

The background features abstract, overlapping green geometric shapes in various shades of green, creating a modern and dynamic visual effect.

# 第五讲 提示词工程 (II) Lecture 5 Prompt Engineering (II)

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# 声明

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# 总括

## Global View

- 大型语言模型（LLM）如ChatGPT在各个领域和任务中表现比较依赖精心设计的指令或提示。尽管对于普通用户来说有时这样要求过高，但我们仍尝试揭示开发人员或普通用户在查询和与LLM交互时的一些技巧，并通过提示词例子展示LLM响应的质量。

The impressive abilities of Large language models (LLMs) like ChatGPT in various domains and tasks usually rely especially on well-designed optimal instructions or prompts. Although it posts challenge for common users in doing that, we still aim in this work to reveal the techniques for developers or general users when inquiring and interacting with LLMs, and further enhance the quality of the responses from the LLMs by simply curating better prompts.

- LLM性能的一个很重要的指标是泛化，即解决在训练中未涉及领域问题的能力。尽管探索涉及如何不同的提示设计显著影响语言模型的性能和输出是提示词工程的重要研究方面，但研究提示在少样本和零样本学习场景中的关键作用也是更具意义的。

One performance index of LLMs is the generalization capability, indicating how good the model can solve problem in unseen domain not encountered in training. Although explorations of how varying prompt designs could dramatically influence the performance and outputs of language models is an important aspect for prompt engineering, keep in mind that uncovering the critical role of prompts in few-shot and zero-shot learning scenarios is also pivotal work.

# 基本原则

## Basic Principles

### ► 明确对话的目的和重点

通常，在开始撰写提示之前，要了解清楚希望通过对话达到什么目标。例如，与 ChatGPT 交互的目标是提供信息、回答问题，还是进行随意的对话？明确定义对话的目的和重点是非常重要的，这能够帮助并约束用户制定一个具体而相关的提示，从而更自然地导向到实现更有吸引力和信息量的对话。也即尽量不要通过一次对话解决一个特别宽泛而宏大的问题，从而不利于模型有效利用上下文信息。

### ► Specify the purpose and focus of the conversation

Generally, to have a clear idea of what you want to accomplish with the conversation, before you start writing your prompt. For example, is your goal to provide information, answer a question, or engage in casual conversation? It is vital to define the purpose and focus of the conversation, it will help you to craft a prompt and constrain that the created prompt is specific and relevant, resulting in a more engaging and informative conversation. That is to say, try not to address an overly broad and vast question in a single conversation, as it may hinder the model's effective utilization of contextual information.

# 基本原则

## Basic Principles

### ► 使用具体而相关的语言

为了确保ChatGPT理解提示并能够生成适当的回应，使用具体而相关的语言是很重要的。避免使用行话或模糊的语言，以免导致混淆或误解。相反，力求表达清晰简明，使用与手头主题相关的语言。注意，行话与行业术语是相关的概念，但它们之间有区别：术语的目的是建立某一领域一种标准化且共同的词汇。行话往往是某一领域成员之间高效交流的一种简便方式，可能会造成领域外的人理解上的障碍。

### ► Use specific and relevant language

To ensure that the ChatGPT understands your prompt and is able to generate an appropriate response, it's important to use specific and relevant language. Avoid using jargon or ambiguous language that could lead to confusion or misunderstandings. Instead, aim to be as clear and concise as possible, using language that is relevant to the topic at hand. Please note that jargon is different from terminology, which is to establish a standardized and common vocabulary that aids communication among professionals, experts, or individuals within a specific field. Jargon can serve as a shorthand way for members of a group to communicate efficiently, but it may also create a barrier to outsiders.

# 基本原则

## Basic Principles

- ▶ 避免使用开放性或过于宽泛的提示，且保持对话方向一致

虽然提出开放性或过于宽泛的问题可能会诱人，以期获得更全面的回答，但这类提示往往会导致杂乱或缺乏焦点的对话。相反，应力求在提示中尽可能具体，为对话明确目的和重点。同时，在与ChatGPT进行对话时，保持专注于手头的主题，避免引入离题或不相关的话题。通过保持对话一致，你可以确保它涵盖用户感兴趣的主体，并提供有用且相关的信息。

- ▶ Avoid open-ended or overly broad prompts, and keep the conversation on track

While it can be tempting to ask open-ended or overly broad questions in an effort to get a more comprehensive response, these types of prompts can often lead to disjointed or unfocused conversations. Instead, aim to be as specific as possible in your prompts, defining a clear purpose and focus for the conversation. Meantime, as you engage in a ChatGPT conversation, to stay focused on the topic at hand and avoid introducing tangents or unrelated topics. By keeping the conversation on track, you can help to ensure that it covers the topics of interest to the user and provides useful and relevant information.



# 包含对象

## Integrate Audience

- LLM的用户可能涵盖不同认知层次的用户。针对特定问题的回答，通常可能是在模型综合多个源后的概述。但对不同的使用者来说，答案未必是合适的。因此，如果希望回答针对特定的人群，则应该在提示词中包含观众或用户信息。

The LLM users might cover a wide range of people of various cognitive levels. For a specific question, the response from the model might be the synthesis of multiple information sources. However, the answer might be inappropriate for specific user group. To have the answer target specific users, try to integrate the audience in the prompts.

请解释温室效应。我是专家。

温室效应是指地球大气层中的某些气体（如二氧化碳、甲烷和水蒸汽）能够阻碍地表向外放射的热量，从而导致地表温度升高的现象。这些气体被称为温室气体，因为它们的作用类似于温室的玻璃墙，能够让太阳能量进入，但不易让热量逸出。如果温室气体的浓度过高，就会导致地球的平均温度上升，引发气候变化和环境问题。目前，主要的温室气体排放来源是人类活动，如工业生产、交通运输、农业等。

请解释温室效应。我是小学生。

温室效应是一种现象，类似于我们在温室里种植植物。当太阳光能进入地球的大气层时，有些能量会被地球表面吸收，而剩下的能量则会反射回空间。但是，在大气层中有一些气体（如二氧化碳、甲烷和水蒸汽），这些气体可以像保护墙一样，阻止部分反射回空间的太阳光线逃逸到大气层外面，并将其反射回地表，使得地球变得更暖和。如果这种情况持续存在，就会导致地球变得越来越热，从而引起一系列的环境问题。目前，人类活动是温室气体排放的主要原因，所以我们需要做出努力，减少二氧化碳和其他温室气体的排放，保护我们的地球。

# 包含对象

## Integrate Audience

- ▶ 关于对象的信息，也可以其它更自然的方式嵌在提示中，如下所示：。
  - ▶ 请用简单的语言向我解释XX主题。
  - ▶ 像对待我是11岁孩子一样向我解释。
  - ▶ 以我对XX领域为初学者的身份向我解释。
  - ▶ 使用简单的英语写[文章/文本/段落]，就像你在向5岁儿童解释某些事情。
- ▶ The audience information can also be embedded into the prompts in other more natural ways:
  - ▶ Explain [insert specific topic] in simple terms.
  - ▶ Explain to me like I'm 11 years old.
  - ▶ Explain to me as if I'm a beginner in [field].
  - ▶ Write the [essay/text/paragraph] using simple English like you're explaining something to a 5-year-old



# 角色扮演

## "Act as..." Hack

- ▶ 角色扮演是设计有效的LLM提示中一个非常有用的技巧。这种技巧涉及在提示中使用“扮演”一词，指示LLM在对话中扮演特定的角色或个性。这对于创建沉浸式对话或模拟现实场景尤其有用。例如，可以使用“扮演”的技巧告诉LLM“扮演旅行代理”，根据用户的偏好提供度假目的地的推荐；或者告诉LLM“扮演侦探”，解决虚构的犯罪案件。总之，“扮演”技巧可以有效创建沉浸式LLM对话。
- ▶ One useful techniques for crafting effective LLM prompts is the "act as" hack. This technique involves using the phrase "act as" in the prompt to tell the LLM to assume a specific role or persona in the conversation. This can be especially useful for creating more engaging and immersive conversations, or for simulating real-world scenarios. For example, users can use the "act as" hack to tell the LLM to "act as a travel agent" and provide recommendations for vacation destinations based on the user's preferences. Or users might tell the LLM to "act as a detective" and solve a fictional crime. To sum it up, the "act as" hack can be a powerful tool for creating engaging and immersive LLM conversations.

# 角色扮演

## "Act as..." Hack

- ▶ 下面是关于解释温室效应的例子，不是在提示词中包含对象，而是用了角色扮演，读者可进行比较。
- ▶ Below are examples explaining the greenhouse effect. Instead of augmenting the audience in the prompt, role-playing is used. Users can compare these cases.



你

扮演小学生用中文解释温室效应



聊天GPT

嘿！所以，温室效应嘛，就好比是我们地球穿的一件保暖衣服一样。太阳的光会照射到地球上，然后地球会吸收这些光，变得温暖。可是有些光不是全部都走了，有一部分会被地球上的一些东西，比如云啦、水汽啦，给阻挡住了。这些被阻挡的光，就好像是我们身上穿的那层保暖衣，它们被留在了地球周围，让地球保持温暖。

问题就在于，我们有时候在地球上做了一些事情，比如烧煤啦、开车啦，这样就会产生一些气体，叫做温室气体。这些气体就像是给地球套上了一层更厚的保暖衣，多了很多。这样一来，太阳的光容易进来，但有些光却难以离开，导致地球变得更加热。这就是温室效应的基本原理啦。

所以，我们要注意减少排放温室气体，就好比是在脱掉地球多余的保暖衣，让它能够保持一个适中的温度，对吧！

# 角色扮演

## "Act as..." Hack

► 可以看出，通过角色扮演，得到了与包含对象同样的效果，甚至效果更好。

► It can be noticed via “Act as ...” tricks, it achieves similar expected results as integrated the audience in the prompt. Actually, the result is better than the audience integration trick.



你

作为一名大学教授用中文解释温室效应



聊天GPT

大家好，今天我们来谈一谈温室效应。温室效应是一种自然现象，类似于地球自身的保温机制。当太阳光照射到地球表面时，地球吸收部分光能并释放热量。然而，并非所有的太阳光都能够顺利穿透地球的大气层，一些被云层和气体阻挡的光线会被反射回地球表面，使地球保持温暖。

问题在于，人类活动引入了一些额外的温室气体，比如二氧化碳和甲烷。这些气体在大气中形成一个“保暖层”，阻碍部分热量逃逸到太空。这就好比给地球额外穿上了一层厚重的保温衣，导致地球温度上升。

这种气体的增加主要来自于燃烧化石燃料、森林砍伐以及一些工业过程。我们必须认真对待温室效应，因为过度的温室气体排放对地球的气候产生了不可忽视的影响，包括极端天气事件和海平面上升等问题。因此，通过减少温室气体的排放，我们可以共同努力减缓气候变化的进程。

# 角色扮演

## "Act as..." Hack

- ▶ 实际上，角色扮演有更广泛的用途，比如，用户可以让 LLM 扮演成 Python 解释器，直接输出程序代码的结果。
- ▶ In fact, "Act as ..." has broader applications. For example, users can have LLM play the role of a Python interpreter, directly outputting the results of program code.



你

Act as a python interpreter and only output without explanations.



ChatGPT

Sure, feel free to provide the Python code, and I'll output the results without explanations.



你

```
a = range(10)
b = [i for i in a if i % 2 == 0]
print(a)
print(b)
```



ChatGPT

SCSS

Copy code

```
range(0, 10)
[0, 2, 4, 6, 8]
```



# 界定内容

## Delimit Content

- 在设计提示时，建议使用分隔符清楚地指示或分割输入的不同部分，例如三引号、XML标签、节标题等，这些分隔符可以帮助划分要区别对待的文本部分。对于简单的任务，由于模型通常可以正确地理解提示，因此，使用分隔符可能不会对输出质量产生影响。然而，任务越复杂，消除任务细节的歧义就越重要。使用分割符可以让模型准确地理解用户对他们的要求。

To design prompts, it is recommended to use delimiters to clearly indicate distinct parts of the input. Delimiters like triple quotation marks, XML tags, section titles, etc. can help demarcate sections of text to be treated differently. For straightforward tasks, using delimiters might not make a difference in the output quality since usually LLM can correctly interpret the prompts. However, the more complex a task is the more important it is to disambiguate task details. Using delimiters greatly enhance the chance that the model understands exactly what users are asking of them.

# 界定内容

## Delimit Content

- ▶ 右边展示了使用分割符界定内容的例子。第一个是指示模型翻译特定文字，第二个是替换指定短语。

The right shows examples of using delimiters to confine content. The first one instructs the model translating specific text, and the second one is for replacing specified phrases.



你

please translate the following chinese into english: "人工智能生成内容（简称AIGC）是一种利用人工智能技术自动生成文章、音频、视频等多媒体内容的方法。"



ChatGPT

The translation of the Chinese text into English is:

"Artificial Intelligence Generated Content (AIGC) is a method that uses artificial intelligence technology to automatically generate articles, audio, videos, and other multimedia content."



你

please substitute the chinese phrases in quotes with their synonyms of the following chinese text:

春天，大地像一幅"丰富多彩"的画卷，绽放着生命的美丽。万物复苏，草木"蓬勃茂盛"，为人们带来无尽的美好感受。春风拂面，"清新宜人"，仿佛每一寸空气都充满了蓬勃的生机。



ChatGPT

春天，大地像一幅多姿多彩的画卷，绽放着生命的美丽。万物复苏，草木繁茂蓬勃，为人们带来无尽的美好感受。春风拂面，宜人清新，仿佛每一寸空气都充满了蓬勃的生机。

# 示例—写作

## Example – Writing

### ► 博客/短文/文章 (Blog Posts/Essays/Articles)

请帮我写一个关于【目标】的【什么样子】的【文章类型】。解释或阐述【观点1、观点2...】

Write a [adjective] [type of content] on [goal]. Explain why [topic1, topic2, ...]

- Write a friendly blog post on why people should lose weight . Explain why obesity is a problem, how people can lose weight, and why being healthy is important.
- Write a humorous essay on how not to prepare for an exam.

### ► 写作助手 (Writing Assistant)

你能让我的【文章类型】更【如何】？ Can you [action] my text [adjective]?

- Can you make my paragraph less formal?
- Can you make my sentence easier to read?
- Can you complete my sentence? [insert sentence]
- Can you continue my paragraph? [insert paragraph]



# 示例—写作

## Example – Writing

### ► 文案撰写 (Copywriting)

请帮我写一个关于【目标产品】的【文案类型】，展示【优点1、优点2...】

Write a [type of content] for [subject] showcasing the [benefit1, benefit2, ...]

- Write a social media ad for a productivity tool showcasing its simplicity and design.
- Create a sales copy for a travel agency showcasing the price, destinations and commitment.

### ► 电子邮件 (Writing Assistant)

回复这封邮件：【邮件内容】，用【什么样的态度】表达我决定【怎样做】

Reply to this email: [insert email]. Be [behavior] and notify the peer that [ideas/decisions]

- Reply to this email. Be polite and say that I accept the offer if ...
- Reply to this email. Be friendly and say that I don't have time for the meeting
- Reply to this email. Be upset and say that I am not satisfied with their actions to deal with the dispute.

# 示例—创意

## Example – Creativity

### ► 娱乐 (Entertainment)

根据【考量】，创建一个【娱乐类型】。Create X [element] considering [detail].

- Create 5 jokes considering words like knowledge and money
- Create 5 pickup lines considering that you're a doctor

### ► 计划 (Planning)

创建一个【多少】天的计划去【做什么】

Create a X-day [type of plan] for [detail]

- Create a 7-day trip for our anniversary in September
- Create a 30-day workout for my arms and abs with no gym equipment
- Create a 5-day meal plan for a child who is lactose intolerant.

# 示例—学习

## Example – Academic Life

### ► 工作提升 (Work Improvement)

建议提升【某种技能】的【多少种】方式。Provide X ways to improve [subject].

- Provide 3 ways to improve my resume summary: [insert text]
- Provide 2 ways to improve my essay: [insert essay]

### ► 手把手教程 (Step-by-step Guide)

请提供做【什么】的手把手指令。Provide step-by-step instructions on how to [subject]

- Provide step-by-step instructions on how to increase my vocabulary
- Provide step-by-step instructions on how to prepare for a job interview

### ► 总结 (Summarization)

你能总结下如下内容吗？【内容/主题】。Can you summarize the content? [content/subject]

- Can you summarize the book The Little Prince?
- Can you summarize World War II in 400 words?

# 示例—工作

## Example – Working Life

### ► 电子表格 (Spreadsheet)

为【特定范围】的单元格创建【公式】。 Create a formula to [goal] in cell [range of cells].

- Create a formula to calculate the sum in cells A1 to A10
- Create a formula to calculate the average in cells H10 to H20
- Create a formula that sums only the expenses that have the status "No" in column C

### ► 解释公式 (Explain Formula)

请解释这个公式的意思：【插入公式】。 Explain the meaning of the formula [formula]

- =SUM(A1:A10)
- =AVERAGE(H10:H20)
- =SUMIF(C1:C13,"No", B1:B13)

# 示例—工作

## Example – Working Life

### ► 出题 (Quiz)

由【特定内容】生成【多少】【题目类型】

- Turn a list of facts about Chinese history into a multiple choice quiz
- Turn a list of facts about biology into true/false question
- Propose an examination paper include 10 single choice problems, 10 multiple choice problems, 1 programming program about using ESP32 to read temperature and humidity data from DHT22 and upload the statistics to open-sourced IoT platform ThingsBoard. The last comprehensive problem is about the description of IoT technology in smart campus.

### ► 评价 (Evaluation)

根据【项1】、【项2】、...等，评价学生的【模块/课程/学业】能力

Make an assessments of students' [module/subject/course] by [element1], [element2], ...

- Make an evaluation of a student's English ability according to four components: listening 7, reading, 8, writing 6.5, speaking 6. Each components above scoring from 0 to 10.

# 示例—外语

## Example – Foreign Language

### ► 提问 (Ask Questions)

举例说明【某种语言】中，【单词1】与【单词2】的差别并举例说明

What's the difference between [word1] and [word2] in [language]? Provide an example.

- What's the difference between bid and abide in English? Provide an example
- What's the difference between por and para in Spanish? Provide 2 examples

### ► 对话 (Conversation)

LLM基本都可以进行流利的合乎逻辑的按指定语种的对话，下面是一个提示的例子，读者可以综合应用相关技巧，模拟对话提高语言能力。

Almost all LLMs are capable of conducting conversations in a given language fluently and rationally. The follow prompt demonstrates how users can put all tricks together to improve their language ability via simulated conversations.

- Act as a language partner. You'll start a conversation with me about [topic] in [language]. In every response, you should provide your opinion and then ask me a question to keep the conversation going.

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# 示例—编程

## Example – Programming

### ► 编码（Coding）

请用【编程语言】完成【具体功能】。How to [action] in [programming language]?

- How to merge dictionaries in Python?
- How to join two datasets in Python?

对于【编程语言】，解释【概念】，请问【概念1】与【概念2】的差别是什么？

In [language], explain [concept], what's the difference between [concept1] and [concept2]?

- Explain the try/except in Python.
- What's the difference between lists and dictionaries in Python?
- What's the difference between OOP and functional programming?

### ► 协作（Collaboration）

- Add CSS to customize the size of the logo image and put it around the top-left corner.
- Use Python to rename all the [file extension] files in my directory. Add the [word] to each name.

# 示例—数据分析

## Example – Data Science

### ► 调查问卷 (Questionnaire)

关于【调查主题】，请设计一份调查问卷，要求如下：【具体要求】

Design a questionnaire about [subject] with the specification as follows: [insert specification]

- Design a survey about load and satisfaction of homework for students in Grade 7.
- Design a questionnaire relating to eye health for pupils in primary school. The questions include options, ranking, feedback, etc.

### ► 数据处理 (Data Processing)

对于【研究主题】，请建议一些【数据源/研究方法】

Suggest some [dataset/research methods] for [subject]

- Where can I find data for my project about depressions in high-school student?
- How to oversample/undersample my dataset?
- How to split my dataset into train and test sets with Python?

# 示例—数据分析

## Example – Data Science

### ► 智能模型 (AI Model)

#### 数据生成 (Data Generation)

- Act as a fake data generator. Create a dataset that has X rows and Y columns: [column], column2,]

#### 训练模型 (Train Model)

- I have a dataset of [describe dataset], build a machine learning model that predicts [target variable]

#### 调参 (Tune Hyperparameter)

- I've trained a [model name]. Write code or suggest strategies to tune the hyperparameters

#### 诊断 (Diagnosis)

- When I train the model, I find the loss never got convergent, give some suggestions to tackle the problem
- The evaluation accuracy first rises then decreases, suggest how to resolve this problem
- It seems the model trained well, but upon deployment, the performance of inference sucks. How to amend it?