

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is a light green color. They are positioned diagonally, with the blue one partially covering the green one.

Basics of Prompt Engineering

Using Generative AI to create content



What is Prompt Engineering

- Prompt engineering is a relatively new discipline for developing and optimizing prompts to efficiently use language models (LMs) for a wide variety of applications and research topics.
- Prompt engineering skills help to better understand the capabilities and limitations of large language models (LLMs).
- Researchers use prompt engineering to improve the capacity of LLMs on a wide range of common and complex tasks such as question answering and arithmetic reasoning.
- Developers use prompt engineering to design robust and effective prompting techniques that interface with LLMs and other tools.



Text Summarization

- One of the standard tasks in natural language generation is text summarization.
- Text summarization can include many different flavors and domains.
- One of the most promising applications of language models is the ability to summarize articles and concepts into quick and easy-to-read summaries.
- Let's try a basic summarization task using prompts.



Example 1:

Prompt:

Explain antibiotics

A:

Output:

Antibiotics are a type of medication used to treat bacterial infections. They work by either killing the bacteria or preventing them from reproducing, allowing the body's immune system to fight off the infection. Antibiotics are usually taken orally in the form of pills, capsules, or liquid solutions, or sometimes administered intravenously. They are not effective against viral infections, and using them inappropriately can lead to antibiotic resistance.



Explanation

- The "A:" is an explicit prompt format that's used in question answering.
- Used to tell the model that there is an expected answer
- Let's just assume that this is too much information and want to summarize it further. We can instruct the model to summarize into one sentence like so:



Example 2:

Prompt:

Antibiotics are a type of medication used to treat bacterial infections. They work by either killing the bacteria or preventing them from reproducing, allowing the body's immune system to fight off the infection. Antibiotics are usually taken orally in the form of pills, capsules, or liquid solutions, or sometimes administered intravenously. They are not effective against viral infections, and using them inappropriately can lead to antibiotic resistance.

Explain the above in one sentence:



...Output

Output:

Antibiotics are medications used to treat bacterial infections by either killing the bacteria or stopping them from reproducing, but they are not effective against viruses and overuse can lead to antibiotic resistance.



Information Extraction

- While language models are trained to perform natural language generation and related tasks, it's also very capable of performing classification and a range of other natural language processing (NLP) tasks.
- Here is an example of a prompt that extracts information from a given paragraph.



Example:

Prompt:

Author-contribution statements and acknowledgements in research papers should state clearly and specifically whether, and to what extent, the authors used AI technologies such as ChatGPT in the preparation of their manuscript and analysis. They should also indicate which LLMs were used. This will alert editors and reviewers to scrutinize manuscripts more carefully for potential biases, inaccuracies and improper source crediting. Likewise, scientific journals should be transparent about their use of LLMs, for example when selecting submitted manuscripts.

Mention the large language model based product mentioned in the paragraph above:



Output

Output:

The large language model based product mentioned in the paragraph above is ChatGPT.

There are many ways we can improve the results above, but this is already very useful.



Question Answering

- One of the best ways to get the model to respond to specific answers is to improve the format of the prompt.
- A prompt could combine instructions, context, input, and output indicators to get improved results.
- While these components are not required, it becomes a good practice as the more specific you are with instruction, the better results you will get.
- Next is an example of how this would look following a more structured prompt.



Example:

Prompt:

Answer the question based on the context below. Keep the answer short.
Respond "Unsure about answer" if not sure about the answer.

Context: Teplizumab traces its roots to a New Jersey drug company called Ortho Pharmaceutical. There, scientists generated an early version of the antibody, dubbed OKT3. Originally sourced from mice, the molecule was able to bind to the surface of T cells and limit their cell-killing potential. In 1986, it was approved to help prevent organ rejection after kidney transplants, making it the first therapeutic antibody allowed for human use.

Question: What was OKT3 originally sourced from?

Answer:



Output

Output:

Mice.

Context obtained from Nature.



Code Generation

One application where LLMs are quite effective is code generation. Copilot is a great example of this. There are a vast number of code-generation tasks you can perform with clever prompts. Let's look at a few examples below.

First, let's try a simple program that greets the user.



Example:

Prompt:

```
/*
```

```
Ask the user for their name and say "Hello"
```

```
*/
```



Output

Output:

```
let name = prompt("What is your name?");  
  
console.log(`Hello, ${name}!`);
```

You can see that we didn't even need to specify the language to use.