2. Student Handout

Prompt Engineering for Specific Applications: Student Handout

Welcome to the session on **Prompt Engineering for Specific Applications**. This guide will help you understand how to effectively design prompts for AI models across various domains, including creative tasks, coding, logic and problem-solving, and information retrieval and research.

What is Prompt Engineering?

Prompt Engineering is the process of designing and refining the input (or "prompt") given to an AI model to obtain the most accurate, useful, or creative response. The goal is to ask the right question in the right way to get the best possible answer.

Prompt Engineering for Specific Applications

1. Creative Tasks

Creative tasks involve writing stories, generating art ideas, composing music, or brainstorming new business ideas. The prompts should encourage the AI to think creatively.

Designing Prompts for Creative Tasks:

- **Be Open-Ended:** Allow the AI to explore different possibilities.
- **Provide Context:** Give the AI some background to generate more relevant responses.

Examples:

1. **Story Writing:**
    - Prompt: "Write a story about a dog who discovers a hidden talent."
    - Prompt: "Create a short story set in a futuristic Mumbai."

- Prompt: "Imagine a world where humans can communicate with trees. Write a story about it."

2. **Poetry:**
   - Prompt: "Write a poem about the beauty of the monsoon season in Kerala."
   - Prompt: "Compose a haiku about the sunrise over the Himalayas."
   - Prompt: "Write a sonnet about the changing seasons."
3. **Art Ideas:**
   - Prompt: "Describe an art piece that represents the concept of time."
   - Prompt: "Generate an idea for a painting that combines technology and nature."
   - Prompt: "Imagine a sculpture that symbolizes freedom."

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2. Coding, Logic, and Problem-Solving

For coding and problem-solving, prompts need to be structured to generate accurate and logical solutions.

Designing Prompts for Coding and Problem-Solving:

- **Be Clear and Specific:** Clearly define the task.
- **Provide Constraints:** Specify any constraints to ensure efficiency.

Examples:

1. **Coding Tasks:**
   - Prompt: "Write a Python program that calculates the factorial of a number."
   - Prompt: "Create a JavaScript function to reverse a string."
   - Prompt: "Develop a C++ program to find the greatest common divisor of two numbers."
2. **Math Problems:**
   - Prompt: "Solve the quadratic equation 2x^2 + 3x - 5 = 0 using the quadratic formula."
   - Prompt: "Calculate the area of a circle with a radius of 5 units."
   - Prompt: "Find the derivative of the function f(x) = 3x^3 + 2x^2 - x + 7."
3. **Logic Puzzles:**
   - Prompt: "Solve the Sudoku puzzle with the given initial numbers."
   - Prompt: "Determine the next number in the sequence: 2, 4, 8, 16, ..."

- Prompt: "Find the missing piece in the jigsaw puzzle."

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3. Information Retrieval and Research

Information retrieval involves asking the AI to find or summarize information from a large dataset or knowledge base.

Designing Prompts for Information Retrieval:

- **Be Specific:** Clearly state what information you need.
- **Ask for Summaries:** Request concise overviews if needed.

Examples:

1. **Research Topics:**
   - Prompt: "Summarize the impact of climate change on agriculture in India."
   - Prompt: "Provide an overview of the key events in the Indian independence movement."
   - Prompt: "Explain the significance of the Silk Road in ancient trade."
2. **Historical Information:**
   - Prompt: "Describe the role of Mahatma Gandhi in India’s independence movement."
   - Prompt: "List the major battles of World War II."
   - Prompt: "Outline the causes and effects of the Industrial Revolution."
3. **Scientific Concepts:**
   - Prompt: "Explain the theory of relativity in simple terms."
   - Prompt: "Summarize the process of photosynthesis."
   - Prompt: "Describe the structure of a DNA molecule."

Conclusion

Prompt Engineering is about crafting the right input to get the best output from an AI model. Whether working on creative tasks, coding, problem-solving, or information retrieval, the key is to be clear, specific, and sometimes open-ended, depending on the task.

Key Takeaways:

1. **Creative Tasks:** Use open-ended prompts with context to encourage creativity.
2. **Coding and Problem-Solving:** Be clear, specific, and provide constraints for accurate solutions.
3. **Information Retrieval:** Be specific and focused to get relevant and concise information.

By mastering prompt engineering, you can unlock the full potential of AI in various domains.