Prompt Engineering Techniques

1. Few-Shot Prompting – Giving Examples to Set Patterns

What is Few-Shot Prompting?

Few-Shot Prompting is a technique where we provide **a few examples** to the AI before asking it to perform a task.

These examples help the AI understand the **pattern, tone, style, and expected output**.

Instead of only telling AI what to do, we **show it how to do it**.

How Few-Shot Prompting Works

The prompt usually contains:

- Example Inputs
- Example Outputs
- New Input for AI to solve

Example Without Few-Shot Prompting

Prompt:
Convert the sentence into a positive sentiment.
"I hate rainy days.“

AI output may vary and may not follow consistent structure.

Example With Few-Shot Prompting

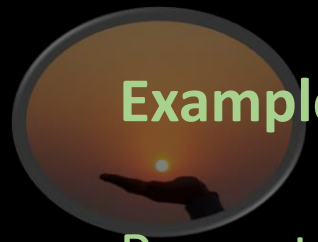
Prompt:
Convert sentences into positive sentiment.

Example 1:
Input: I hate waking up early.
Output: Waking up early helps me stay productive.

Example 2:
Input: I dislike traffic.
Output: Traveling gives me time to listen to music.

Now convert:
Input: I hate rainy days.
Output:

AI is now more likely to follow the pattern.



Example With Few-Shot Prompting

Prompt: "Categorize the sentiment of customer reviews based on the examples below.

Review: The interface is confusing and slow.
Sentiment: Negative

Review: I absolutely love the new design, it's so sleek!
Sentiment: Positive

Review: It arrived on time and works as expected.
Sentiment: Neutral

Review: The battery life is terrible.
Sentiment:"

Why Few-Shot Prompting is Important

AI models learn patterns very effectively. When we provide examples:

- AI understands formatting better: AI adapts to specific styles or formats
- AI maintains consistency and produces more accurate responses

2. Chain-of-Thought (CoT) Prompting – Making AI Show Its Reasoning

What is Chain-of-Thought Prompting?

Chain-of-Thought Prompting is a technique where we ask AI to **explain its reasoning step-by-step** before giving the final answer.

This method improves accuracy, especially in:

- Logical problems: Coding
- Mathematical calculations
- Complex reasoning tasks
- Decision making and Data analysis

Example Without Chain-of-Thought

Prompt:
If a train travels 60 km in 1 hour, how far will it travel in 3 hours?

AI may directly give the answer:
180 km

Example With Chain-of-Thought

Prompt:

Solve the problem **step-by-step.**

If a train travels 60 km in 1 hour, how far will it travel in 3 hours?

AI Output:

Step 1: Distance covered in 1 hour = 60 km

Step 2: Total time = 3 hours

Step 3: Total distance = 60 × 3

Final Answer: 180 km

Example With Chain-of-Thought

Without COT Prompt:

"I have 10 apples. I give 2 to a neighbor and 2 to a repairman. Then I buy 5 more and eat 1. How many do I have left?“

Typical AI Response: "You have 11 apples." (Incorrect; often occurs when models skip steps)

Example With Chain-of-Thought

With COT Prompt:

"I have 10 apples. I give 2 to a neighbor and 2 to a repairman. Then I buy 5 more and eat 1. How many do I have left? **Let's think step by step.**"

Typical AI Response:
Step1: You started with 10 apples.
Step2: You gave away 2 to the neighbor and 2 to the repairman (10 - 4 = 6 apples left).
Step3: You bought 5 more (6 + 5 = 11 apples).
Step4: You ate 1 (11 - 1 = 10 apples).

Final Answer: 10 apples.

Powerful CoT Keywords

You can force reasoning by adding phrases such as:

- “Explain step-by-step”
- “Show your reasoning”
- “Break the solution into steps”
- “Think through the problem logically”

Why Chain-of-Thought Prompting is Important

Normally, AI may jump directly to an answer. When we ask AI to show steps:

- Errors reduce significantly
- Reasoning becomes transparent and Output becomes more reliable
- Complex tasks become easier

3. Role Prompting – Assigning AI a Professional Identity

What is Role Prompting?

Role Prompting is a technique where we assign AI a **specific role, profession, or expertise level** before asking it to perform a task.

Example:

Act as a Senior Software Developer.

Example Without Role Prompting

Prompt:
Explain API security.

Output may be generic or basic.

Example With Role Prompting

Prompt:
Act as a Cybersecurity Expert. Explain API security risks and best practices.

Output will be more professional and detailed.

Common Roles Used in Prompt Engineering

- Senior Software Developer
- Data Scientist
- Medical Professional
- Financial Advisor
- Teacher or Trainer
- Business Consultant
- Research Analyst

Combining All Three Techniques: These techniques can be used together for best results.

Bad Prompt:

A customer buys a laptop for $1,200. There is a 15% discount, but a 7% sales tax is applied to the final discounted price. How much is the final total?

Combining All Three Techniques: These techniques can be used together for best results.

Good Prompt:

Role Prompt: Act as a Senior Tax Accountant with 20 years of experience in retail finance.
Few-Shot Examples (Pattern Consistency):
Scenario A: Buy a $100 shirt, 10% discount, 5% tax.

Reasoning: Discount is $100 * 0.10 = $10. Subtotal is $90. Tax is $90 * 0.05 = $4.50. Total is $94.50. 1.2.7

Scenario B: Buy a $50 book, 20% discount, 10% tax.

Reasoning: Discount is $50 * 0.20 = $10. Subtotal is $40. Tax is $40 * 0.10 = $4. Total is $44. 1.1.4

Task: Now, calculate the final total for a customer buying a laptop for $1,200 with a 15% discount and 7% sales tax.
Chain-of-Thought Instruction: Please **think step-by-step**, breaking down each calculation clearly before stating the final answer.

Combining All Three Techniques: These techniques can be used together for best results.

Example Combined Prompt

Act as a Senior Data Scientist.

Below are examples of sentiment classification:

Example 1:
Text: I love this product.
Sentiment: Positive

Example 2:
Text: This service is terrible.
Sentiment: Negative

Now classify the following text step-by-step:
Text: The experience was okay but could improve.