

# AI Prompt Engineering

This course is designed to equip learners with the skills needed to effectively use AI language models, a rapidly emerging and increasingly prevalent technology. We will focus on the art and science of "prompt engineering" - crafting precise instructions that guide AI responses. Understanding how to communicate with AI is becoming an important aspect of digital competency, and developing this skill will help students in school and at work. In this course, students will learn techniques for formulating clear and specific prompts, common pitfalls in prompt design, iterative prompt refinement, and ethical considerations in using AI.

## 1. Introduction to AI and Language Models

- Definitions and concepts: What is AI? Artificial intelligence (AI) is a branch of computer science that deals with the creation of "intelligent agents". These agents are systems that have the ability to reason, learn, and make decisions on their own. AI has found its way into a host of applications, including natural language processing (NLP), computer vision, and robotics.
- What are language models like GPT-4? A language model is a statistical model that predicts the next word in a sequence. It works similarly to the predictive text in your smartphone, only much more powerful. Language models are key players in many NLP tasks, such as machine translation, speech recognition, and text summarization.
- What is ChatGPT? A highly advanced chatbot built on GPT-3 and GPT-4. You can ask it questions, and it will answer like a human.
- Overview of prompt engineering: Understanding the importance and purpose of prompt engineering. Prompt engineering is the process of designing and optimizing prompts for language models. Prompts are instructions that tell the language model what to do. For example, a prompt for a machine translation task might be "Translate this sentence from English to French."

## 2. Prompt Engineering Basics

- <https://hackernoon.com/prompt-engineering-101-i-unveiling-principles-and-techniques-of-effective-prompt-crafting>
- Prompt design: The goal of prompt design is to create prompts that are clear, concise, and informative. The prompt should be specific enough to guide the language model to the desired output, but not so specific that it limits the language model's creativity. Effective prompt engineering involves creating prompts that guide the AI in providing the desired response. This requires an understanding of how the model works and what kind of prompts it responds best to. Here are a few examples:
  - 1. Setting the tone and style: If you want the AI to respond in a certain way, you can specify it in your prompt. For example, if you want a response in the style of Shakespeare, you might write: "Write a short paragraph about the sunrise in the style of William Shakespeare."
  - 2. Providing clear instructions: The AI can follow complex instructions, but they need to be clear and direct. For example, if you want a list of five ideas for a vegetarian dinner, you might prompt: "Please provide a list of five unique dinner ideas suitable for vegetarians."
  - 3. Guiding the format: If you want the response in a specific format, specify it in your prompt. For example, to generate a poem about spring, you might prompt: "Compose a four-stanza poem about the arrival of spring, with each stanza containing five lines."
  - 4. Leveraging system messages: A system message is a way to set the AI's behavior without it appearing in the user-facing text. It can be used to instruct the AI on tone, style, verbosity, etc. For example, a system message could be: "You are ChatGPT, a language model developed by OpenAI. You should respond to user prompts in a helpful, informative, and friendly manner."
- Prompt clarity and specificity: Emphasize the need for clear and precise prompts. The AI model should understand exactly what you want it to do.

Specificity is important in prompt design because it helps to ensure that the language model produces the desired output. A prompt that is too vague will likely result in a response that is not relevant or accurate.

- Brevity in prompts: While AI doesn't have a concept of "time," being concise is important to ensure the AI's responses fit within its maximum token limit.
- Creativity in prompts: Encourage the use of creative prompts to stimulate interesting and original output from the model.
- Iterating and refining: The process of prompt engineering is iterative. This means that the prompt is designed, tested, and refined until the desired output is achieved. It is important to be patient and persistent when working with language models, as it may take some time to find the right prompt.

### **3. Advanced Prompt Techniques**

- Conditioning the model: Conditioning the model is a technique that can be used to set the tone, style, and context for the output. For example, a prompt that is conditioned on a specific genre of writing will likely produce output that is consistent with that genre.
- Prompt diversity: Using varied prompts to encourage diverse output.
- Introduction to model hyperparameters: Explanation of concepts like temperature and top-k which influence the model's output.
- Techniques for adding randomness: Discuss how adjusting hyperparameters can add an element of unpredictability to AI responses, preventing repetitive outputs.

### **4. Avoiding Common Pitfalls**

- Avoiding overly complicated instructions: While the model can handle complex instructions, ensuring clarity and precision is important for best results.

- Jargon: While the model understands a range of jargon, its use can sometimes lead to misunderstandings if not used correctly or without sufficient context.
- The impact of language tone: Understanding how the language tone of a prompt (positive or negative) can affect the output.

## **5. Tips for Success in Prompt Engineering**

- Encouragement to experiment: Highlight the importance of trial and error in prompt engineering. Encourage trying different prompts and learning from the results.
- Continued emphasis on creativity: Stress the role of creativity in generating compelling and useful output.
- Patience and practice: Reiterate that it takes time and practice to develop effective prompt writing skills.

## **6. Hands-On Practice**

- Group work: Participants can work in groups to try out prompt engineering and share results. This is a great way to learn from each other and to get feedback on your work.
- Case studies: Participants can review and critique prompt examples. This is a great way to learn about the different techniques that can be used in prompt engineering.
- Troubleshooting session: Participants can work through a troubleshooting session to overcome challenges in prompt engineering. This is a great way to learn how to deal with problems that may arise when working with language models.

## **7. Future of Prompt Engineering**

- Potential developments in AI and their implications for prompt engineering.
  - Discuss the role of prompt engineering in shaping AI's societal impact.
- Prompt engineering is a rapidly evolving field. As language models become more powerful, prompt engineering will become increasingly important.

Prompt engineers will be responsible for designing prompts that can harness the power of language models to generate creative and informative output.