

LING3401 Linguistics and Information Technology

Tutorial: Prompting, Agents, and Human-Computer Interaction

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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!