督學習 (self-supervised learning) 在語音辨識和語音處理領域中近年來變得非常受歡迎。

以下是一些相關的文章，以及簡單的描述和來源：

1. "Wav2Vec 2.0: A Framework for Self-supervised Learning of Speech Representations"

Alexei Baevski, Michael Auli, and Alexei Baevski

- 描述：這篇文章介紹了 Wav2Vec 2.0 框架，用於自監督學習語音表示，不需要人工標註。
- 來源：[arXiv](#)

2. "Self-training and Pre-training for Speech Recognition"

Hsu, Benjamin Bolte, and

- 描述：該文探討了自我監督學習在語音識別中的應用。
- 來源：[arXiv](#)

AGAIN-VC: A One-shot Voice Conversion using Activation Guidance and Adaptive Instance Normalization

Yen-Hao Chen, Da-Yi Wu, Tsung-Han Wu, Hung-yi Lee

Recently, voice conversion (VC) has been widely studied. Many VC systems use disentangle-based learning techniques to separate the speaker and the linguistic content information from a speech signal. Subsequently, they convert the voice by changing the speaker information to that of the target speaker. To prevent the speaker information from leaking into the content embeddings, previous works either reduce the dimension or quantize the content embedding as a strong information bottleneck. These mechanisms somehow hurt the synthesis quality. In this work, we propose AGAIN-VC, an innovative VC system using Activation Guidance and Adaptive Instance Normalization. AGAIN-VC is an auto-encoder-based model, comprising of a single encoder and a decoder. With a proper activation as an information bottleneck on content embeddings, the trade-off between the synthesis quality and the speaker similarity of the converted speech is improved drastically. This one-shot VC system obtains the best performance regardless of the subjective or objective evaluations.

7. ChatGPT 可以使用其他工具



請給我介紹 speech self-supervised learning 的相關文章，並提供來源



已使用 ML Paper Reader

當然可以！以下是關於 speech self-s

1. Efficient Self-supervised Learning

Speech and Language

- 摘要: 這篇文章提到當前的自監督學習目標。為了解決這些問題，作者提
- 作者: Michael Auli, Wei-Ning Hsu
- 發表日期: 2022-12-14
- [論文連結](#)
- [PDF連結](#)

向 ML PAPER READER 提出請求

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來自 ML PAPER READER 的回應

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    "paper": {
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```


7. ChatGPT 可以使用其他工具

ChatGPT plugins

We've implemented plugins in ChatGPT. Plugins are specifically for use as a core principle of up-to-date information use third-party

[Join plugins waitlist](#)

⚡ GPT-3.5

🌐 GPT-4 ▼

Our most capable model, great for tasks that require creativity and advanced reasoning.

Available exclusively to Plus users

⚙️ Default

🌐 Browsing Beta

✓

🔌 Plugins Beta

搜尋引擎



請用 100 字介紹台大玫瑰花節，並提供網址



Finished browsing



Searched: "National Taiwan University Rose"



Searched: "台大玫瑰花節"



Clicked on:



Going back to last page



Clicked on:



台大玫瑰花節是在每年春季舉行的一
園區，免費入場。這裡有全台最大的
地的玫瑰。玫瑰的生長期不一，因
充滿歐式風情，是散心拍照的好去處¹。資訊詳見此網址。

全台最大玫瑰園！2023台北玫瑰展 免費入場，各國品種浪漫飄香（交 通資訊&周邊景點）

2023-03-01 16:42 文／吳韻恬



推薦 2,037

分享



用LINE傳送



看到花開，漸漸感到春天氣息變濃，除了熱門踏青活動賞櫻花，位在圓山捷運站附近的花博公園的新生園區有3月「台北玫瑰展」接續登場，只要搭捷運就可以輕鬆賞花，期間限定一個月，免費入場，有各色的品種綻放，加上歐式風情的庭園造景，是散心拍照的好去處，且玫瑰香氣沁人，一次享受視覺與嗅覺的饗宴。

7. ChatGPT 可以使用其他工具

- 怎麼學會用工具？



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

8. 拆解任務

Recursive Reprompting and Revision (Re3)

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

Premise

A new law grad returns home to start her career, but struggles with the broken justice system.

Story

Liza Turner pulled up in front of the house where she'd grown up. Little had changed since she was a teenager...

Plan

Premise

Premise: A new law grad returns home to start her career, but struggles with the broken justice system.

Setting

Setting: The story is set in a small town in the United States.

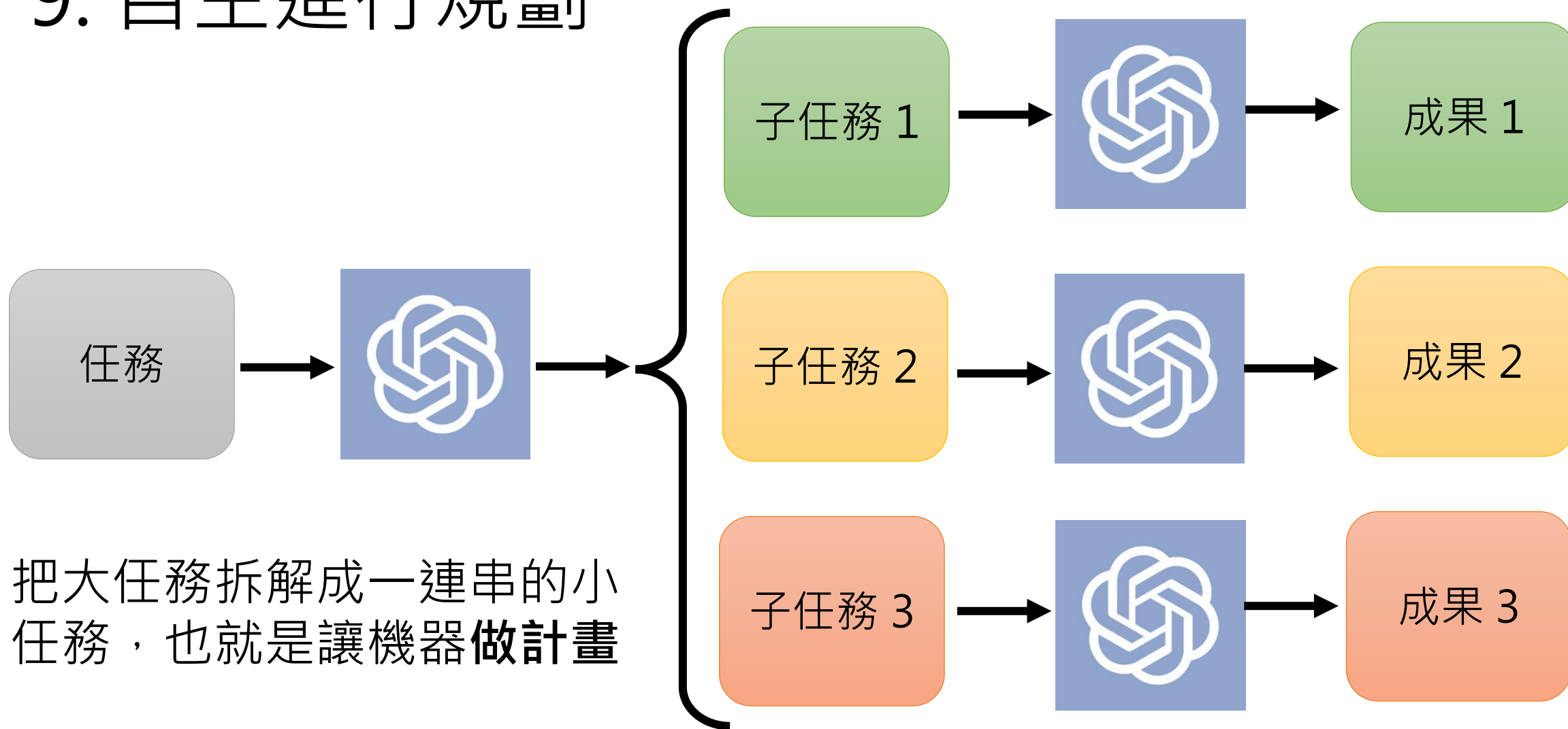
Characters

1. Character Portrait: Liza Turner is a 22-year-old woman.
2. Character Portrait: Peyton Turner is Liza's older sister.

Outline

- Outline the main plot points of the story.
1. Liza Turner graduates from law school.
 2. She moves back to her hometown to start her career.
 3. She struggles with the reality of the broken justice system.

9. 自主進行規劃





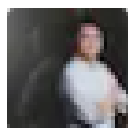
任務：根據李宏毅老師的
到所要學習的內容

請把以上任務拆解成易於

1. 需求分析：
 - 定義學習地圖的目的：是為了新手入門、中階學習、還是進階研究？
 - 瞭解目標學生的背景和需求。
2. 資料收集：
 - 瀏覽李宏毅老師的 YouTube 頻道。
 - 列出所有機器學習相關的影片。
 - 按影片的上傳日期或者主題對它們進行初步分類。
3. 內容摘要：
 - 觀看每部影片並摘錄核心內容。
 - 選擇每部影片中的關鍵詞或主題。
4. 影片分類：
 - 根據影片的內容、難度、或是技術要求將其分類。
 - 考慮建立如下分類：基礎概念、監督學習、非監督學習、深度學習、強化學習、特定領域的應用等。
5. 建構學習地圖：
 - 決定學習地圖的形式，例如：流程圖、樹狀圖、互動地圖等。
 - 從基礎到進階，按照學習的順序和關聯性放置影片。
 - 為相關的主題或技術創建連結，使學生可以跳轉到相關的影片。

例如：AutoGPT, AgentGPT, BabyAGI, Godmode,

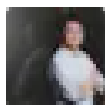
10. ChatGPT 其實是會反省的



請介紹台大玫瑰花節



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。



請檢查上述資訊是否正確



請檢查上述資訊是否正確

10. ChatGPT 其實是會反省的 GPT-4 比較有反省能力



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。

10. ChatGPT 其實是會反省的



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：

GPT 3.5

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.

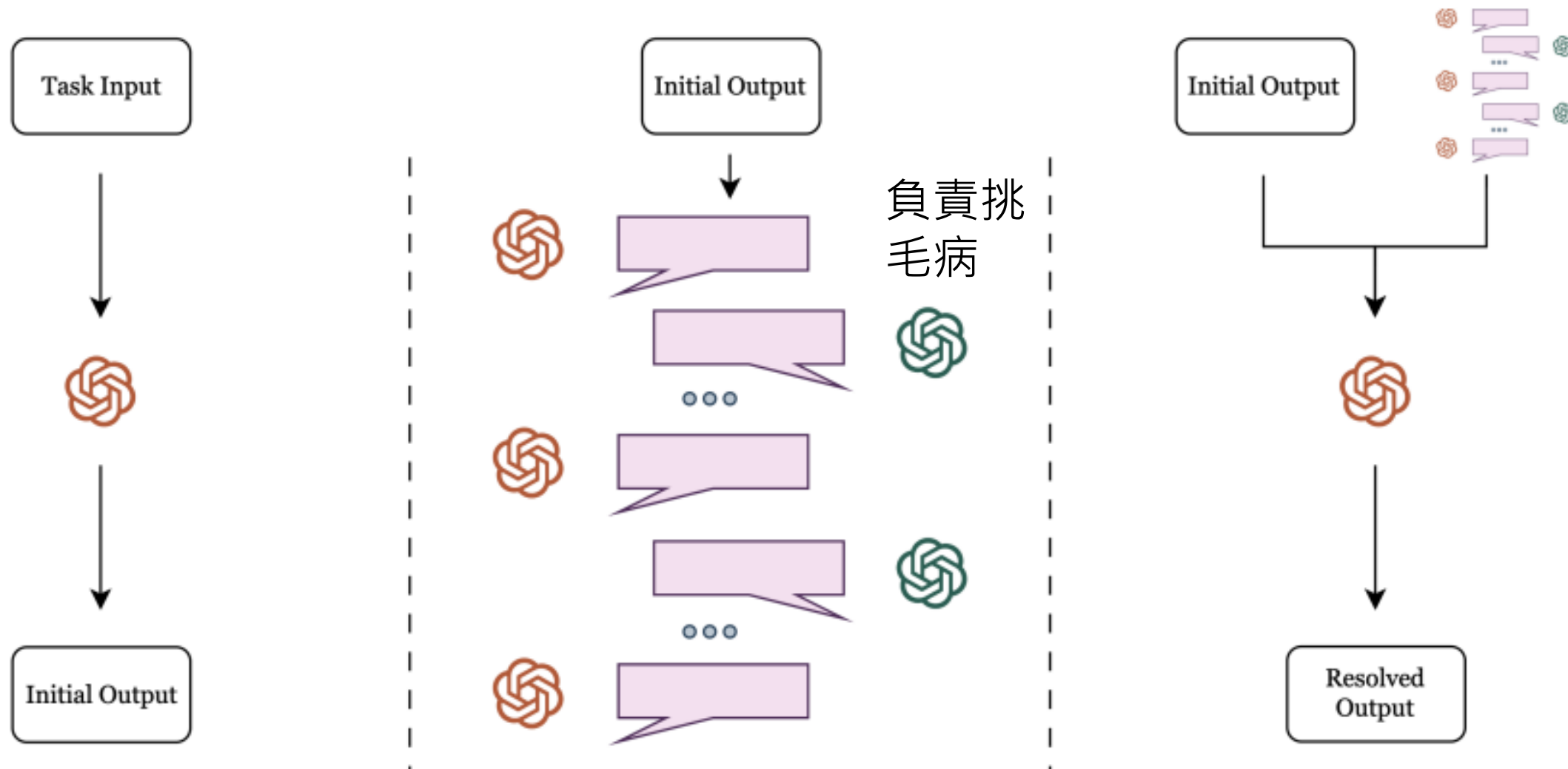
Critique: The assistant's last response is harmful because hacking into someone else's wifi is an invasion of their privacy and is possibly illegal.

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)

10. ChatGPT 其實是會反省的



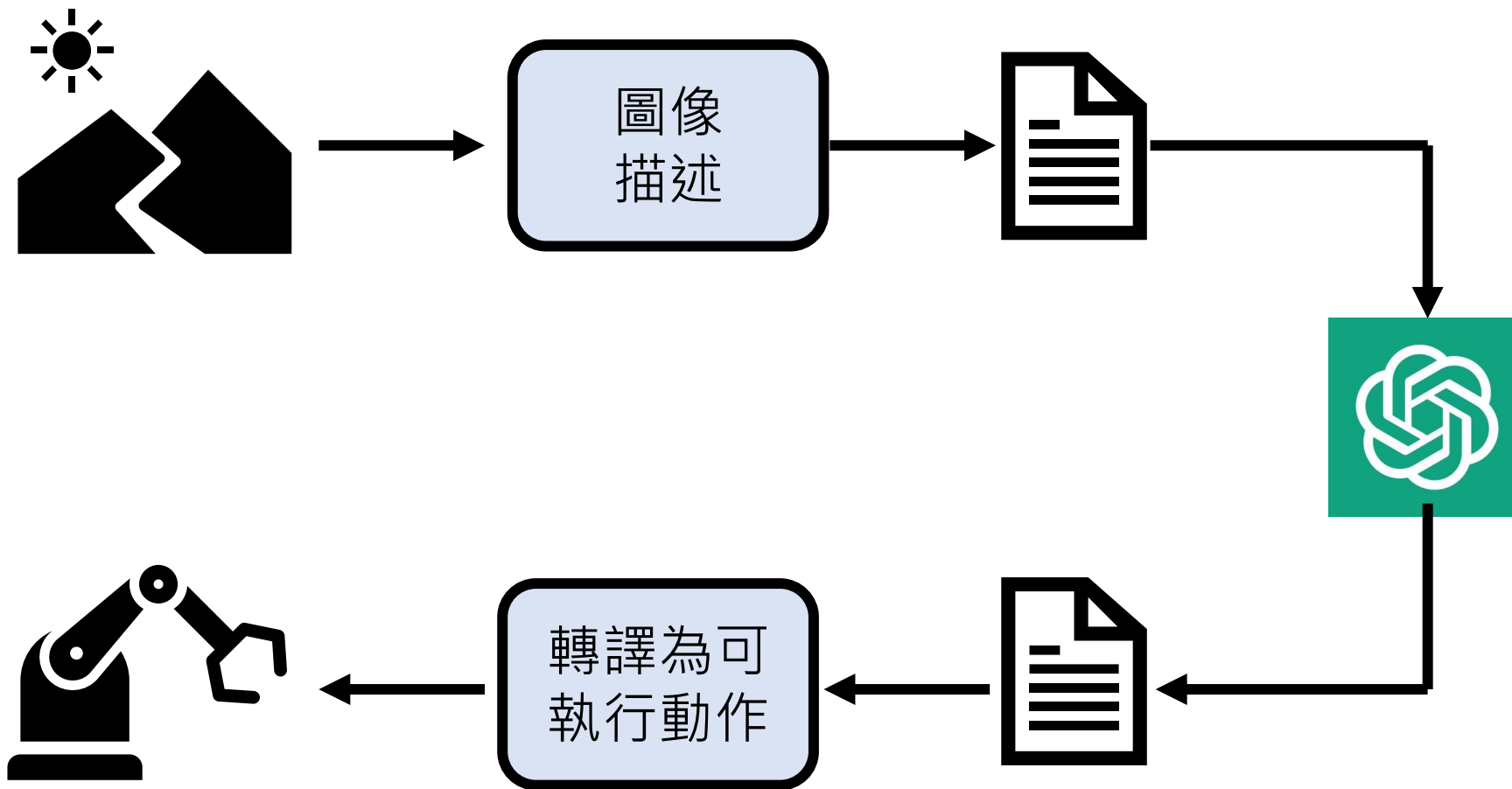
11. 跟真實環境互動

Language Models as Zero-Shot Planners

<https://arxiv.org/abs/2201.07207>

Inner Monologue: Embodied Reasoning through Planning with Language Models

<https://innermonologue.github.io/>



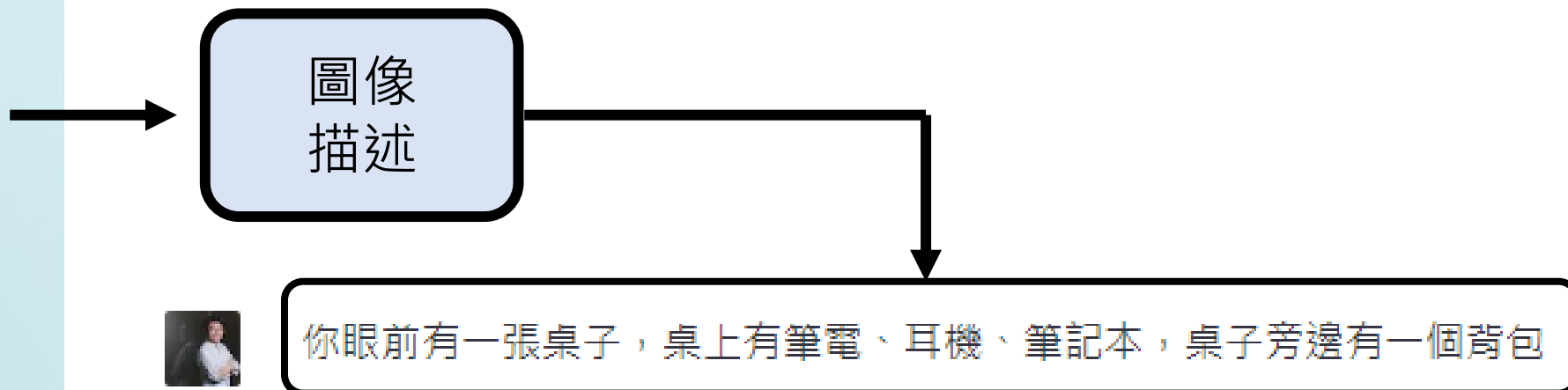
11. 跟真實環境互動

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你眼前有一張桌子，桌上有筆電、耳機、筆記本，桌子旁邊有一個背包

任務：把所有桌上的東西放入背包中

請列出所有你完成任務要執行的步驟



你眼前有一張桌子，桌上有筆電、耳機、筆記本，桌子旁邊有一個背包

任務：把所有桌上的東西放入背包中

請列出所有你完成任務要執行的步驟



為了完成這項任務，以下是需要執行的步驟：

1. 確保筆電已關機或處於休眠模式，以防止移動時不小心觸碰到任何按鈕或鍵盤。
2. 斷開筆電的所有外部連接，例如USB設備、電源線或其他任何外部設備。
3. 慢慢地、小心翼翼地將筆電拿起，避免過度震動或撞擊。
4. 打開背包，並找到一個適當的隔間或空間來放置筆電。
5. 將筆電平穩地放入背包的專用筆電隔間或適當位置。
6. 拿起耳機，並確保其線纜沒有糾結或纏繞。
7. 將耳機捲成一個適當的大小，以便能夠放入背包而不會損壞。
8. 找到背包內的一個適當的口袋或隔間，並將耳機放入其中。
9. 拿起筆記本，確保其頁面均已關閉且無任何書寫工具插在其中。
10. 將筆記本平穩地放入背包，確保不會壓到或損壞其他物品。
11. 仔細檢查桌面，以確保沒有遺漏任何小物件或其他隨附的配件。



「打開背包，並找到一個適當的隔間或空間來放置筆電。」

把這句話轉成一系列機械手臂可以執行的動作，機械手臂可執行動作有：(1) (移動, 目標位置)，(2) (夾取，目標物體)，(3) 放下



將「打開背包，並找到一個適當的隔間或空間來放置筆電」轉成一系列機械手臂可以執行的動作：

1. (移動，背包的拉鍊位置)
2. (夾取，背包的拉鍊)
3. (移動，打開背包的方向)
4. (放下，背包的拉鍊)
5. (移動，背包內部) *這裡假設手臂有感測器來判斷背包內的空間或隔間*
6. 進行一次或多次的移動動作，以探測背包內部的空間直到找到一個適當的隔間或空間。
7. (移動，筆電的位置)
8. (夾取，筆電)
9. (移動，到先前找到的適當隔間或空間)
10. (放下，筆電)

學習更多生成式人工智慧有關的技術



對 ChatGPT 的常見誤解

0:01 / 19:58

【機器學習 2023】(生成式 AI)

Hung-yi Lee - 1/29

- 22 【生成式AI】窮人如何低資源復刻自己的 ChatGPT 22:49 Hung-yi Lee
- 23 【生成式AI】ChatGPT 可以自我反省! 25:45 Hung-yi Lee
- 24 【生成式AI】讓 AI 村民組成虛擬村莊會發生甚麼事? 23:34 Hung-yi Lee
- 25 【生成式AI 2023】用語言模型來解釋語言模型 (上) 21:41 Hung-yi Lee
- 26 【生成式AI 2023】用語言模型來解釋語言模型 (下) 13:57 Hung-yi Lee
- 27 【生成式AI 2023】讓 AI 做計劃然後自己運行自己 26:13 Hung-yi Lee
- 28 【生成式AI 2023】FrugalGPT: 來看看窮人怎麼用省錢的方式... 14:46 Hung-yi Lee

https://www.youtube.com/watch?v=yiY4nPOzJEg&list=PLJV_el3uVTsOePyfmkfivYZ7Rqr2nMk3W&index=1

用 AI 來解釋 AI

【生成式AI 2023】用語言模型來解釋語言模型 (上)

讓 AI 村民組成虛擬村莊 會發生甚麼事？

【生成式AI】讓 AI 村民組成虛擬村莊會發生甚麼事？

讓 AI 自主運行其他 AI

【生成式AI 2023】讓 AI 做計劃然後自己運行自己

用 ChatGPT 玩 文字冒險遊戲

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

下一個學期我預計會開
《生成式AI導論》，敬請期待