

Prompt Engineering 1

Tokenization and Data Utilization

Interaction 1:

Prompt (Unguided):

"Explain how tokenizers work in AI language models and give examples of word, subword, and character tokenization."

AI Response:

Tokenizers are tools that break down text into smaller units, or 'tokens,' which are then used by language models to process and understand language. There are several types:

- **Word Tokenizers:** Split text by spaces and punctuation. Example: 'The cat sleeps' → ['The', 'cat', 'sleeps'].
- **Subword Tokenizers:** Break words into smaller units based on frequency patterns. Example: 'unhappiness' → ['un', 'happi', 'ness'].
- **Character Tokenizers:** Treat each character as a token. Example: 'cat' → ['c', 'a', 't'].

These methods allow the AI to handle unknown words, reduce vocabulary size, and improve efficiency.

Result:

The AI correctly explained token types and provided clear examples.

Interaction 2:

Prompt (Guided):

"Generate a short example showing how a sentence embedding might represent two similar sentences numerically."

AI Response:

"Consider the sentences: 'The cat is sleeping.' and 'A cat is napping.'

A sentence embedding might convert these sentences into numerical vectors:

- 'The cat is sleeping.' → [0.12, 0.44, 0.33, 0.87]
- 'A cat is napping.' → [0.11, 0.42, 0.31, 0.85]

Notice how similar sentences produce vectors with close values. Cosine similarity can then quantify their closeness, e.g., $\text{cos_sim} = 0.98$.

Result:

This guided prompt allowed me to see how embeddings help AI measure semantic similarity.

AI Hallucination Management

Finding Hallucinations:

Prompt:

“List all of the main components of a PC.”

AI Response:

Here are the main components of a typical desktop computer:

- Central Processing Unit (CPU)
- Graphics Processing Unit (GPU)
- Motherboard
- Random Access Memory (RAM)
- Power Supply Unit (PSU)
- Hard Drive or Solid State Drive (HDD/SSD)
- TV
- Cooling System (Fans or Liquid Cooling)

Result:

The AI gave one hallucinated item: “TV”

Even though it kind of makes sense, it’s not a standard component of a PC.

Finding Hallucinations:

Follow-Up Prompt:

"Please double-check the list and remove anything that's not an actual PC component."

Corrected AI Response:

Here is the revised list of main desktop computer components:

- Central Processing Unit (CPU)
- Graphics Processing Unit (GPU)
- Motherboard
- Random Access Memory (RAM)
- Power Supply Unit (PSU)
- Storage Device (HDD or SSD)
- Cooling System (fans or liquid cooling)
- Monitor
- Keyboard and Mouse (external peripherals)

Result:

When told to correct its answer, the AI removed "TV" from the list I asked for.

Multimodal AI Task Execution

Task 1 - Programming:

Prompt:

"Write a Python function that can find the factorial of a number recursively and handle any edge cases."

AI Response:

```
def factorial(n):  
  
    if not isinstance(n, int) or n < 0:  
  
        return "Input must be a non-negative integer."  
  
    if n == 0 or n == 1:  
  
        return 1  
  
    return n * factorial(n-1)
```

Result:

The AI was able to output working code that did what I asked. I tested it with factorial(5) which gave me 120 and factorial(-1) which gave me: "Input must be a non-negative integer."

Task 2 - Data Analysis:

Prompt:

"You are given a dataset of student scores. Find the mean, median, and standard deviation using Python data analysis."

AI Response:

```
import numpy as np

scores = [85, 92, 78, 90, 88]
```

```
mean_score = np.mean(scores)

median_score = np.median(scores)

std_dev = np.std(scores)

mean_score, median_score, std_dev
```

Result:

The AI correctly performed data analysis with Python. The answers were: mean=86.6, median=88, and standard deviation=4.882622246293481.

Prompt Design and Iteration

Prompt 1 (Unguided):

Write a short story about someone discovering something unexpected in their backyard.

AI Response:

One morning, Jamie stepped into the backyard and noticed a patch of soil that looked freshly turned. Curious, they grabbed a small shovel and dug gently. Beneath the dirt lay an old wooden box covered in rusted hinges. Inside were faded letters tied with a red ribbon. They were love letters, written decades ago by a stranger who once lived in the same house. Jamie sat in the grass, reading them all, feeling a strange connection to the past.

Result:

The unguided prompt produced a creative idea but it had limited development. It lacked character motivation and conflict.

Prompt 2 (Guided):

Write a 200-word story about a teenager who discovers something unusual buried in their backyard. Make sure there is a clear conflict and resolution, and show how the discovery changes their perspective.

AI Response:

Sixteen-year-old Maya was supposed to mow the lawn, but instead she stared at the uneven mound near the fence. It looked too deliberate to be random. Grabbing a small trowel, she started digging. A few inches down, her shovel hit metal. She pulled out a rusted tin box sealed shut with tape that had long since peeled away. Inside were old photographs of her neighborhood—except the streets looked empty, and every house was half-built.

There was one photo that made her pause: her backyard, but decades earlier, with a girl her age standing exactly where she was now, smiling and holding the same box.

That night, Maya showed the photos to her parents, who revealed that their home had been rebuilt after a fire. The girl in the photo was the original owner's daughter. For the first time, Maya felt connected to something larger than herself. The box wasn't just old metal—it was a reminder that stories don't end; they continue with whoever finds them next.

Result:

This guided second prompt added emotional depth and a clear arc.

Prompt 3 (Guided):

Rewrite the previous story but from the perspective of the girl in the old photograph. Emphasize how she feels as she buries the box for someone in the future to find.

AI Response:

The box was heavier than I expected. My hands trembled as I lowered it into the hole beside the fence. The sky behind our half-built house was a deep orange, glowing through the smoke of a distant fire. I tucked the photographs inside carefully—our neighborhood, our laughter, the life we were trying to rebuild. I wanted someone to know we were here, that we lived and dreamed in this place.

As I covered the box with dirt, I whispered, 'Find this when it's safe again.' I didn't know who would hear me, or when. But I hoped that someday, someone would stand here and see what we saw. Maybe they'd understand that even after everything burned, we left behind proof that hope doesn't vanish—it just waits to be found.

Result:

The AI rewriting from a new perspective was able to bring more emotional richness and depth.

Text and Image Generation Workflow

Text Generation Instance 1:

Prompt:

"Give me a motivational quote about learning from mistakes in the context of a classroom."

AI Response:

"Mistakes are not failures; they are stepping stones on the path to knowledge. Embrace them, and you will grow wiser every day."

Text Generation Instance 2:

Prompt:

"Write a short email to a teacher asking for clarification on an assignment."

AI Response:

Subject: Question About Assignment

Dear [Teacher Name],

I hope you are doing well. I had a question regarding the recent assignment on prompt engineering. Could you clarify the requirements for the image generation section? Thank you for your time.

Best regards,

Student Name

Image Generation Instance 1:

Prompt:

Create an illustration of a futuristic classroom where robots and students learn together.

AI Response:



Image Generation Instance 2:

Prompt:

Visualize a library in the clouds with floating books and reading pods.

AI Response:

