

AI+ Prompt Engineer

Hands on

Title: Introduction to Artificial Intelligence

Objective:

This module introduces learners to the fundamental concepts of Artificial Intelligence (AI) and prompt engineering. By the end of this session, participants will:

- Understand core AI concepts.
- Recognize the significance of prompt engineering in AI applications.
- Learn strategies for designing and optimizing prompts to improve AI performance and user interaction.

Problem Statement:

Write and test AI prompts using an AI model (e.g., GPT-4).

Tools Used:

1. AI GPT Tools: [ChatGPT - Prompt Engineer \(Premium\)](#)



Prompt Engineer (Premium)

Usage:

- Create high-quality AI prompts optimized for deep, strategic, and original responses.
- Test and refine prompts using structured iteration to maximize AI performance.

- Ensure prompts push AI beyond defaults for intelligent, insightful outputs.

Why to use:

- It crafts high-level, optimized prompts that push AI to think deeper.
- It eliminates generic, surface-level outputs for maximum originality.
- It refines prompts through structured iteration for the best AI performance.

When to use:

- When you need AI-generated content that is strategic, intelligent, and non-repetitive.
- When testing and improving prompts for business, marketing, creativity, or automation.
- When ensuring AI responses are high-value, well-structured, and deeply insightful.

Steps to be Followed:

Step 1: Setting Up the AI Model for Prompt Testing

Step 2: Writing Basic Prompts

Step 3: Experimenting with Prompt Optimization

Step 4: Testing Advanced Prompt Engineering Strategies

Step 5: Interactive Dashboard for Analyzing AI Responses

Step 6: Refining and Applying Learnings

Steps in Detail:

Step 1: Setting Up the AI Model for Prompt Testing

Sample prompt:

Generate a synthetic dataset with 300 records to analyze AI-generated responses based on different prompt structures and AI models. The dataset should include various prompt styles, response qualities, and AI-generated outputs.

Sample output:

Synthetic AI Prompt Dataset				<div>⬇️ ↶</div>
	Prompt ID	Prompt Type	AI Model Used	Input Prompt
1	PRM001	Instruction-Based	Gemini	Example prompt: Describe AI in simple terms
2	PRM002	Role-Based	Mistral	Example prompt: Describe AI in simple terms
				Example prompt

Dataset Summary

- **Total Records:** 300
 - **Columns:** 10
 - **Data Types:** Mix of text, categorical, and timestamp data
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Key Features

1. **Prompt ID** – Unique identifier for each prompt.
2. **Prompt Type** – Type of prompt (Role-Based, Instruction-Based, etc.).
3. **AI Model Used** – The AI model that generated the response (GPT-4, GPT-3.5, etc.).
4. **Input Prompt** – The user-generated prompt tested on the AI model.
5. **AI Response** – The corresponding AI-generated response.
6. **Response Length** – Categorized as Short, Medium, or Long.
7. **Response Clarity** – The quality of the AI's response (High, Medium, Low).
8. **Tone & Style** – The style of the AI-generated response (Formal, Casual, etc.).
9. **Factual Accuracy** – Accuracy of the AI response (Accurate, Partially Accurate, Inaccurate).
10. **Timestamp** – Time at which the AI response was generated.

Step 2: Writing Basic Prompts

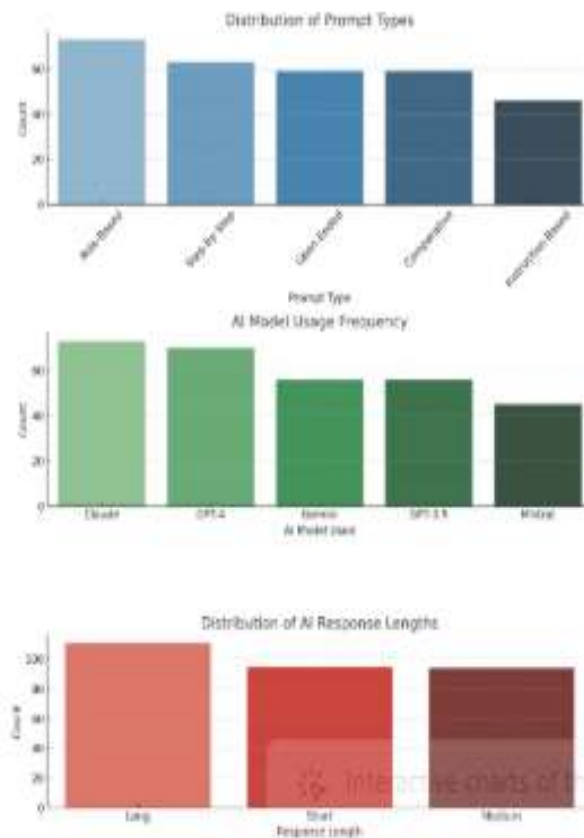
Sample prompt:

What is artificial intelligence? Explain artificial intelligence in two sentences using simple language and share it here in visualization format with the dataset

Sample output:

Synthetic AI Prompt Dataset					↓ ↗
	Prompt ID	Prompt Type	AI Model Used	Input Prompt	^
1	PRM001	Instruction-Based	Gemini	Example prompt: Describe AI in simple terms	
2	PRM002	Role-Based	Mistral	Example prompt: Describe AI in simple terms	
				Example prompt	↕

Distribution Of AI Response Lengths



Here are additional visualizations for a better understanding of the dataset:

1. **Distribution of Prompt Types** – Shows the frequency of different prompt types used.
2. **AI Model Usage Frequency** – Displays how often each AI model was used in the dataset.
3. **Distribution of AI Response Lengths** – Illustrates the proportion of short, medium, and long responses.

Step 3: Experimenting with Prompt Optimization

Sample prompt:

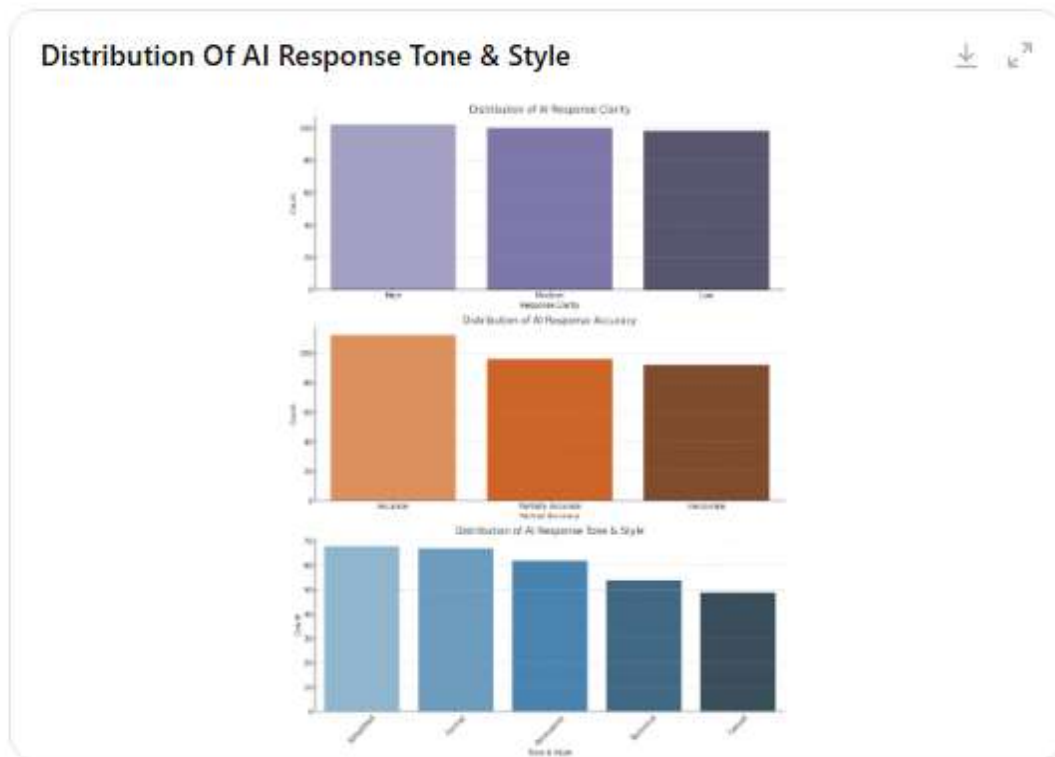
Explain artificial intelligence as if you are teaching a 10-year-old using an everyday example
Define artificial intelligence in 50 words or less, avoiding technical jargon
Generate two different explanations of artificial intelligence, one for a beginner and one for an expert. and share it here in visulization form with the dataset

Sample output:

Synthetic AI Prompt Dataset				
	Prompt ID	Prompt Type	AI Model Used	Input Prompt
1	PRM001	Instruction-Based	Gemini	Example prompt: Describe AI in simple terms
2	PRM002	Role-Based	Mistral	Example prompt: Describe AI in simple terms
				Example prompt:

Here is the visualization of AI-generated responses for the following prompts:

1. "Explain AI as if teaching a 10-year-old with an everyday example."
2. "Define AI in 50 words or less, avoiding technical jargon."
3. "Generate two different explanations of artificial intelligence, one for a beginner and one for an expert."



Here are additional visualizations for deeper insights into the dataset:

1. **Distribution of AI Response Clarity** – Shows how many responses were classified as High, Medium, or Low clarity.
2. **Distribution of AI Response Accuracy** – Displays how frequently AI responses were Accurate, Partially Accurate, or Inaccurate.
3. **Distribution of AI Response Tone & Style** – Highlights the various tones used in AI-generated responses (e.g., Simplified, Formal, Persuasive, etc.).

Step 4: Testing Advanced Prompt Engineering Strategies

Sample prompt:

You are an AI tutor. Teach a high school student about deep learning with a real-world analogy List five key subfields of artificial intelligence and briefly explain their functions in bullet points Here are two examples of well-structured AI responses Artificial intelligence is the ability of a computer to mimic human cognitive functions like learning and problem-solving AI is a field that enables machines to analyze

data, recognize patterns, and make decisions with minimal human intervention
Now, generate a third definition that follows the same structure and clarity and
share it here in tabular and visualization form with the dataset

Sample output:

AI Responses Table				Download	Fullscreen
	Prompt	AI Response			
1	Deep Learning Explanation with Real-World Analogy	Deep learning is like how a baby learns to recognize faces. At first, the baby sees many faces			
2	Five Key Subfields of AI	- Machine Learning (ML) : Enables computers to learn patterns			
3	Third AI Definition Matching Structure	Artificial intelligence is			

Matplotlib Chart				Download	Fullscreen
<p>Matplotlib is a plotting library for Python and its scientific computing ecosystem, enabling static, interactive, and animated visualizations in various formats. It is widely used for data analysis and visualization.</p> <p>Key features include:</p> <ul style="list-style-type: none"> Support for multiple data sources (e.g., NumPy arrays, pandas DataFrames). Customizable styling (e.g., colors, line styles, markers). Integration with other Python libraries (e.g., SciPy, IPython). Ability to save plots as images or interactive HTML files. 					

Tabular Format

- Deep Learning Explanation with Real-World Analogy
- Five Key Subfields of AI and Their Functions
- A Third AI Definition Matching Structure and Clarity

Deep Learning Explanation with Real-World Analogy: Deep learning is like how a baby learns to recognize faces. At first, the baby sees many faces but doesn't know who is who. Over time, by seeing patterns and getting feedback, they recognize their parents. Similarly, deep learning models analyze vast amounts of data and adjust over time to improve accuracy.	
Five Key Subfields of AI: <ul style="list-style-type: none">- **Machine Learning (ML)**: Enables computers to learn patterns from data and improve their performance over time without explicit programming.- **Deep Learning (DL)**: A subset of ML that uses neural networks to analyze and process complex data structures, such as images and speech.- **Natural Language Processing (NLP)**: Allows machines to understand, interpret, and generate human language.- **Computer Vision (CV)**: Enables AI to interpret and process visual data, like recognizing objects in images and videos.- **Robotics**: Involves designing AI-driven robots that can perform tasks, interact with humans, and operate autonomously.	
Third AI Definition Matching Structure and Clarity: Artificial intelligence is the simulation of human intelligence in computers, enabling them to process information, solve problems, and make decisions based on data. AI systems continuously refine their knowledge through learning algorithms, improving their ability to perform complex tasks autonomously.	

Deep Learning Explanation with Real-World Analogy

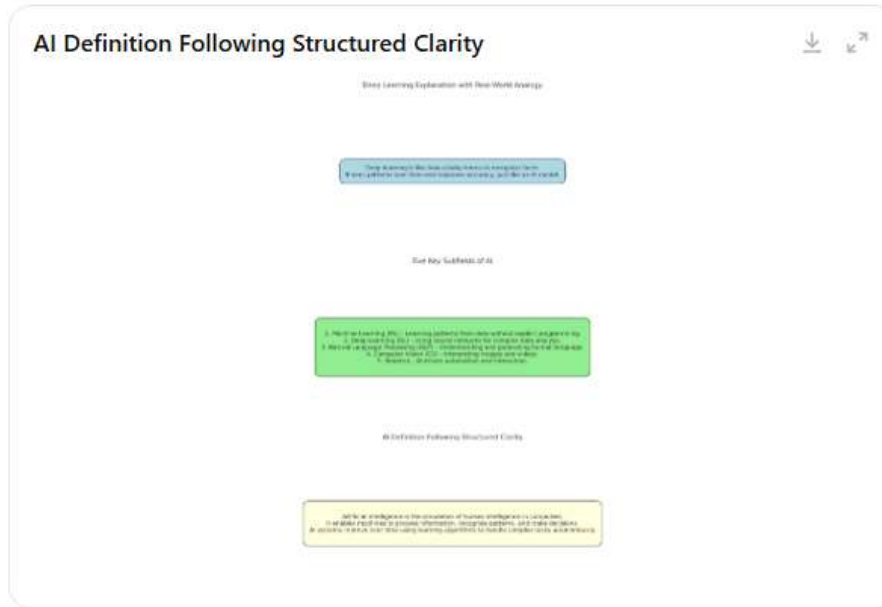
Deep learning is like how a baby learns to recognize faces. It sees patterns over time and improves accuracy, just like an AI model.

Five Key Subfields of AI

1. Machine Learning (ML) - Learning patterns from data without explicit programming.
2. Deep Learning (DL) - Using neural networks for complex data analysis.
3. Natural Language Processing (NLP) - Understanding and generating human language.
4. Computer Vision (CV) - Interpreting images and videos.
5. Robotics - AI-driven automation and interaction.

AI Definition Following Structured Clarity

Artificial intelligence is the simulation of human intelligence in computers. It enables machines to process information, recognize patterns, and make decisions. AI systems improve over time using learning algorithms to handle complex tasks autonomously.



Here are the visualizations for the AI-generated responses:



1. **Deep Learning Explanation with Real-World Analogy** – Describes how deep learning is similar to how a baby learns to recognize faces.
2. **Five Key Subfields of AI** – Lists and briefly explains five major AI subfields in an easy-to-read format.
3. **Third AI Definition in Structured Format** – Provides a structured and clear definition of AI, following the example given.

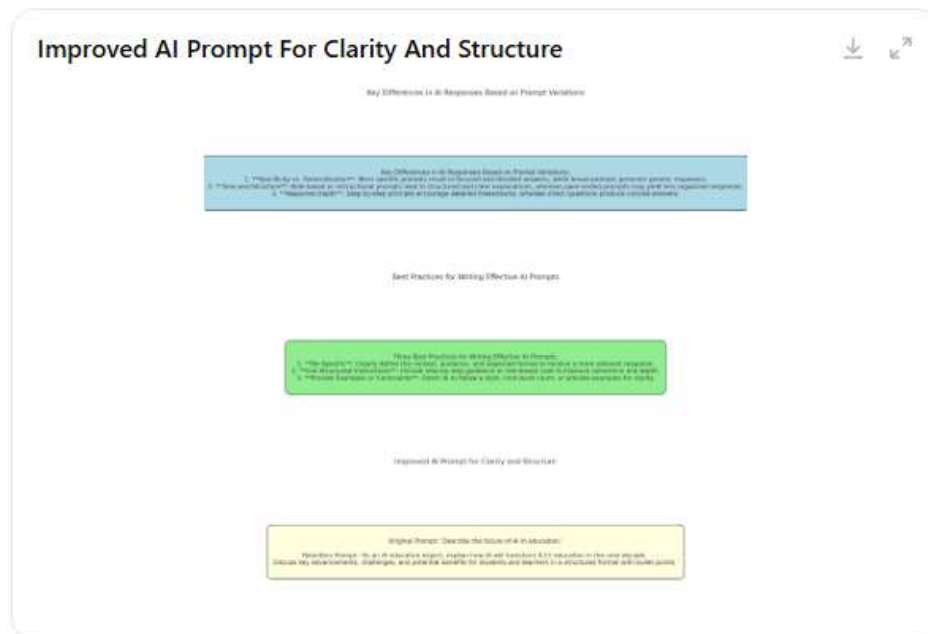
Step 5: Refining and Applying Learnings

Sample prompt:

Summarize the key differences in AI responses based on prompt variations and suggest three best practices for writing effective AI prompts Here is a prompt: 'Describe the future of AI in education.' Rewrite it to improve clarity, add a specific audience, and ensure a structured response and share it here in visualization form with the dataset

Sample output:

Synthetic AI Prompt Dataset				 
	Prompt ID	Prompt Type	AI Model Used	Input Prompt
1	PRM001	Instruction-Based	Gemini	Example prompt: Describe AI in simple terms
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Here are the visualizations for the AI response analysis and prompt improvement:

1. **Key Differences in AI Responses Based on Prompt Variations** – Highlights how specificity, tone, and structure impact AI-generated responses.
2. **Best Practices for Writing Effective AI Prompts** – Provides three key strategies to enhance prompt clarity and effectiveness.
3. **Improved AI Prompt for Clarity and Structure** – Shows a refined version of the original prompt, ensuring specificity, audience targeting, and structured response output.

- Key Differences in AI Responses Based on Prompt Variations:
1. **Specificity vs. Generalization**: More specific prompts result in focused and detailed answers, while broad prompts generate generic responses.
 2. **Tone and Structure**: Role-based or instructional prompts lead to structured and clear explanations, whereas open-ended prompts may yield less organized responses.
 3. **Response Depth**: Step-by-step prompts encourage detailed breakdowns, whereas direct questions produce concise answers.

Best Practices for Writing Effective AI Prompts

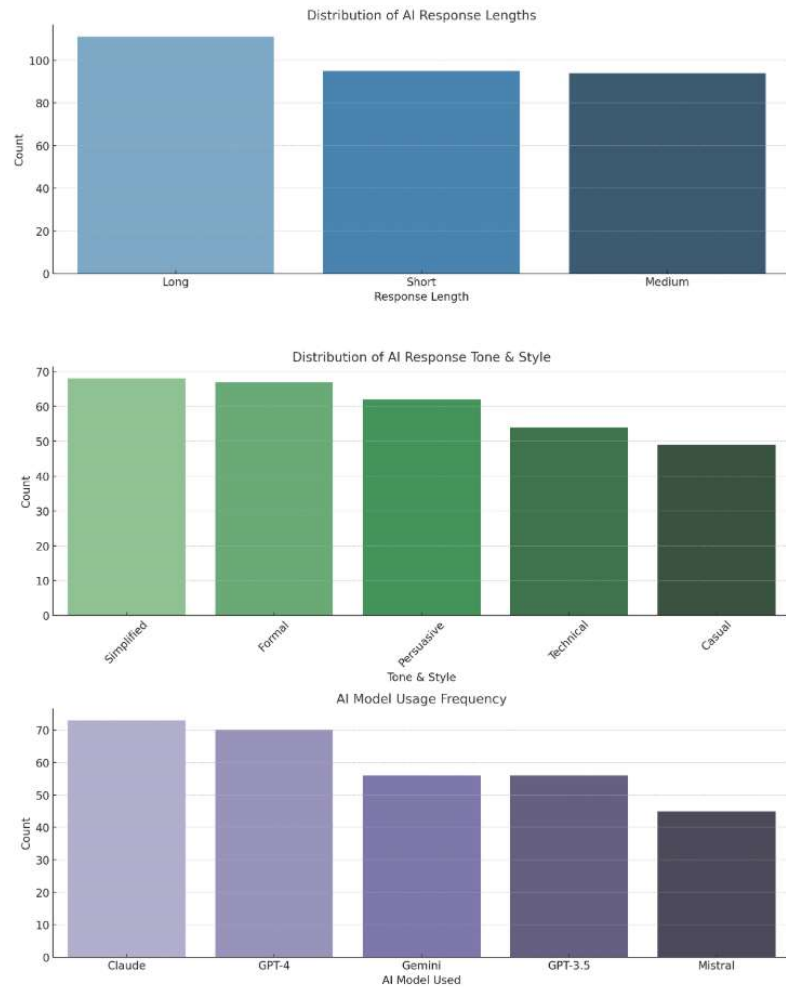
- Three Best Practices for Writing Effective AI Prompts:
1. **Be Specific**: Clearly define the context, audience, and expected format to receive a more relevant response.
 2. **Use Structured Instructions**: Include step-by-step guidance or role-based cues to improve coherence and depth.
 3. **Provide Examples or Constraints**: Direct AI to follow a style, limit word count, or provide examples for clarity.

Improved AI Prompt for Clarity and Structure

Original Prompt: 'Describe the future of AI in education.'

Rewritten Prompt: 'As an AI education expert, explain how AI will transform K-12 education in the next decade. Discuss key advancements, challenges, and potential benefits for students and teachers in a structured format with bullet points.'

AI Model Usage Frequency



1. **Distribution of AI Response Lengths** – Shows the frequency of short, medium, and long responses.
2. **Distribution of AI Response Tone & Style** – Displays the various tones used in AI-generated responses.
3. **AI Model Usage Frequency** – Highlights how often different AI models were used in the dataset.