LING3401 Linguistics and Information Technology

Tutorial: Prompting large language models

Yige Chen

The Chinese University of Hong Kong

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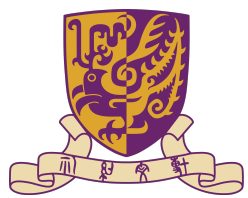

What is prompt engineering?

- The process of designing inputs to guide a language model's output
- Similar to giving instructions: the way you ask affects the response

Why is prompting important?

- LLMs are sensitive to how we phrase prompts
- Small changes in wording can lead to different outputs
- Helps control style, tone, and information retrieval
- Useful for tasks like summarization, translation, and text generation

Example: prompt sensitivity

- *Explain the meaning of "syntax".*
- *Explain "syntax" to a 5-year-old.*
- *Explain "syntax" using a cooking analogy.*
- *Explain "syntax" using topology.*
- The way we phrase our request changes the response!

Types of prompting

- Zero-shot prompting: Asking a question without providing examples.
- Few-shot prompting: Giving a few examples before asking the model to continue.
- Chain-of-thought prompting: Encouraging step-by-step reasoning.

System prompt vs. user prompt

- System prompt (pre-set instructions)
  - Controls the model's behavior globally.
  - Example: *"You are a helpful assistant that answers concisely."*
- User prompt (dynamic input)
  - Direct request from the user.
  - Example: *"Summarize this article in one sentence."*

Understanding context window

- The maximum amount of text an LLM can consider at once
- Older parts of the conversation may be forgotten if too long

Effective prompting strategies

1. Be specific and clear
   - Vague: *Explain phonetics.*
   - Better: *Explain phonetics with examples of English sounds.*
2. Use explicit instructions
   - Instead of *Summarize this*, try *Summarize this article in 3 bullet points*.
3. Guide the output format
   - Example: *List the pros and cons of LLMs in a table.*
4. Use step-by-step reasoning
   - Example: *Explain the process of word formation step by step.*

Using GPT-4o in the tutorial

- I have built a web interface using my MS Azure OpenAI API key.
- This will grant you access to GPT-4o during the tutorial.
- **The API has a rate limit and may crash if all students use it simultaneously. If you have access to LLMs, I'd appreciate it if you used your own.**
- This access is only for our tutorial session. I will shut it down right after class.
- If you want to practice outside of class, you should obtain access to an LLM yourself.
- Please do not overuse it, as excessive usage costs me money.
- Please do not misuse it (e.g., by asking NSFW questions), as this could get my account blocked by Microsoft.
- **Do not share this access with others.**

Task 1: Machine translation with LLMs

- Translate an English text into both colloquial Cantonese and Classical Chinese.
- If you do not read Chinese, feel free to try this out in some other languages that you know!
- Your task is:
  - Translate into:
    - Colloquial Cantonese
    - Classical Chinese
  - Ensure both translations maintain meaning and fit their respective styles.
  - Moreover, try translating the text in a way as if a specific figure is uttering the speech:
    - A Hong Kong taxi driver talking to his/her passenger
    - An ancient Chinese scholar/poet (e.g., Qu Yuan)
    - If you only know English, how about William Shakespeare?

Task 2: Academic paper summarization

- Summarize an academic paper while adapting the summary for different fields.
- Your task is:
  - Generate a concise, accurate summary of the given paper.
  - Adapt the summary for different academic audiences, such as linguistics majors, psychology majors, English majors, mathematics majors, computer science majors, etc.
    - Think about this: are the audiences undergraduate or postgraduate?
  - Ensure each summary aligns with the audience's background knowledge.
- Also, try to determine the best way for LLMs to present the summary: in a paragraph, in slides, or presentation style?

Task 3: Reverse engineering a prompt

- Given an LLM-generated response, reconstruct the most likely prompt!
- Challenge:
  - You will receive a response from the model.
  - Your task is to infer the prompt that likely generated it.
  - Then, modify the prompt to:
    - Produce a more detailed response.
    - Change the response style (e.g., more formal, more concise).
- Discussion:
  - How do slight changes in wording affect the response?

Miscellaneous

- **No class next week (reading week)**
- **Midterm: March 12, in class**
- Please do not hesitate to ask questions
- We enjoy feedback from you, so please let us know if you feel there's anything we could have done better
- It would be great if you'd bring your laptop to the class every week