

LING3401 Linguistics and Information Technology

Tutorial: Prompting, Agents, and Human-Computer Interaction

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Disclaimer

- Yes, I like pigs.





Prompting Revisited

- Prompting is the process of crafting instructions or inputs that guide the LLM to produce desired outputs.
- Good prompts clarify intent, provide context, and structure the expected response.



General Suggestions

- Be clear and explicit about the task (e.g., “Summarize this article in three bullet points”).
- Provide examples when possible (few-shot prompting).
- Specify the format of the response (e.g., “Return a JSON object”, “Write in bullet points”).
- Use delimiters to separate instructions from input data.
- Avoid ambiguity—rephrase vague or underspecified prompts.



Zero-Shot vs. Few-Shot Prompting

- **Zero-Shot Prompting:**

- The model is given only the task instruction.
- Example: “*Translate the following sentence to French: ‘I love learning NLP’.*”

- **Few-Shot Prompting:**

- The model is shown a few examples before the actual task.
- Example:
 - English: ``Hello'' → French: ``Bonjour''
 - English: ``Goodbye'' → French: ``Au revoir''
 - English: ``I love learning NLP'' → ?
- Few-shot prompts help guide the model by demonstrating the pattern.
- Few-shot often improves accuracy, especially on unfamiliar or complex tasks.



System vs. User Prompts

- **System Prompt:** Sets overall behavior/personality of the model (e.g., “You are a financial expert...”).
- **User Prompt:** The user’s actual question or instruction.
- System prompts are usually invisible to users but are critical behind-the-scenes.
- Example:
 - System: “*You are a math tutor who explains concepts clearly.*”
 - User: “*Can you explain what a derivative is?*”
- Together, they shape the model’s response style and content.



Prompting for Lengthy Input

- LLMs have a limited context window (e.g., GPT-4 can handle up to 128k tokens).
- For large documents, consider:
 - Chunking input and summarizing each chunk.
 - Using hierarchical prompting (e.g., summarize sections, then summarize summaries).
 - Extracting relevant parts first before deeper analysis.
- **Warning:** On very long inputs, models may:
 - Hallucinate (make up facts or details).
 - Miss important context or focus only on the beginning.



- **Chain-of-Thought (CoT):** Prompts that encourage step-by-step reasoning.
 - Example: “Let’s think step-by-step...”
- **ReAct:** Combines reasoning with action—model reasons, takes actions (e.g., tool use), and updates thoughts.
- **Self-Consistency:** Sample multiple reasoning paths and choose the most frequent/consistent answer.



LLM Agents

- **LLM Agent:** A language model that can *perceive, reason, and act* using tools, memory, and planning.
 - Can perform tasks like searching, summarizing, or interacting with APIs.
 - Example: *An agent that plans a trip by searching flights, comparing prices, and booking.*
- **Multi-Agent Systems:** Multiple LLM agents collaborating (or competing) to solve complex tasks.
 - Each agent may play a specialized role (e.g., researcher, planner, coder).
 - Agents can delegate, critique, and refine each other's outputs.
 - Example: *A team of agents writing a research paper—one finds sources, another drafts, a third edits.*



Tasks

- The Consulate of Pigland kindly requests your help with several matters concerning Mr. and Ms. Oink and their family.
- Can you assist them using the power of prompts and LLMs?



Task 1: Financial/Economic Domain

- Ms. Oink lives in the U.S. this year and reads news about new tariffs.
- She holds stocks in Nvidia and Apple and wonders:
 - How might tariff changes affect her daily life?
 - Should she buy, sell, or hold her stocks?
- **Goal:** Use the LLM to analyze real news and provide financial insights.
- **Challenge:** Prompt the model to explain in both expert terms and everyday language.
- **Important:** **LLMs are not financial advisors. Do not rely on them for investment decisions. Always consult a qualified expert and consider multiple sources of information, including your personal financial goals and real-world signals.**



Task 2: Linguistic/Language Domain

- Mr. and Ms. Oink's 10-year-old daughter has studied Chinese for 2 years.
- She wants to use an LLM to:
 - Practice Chinese language skills.
 - Learn more about Chinese culture—festivals, foods, customs, etc.
- **Goal:** Prompt the LLM to act as a kind tutor who adapts to her level and interests.
- **Challenge:** Include playful examples, short stories, or cultural facts suitable for a 10-year-old.



- Mr. Oink wants to build a simple neural network, but he knows nothing about math or computer science.
- He asks the LLM to:
 - Help him write beginner-friendly Python code.
 - Explain what the code does in two ways:
 - A formal explanation (for documentation or a class).
 - A pig-friendly version “even a pig can understand.”
- **Goal:** Prompt the LLM to generate runnable code and offer dual explanations.
- **Challenge:** Use analogies, step-by-step logic, and simplified math concepts.



Task 4: Legal Domain

- While visiting Hong Kong, Mr. Oink's dad is hit by a speeding bus.
- He's unsure of what legal steps to take as a foreigner.
- **Goal:** Prompt the LLM for legal guidance:
 - What are his rights?
 - What can he do next?
- **Challenge:** Ask the model to:
 - Summarize HK traffic laws.
 - Draft a polite email to the Pigland consulate requesting help.
- **Important:** LLMs are not lawyers. Do not rely on them for legal advice. Always consult a qualified attorney, especially when dealing with laws, rights, or legal claims.



Closing Remarks

- Unlike many other subfields of linguistics, NLP—and AI more broadly—evolves at an incredibly rapid pace.
- The syntactic or phonological theories you've studied in other courses may remain relevant for decades or even centuries.
- But much of what you've learned in this course might become outdated within just a few years—or even months!
- That's not because we haven't taught you the “right” or most cutting-edge material—we've done our best! But the field moves fast, and that's part of its excitement.
- **So I urge you: stay curious. Stay open. Stay bold. Follow the breakthroughs, question the trends, keep learning—and never stop exploring.**
- The story of AI is still being written—and you are now part of it.



Thank You!

- You guys are amazing. Give yourself a round of applause.
- Thank you all for being my students. I had a good time exploring NLP, LLMs, and AI with you all.
- To those of you graduating: I wish you nothing but the very best in whatever comes next.
- And to those who'll be around for a few more semesters: keep up the great work, and all the best on your journey ahead!



If You Happened to Take Photos...

- This is the last course I'll be TAing here at CUHK.
- If you've taken any photos of me during tutorials and are willing to share, I'd be deeply grateful if you could send them to me at the end of the term.



Feel Free to Connect

- Once the term ends and I'm no longer your TA, you're welcome to connect with me on social media.
- Please note, however, that I will not engage in any conversations about the course on platforms like Instagram or WeChat. I prefer that all communications regarding course matters be conducted via official CUHK emails.

And Please Keep in Touch!



- I'd love to hear from you in the future as well, like how you are doing or what life brings your way. After all, you are among the first batch of students I've ever taught.
- So please, don't be a stranger. Keep in touch!