

268. PROMPT ENGINEERING: THE ART OF EFFECTIVE AI INTERACTION

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Prompt engineering as a fundamental aspect of effective interaction with artificial intelligence systems is described in this paper. Key techniques and principles of constructing effective prompts are observed. Key advantages of prompt engineering are listed.

The emergence of artificial intelligence (AI) and the rapid advancement of large language models have drastically changed the nature of human-machine communication. Powerful AI systems - including ChatGPT, Gemini, DeepSeek, and similar platforms - now demonstrate exceptional abilities in text generation, problem-solving, code writing, and creative content production across multiple domains. Nevertheless, the effectiveness of these systems is directly tied to the quality of user input. The discipline responsible for optimizing this interaction - prompt engineering - has established itself as an essential and increasingly rapidly developing competency in the modern AI landscape [1].

OpenAI defines prompt engineering as the practice of crafting precise instructions that consistently lead a model to produce the desired output. Since AI-generated responses are inherently non-deterministic, achieving reliable results requires both technical understanding and creative intuition [2]. This distinguishes AI interaction from conventional programming: rather than executing fixed commands, language models respond to context, phrasing, and structure. A thoughtfully constructed prompt equips the model with the necessary context, clear objectives, and defined boundaries, resulting in responses that are accurate, relevant, and practically useful. In this sense, the prompt itself becomes a primary instrument of communication between the user and the model.

Understanding why prompt design matters requires a basic grasp of how language models function. These systems are built on enormous text datasets and operate by predicting probable word sequences based on learned statistical patterns [3]. Consequently, even minor changes in wording or structure can produce substantially different outputs, making deliberate prompt construction a critical skill. This sensitivity to input variation is what makes prompt engineering both a technical discipline and a practical art.

Contemporary prompt engineering has grown into a rich field with numerous specialized methodologies, ranging from basic task instructions to sophisticated multi-step reasoning and tool-assisted workflows. Among the recognized approaches are: Zero-shot Prompting, Few-shot Prompting, Chain-of-Thought Prompting, Self-Consistency, Prompt Chaining, Tree of Thoughts, Retrieval Augmented Generation, and several others.

Zero-shot prompting is the most fundamental approach - models handle a wide variety of tasks without any accompanying examples, relying solely on their training. When this proves insufficient, few-shot prompting embeds representative input-output examples directly into the prompt, exploiting the model's capacity for in-context learning. However, even this technique reaches its limits when tasks demand genuine logical reasoning.

Chain-of-Thought (CoT) prompting addresses these reasoning limitations by guiding the model through explicit intermediate steps, producing more reliable answers for tasks involving arithmetic, inference, or multi-stage logic. Its simpler variant - Zero-shot CoT - requires nothing more than appending "Let's think step by step" to the prompt, consistently enhancing reasoning performance. This makes Chain-of-Thought one of the most accessible yet impactful techniques available to practitioners today.

Prompt Chaining tackles complex tasks by breaking them down into a sequence of subtasks, where the output of each prompt becomes the input for the next. This pipeline approach is particularly effective when a single large prompt would overwhelm the model's reasoning capacity. Beyond improving output quality, it enhances the transparency and reliability of large language model-based applications, as each step can be individually monitored and refined [4].

To summarize, prompt engineering is a dynamic and growing field that serves as the critical link between human goals and AI capabilities. Mastering its foundational techniques equips users to extract significantly more accurate and useful responses from AI systems across diverse professional and creative contexts. As artificial intelligence continues to evolve and integrate into everyday workflows, the importance of effective prompt design will only increase.

References:

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