

What Is Prompt Engineering? Definition and best practices

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Prompt engineering is designing high-quality prompts that guide machine learning models to produce accurate outputs. It involves choosing the correct type of prompts, optimizing their length and structure, and determining their order and relevance to the task.

Prompt engineering is highly valuable for individuals in various roles, including [data scientists](#), marketers, educators, journalists, writers, business leaders, and entrepreneurs. This blog will introduce prompts and their types, and offer best practices to produce high-quality prompts with precise and useful outputs.

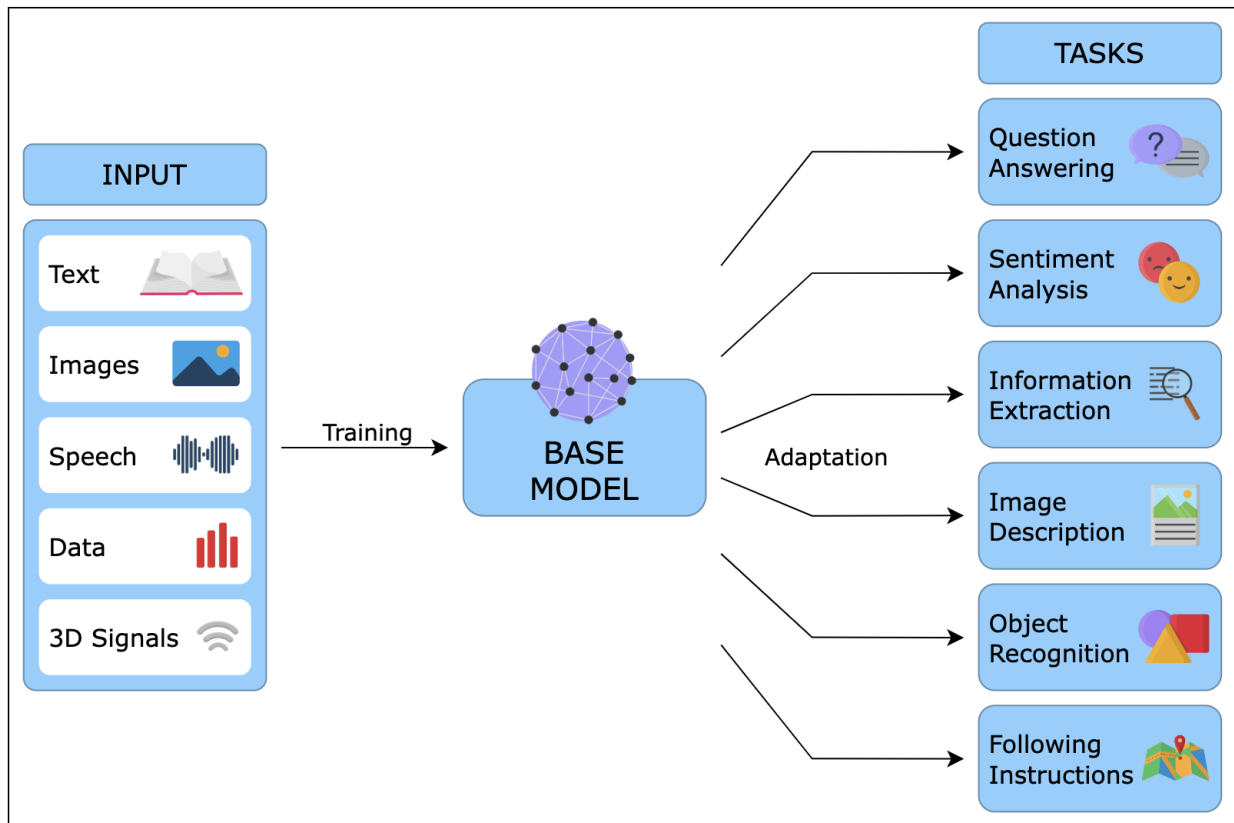


Before digging deeper, let's first discuss the concept of generative AI.

Generative AI

Generative AI is a type of an [artificial intelligence](#) technology that can generate various content types, including text, images, audio, videos, and synthetic data. Unlike other types of AI that rely on pre-existing data to make decisions, generative AI learns patterns and relationships in the input data, and uses those to generate new and unique

output data.



Various tasks that generative AI models can perform

Large language models (LLMs)

Large language models (LLMs) are machine learning models that can generate natural language text with impressive quality and fluency. They are trained on massive text datasets using deep neural network architectures such as transformers, and can learn to predict the probability distribution of words in a text sequence.

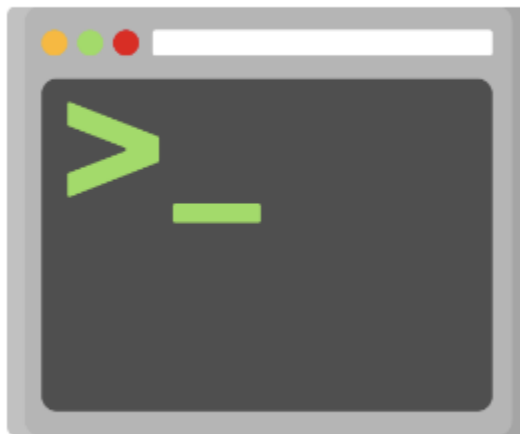
ChatGPT

ChatGPT is an example of an LLM created by OpenAI. It is based on the GPT architecture and can generate human-like responses to various prompts, including text-based prompts, questions, and commands. [ChatGPT](#) is designed to be a conversational AI that can engage in dialogue with users on various topics and is commonly used in chatbots, virtual assistants, and other natural language processing applications.



What is prompt engineering?

A **prompt** is a stimulus or cue to elicit a particular response or action. Prompts can take many forms, such as verbal or written instructions, visual cues, or physical gestures. In the context of natural language processing and LLMs, a prompt is an input provided to the model to generate a response or prediction.



The prompt can take various forms, such as a sentence, a question, a paragraph, or an instruction. The following are a few examples of prompts used for LLMs:

- What is the capital city of the United States of America?
- List the top five most played sports.
- Explain the difference between “affect” and “effect.”

Types of prompts

Prompts can be used to achieve various kinds of tasks. Understanding how to write prompts to attain the desired result effectively is essential. Prompts are useful in the following tasks, including but not limited to:

1. Text summarization
 2. Information extraction
 3. Question and answer systems
 4. Text classification
 5. Translation
 6. Code generation
 7. Reasoning
-

Now, let's explore the specifics of the best practices regarding crafting prompts.

Best practices

Best practices are established methods or techniques recognized as the most effective and efficient ways to achieve a particular goal or outcome. Examples of best practices can include procedures, protocols, guidelines, and methodologies that have successfully achieved specific goals or objectives. They are widely accepted as the most effective way of doing things and are essential for achieving optimal results.



The principles of prompt engineering

Let's look at a few principles of prompt engineering with examples since they provide useful guidelines for creating effective prompts that ensure accurate results.

Simplicity

Simplicity is an essential factor to consider when crafting prompts for natural language processing models. The prompts should be concise, clear, and easy to understand for both the model and the end user. Using overly complex language or providing unnecessary information can confuse the model and lead to inaccurate results.

For example, the following prompt may be too wordy and convoluted for the model to accurately understand and generate the desired output.



Considering the input factors of the user's geolocation, flavored food preferences, and budgetary restrictions, please generate a list of restaurant recommendations for the individual in question.

In contrast, the following prompt is simple and contains only the necessary information to guide the model toward the desired output:



Using the following parameters, generate a list of recommended restaurants based on the user's location, cuisine preference, and price range.

Specificity

Specificity is an essential aspect of prompt engineering in natural language processing since it ensures that the generated output is relevant and accurate. When crafting prompts, it is crucial to be specific about the desired output, task, or objective. Generic prompts may not guide the model enough to generate accurate results.

For example, the following prompt is too general and could result in a wide range of output descriptions that may not be relevant to the user's needs.



Generate a description of a dog.

However, consider a more specific prompt that provides clear guidance to the model and helps ensure the generated output is relevant and accurate.



Generate a description of a golden retriever with a curly tail, a friendly personality, and who loves to play fetch.

By providing specific details in the prompt, we can help the model to focus on the relevant aspects of the task and improve the accuracy of its results.

Essential prompt keywords

Essential prompt keywords are specific words or phrases that convey the intended meaning and guide the natural language processing model toward generating the desired output. Including relevant keywords in prompts ensures the model understands the task or objective and produces accurate results.

For example, consider a prompt like “*Summarize the main points of a news article about climate change.*” In this prompt, the essential keywords are “*summarize,*” “*news article,*” and “*climate change.*” These keywords guide the model on what task to perform, what type of input data to expect, and what topic to focus on.

Other examples of essential prompt keywords include verbs that specify the desired action, such as “generate,” “classify,” or “translate,” as well as specific nouns that

describe the input data, such as “image,” “text,” or “audio.” Including essential prompt keywords helps to ensure that the natural language processing model produces accurate and relevant results that meet the user's needs. Here's the list you need to get familiar with:

Generate	Summarize	Translate	Classify	Identify
Describe	Predict	Recommend	Analyze	Evaluate
Compare	Contrast	List	Define	Explain
Extract	Find	Measure	Rank	Select
Sort	Retrieve	Categorize	Recognize	Organize

A list of keywords for effective prompting

What can go wrong while prompting?

Various factors can influence the accuracy and relevance of results generated by natural language processing models. Here are a few examples:

Ambiguity

Write about the benefits of using social media.

Bias

Prove that climate change is a hoax.

Insufficient context

What is the best restaurant in town?

Too specific

Write a story about a girl named Sarah who goes on a picnic.

Limitations

LLMs are incredibly powerful tools for generating text that is often indistinguishable from human writing. However, despite their impressive capabilities, these models have certain limitations. A few of them are detailed in the following paragraphs.

Citing references

Citing references is a crucial aspect of many types of writing, including academic and scientific publications. However, LLMs can sometimes fail to provide proper attribution, leading to issues with accuracy and credibility. For example, a language model may generate the following sentence:



According to recent research, a new treatment for cancer has been discovered that has a 100% success rate.

Solving math problems

Solving math problems is another area where large language models can fall short. While these models are excellent at generating text, they are not designed to handle complex mathematical equations or operations. For example, an LLM might not be able to generate an accurate answer if it's asked to solve the following equation:

$$2x + 3 = 7$$



Hallucination

LLMs can sometimes generate outputs that are not grounded in reality. Hallucination can occur when the model generates text based on incomplete or incorrect information. For example, a model may generate the following sentence:



The ground is made up from clouds.

In conclusion, while LLMs are impressive and powerful tools, it's essential to be aware of their limitations. Careful consideration and appropriate use of these models can help mitigate these limitations and maximize their potential benefits.
