**PROMPT ENGINEERING**

**WHAT IS PROMPT ENGINEERING**

**Notes**

* The quality of your prompt determines the quality of what you get back.

**Prompt Attributes**

* Personas
* Length
* Tone
* Style
* Audience

**Terminology**

* Prompt Chaining: Giving a feedback through prompt about its previous response.
* Context Length
* Token Limitations
* Shot-based Prompting
* Flipping the Rule

***“Assume the role of an AI researcher and summarize model collapse for a general audience in a paragraph or two !”***

**PLANNING A SUCCESSFUL PROMPT.**

**Prompt Attributes**

* Length
* Tone
* Style
* Audience
* Format
* Domain
* Perspective
* Purpose

**THE MOST USEFUL PROMPT ATTRIBUTES IN GENERATIVE AI**

**Prompt Attributes**

* Length
* Tone
* Style
* Audience

**FLIPPING THE ROLES**

* Generative AI tools such as ChatGPT, Bard etc can be seen as research assistant or personal assistant or enthusiastic and immature intern.
* Ask it to research first, rather than asking it to do something.
* Ask it to don an expert role for the task in question.
* For the varied perspective, flip the role.

**Role based Prompts**

* Assuming different role helps you create balanced and relatable results.
* You can also “flip roles” to help develop new skills, practice conflict resolution, or spur innovation.

**ADVANCED PROMPTS**

* **Combining attributes:** Roles + time + format
* Ask it to ask you a multiple choice questions, in order to learn something.
* Ask for a multiple choice questions, for a precise learning exercise.
* You can have back and forth with the model, as interactive prompting?
* **Shot based prompting:** Provide LLMs with examples to complete a task.
* **Zero-Shot prompting:** Give the model a task with no examples.
* **Few-Shot prompting:** Give the model a task with few examples.
* **Many-Shot prompting:** Give the model a task with many examples.

**PROMPTING IN OTHER GENERATIVE AI**

* Precise prompting can be applied to other generative **AIs** as well.
* As an example, for Image Generative AIs such as Dall-e, MidJourney etc consider adding following attributes to prompting:
  + Style, Composition, Color, Subject, Foreground, Background, Focus, Mood, Genre.
* Suggestions for effective image generative AI: refine through iterative prompting, experimentations,

**PROMPTING TECHNIQUES**

Yes! There are many prompting techniques, and their effectiveness depends on your task, model, and context. Below is a structured guide to the most widely used techniques and which ones are considered highly effective.

**✅ 1. Common Prompting Techniques**

Here are the major categories:

**A. Zero-Shot Prompting**

Definition: Ask the model to do a task without any examples.

Example: Translate this text to French: "Hello, how are you?"

✅ Good for: Simple, well-known tasks

❌ Weak for: Ambiguous or specialized tasks

**B. One-Shot / Few-Shot Prompting**

Definition: Provide 1 or a few examples before asking for the real answer.

Example:

English: Hello → French: Bonjour

Task: Translate "Good morning" →

✅ Good for: Setting context, improving accuracy

❌ Requires examples

**C. Chain-of-Thought (CoT) Prompting**

Definition: Ask the model to reason step-by-step.

Example:

Q: If you have 3 apples and eat one, how many remain? Think step by step.

✅ Highly effective for reasoning & math

❌ Slower and more verbose

**D. Self-Consistency Prompting**

Definition: Generate multiple reasoning paths, then pick the most consistent answer.

✅ Best for: Math, logic

❌ Requires multiple runs (costly)

**E. ReAct Prompting (Reason + Act)**

Definition: Model reasons and takes actions (like calling tools, APIs).

✅ Great for: Tool-augmented workflows

❌ Needs an orchestrator framework (LangChain, LlamaIndex)

**F. Retrieval-Augmented Generation (RAG)**

Definition: Supply external knowledge dynamically (via vector DBs, docs).

✅ Critical for: Enterprise AI, domain-specific Q&A

❌ Needs pipeline setup

**G. Instruction + Markdown Prompting**

Definition: Combine clear task instructions with Markdown for structured formatting.

✅ Great for: Multi-step tasks, improving clarity

❌ Not as powerful alone as reasoning-based techniques

**H. Tree-of-Thought / Graph-of-Thought**

Definition: Explore multiple reasoning branches, then choose the best.

✅ Powerful for: Complex planning, decision-making

❌ Computationally expensive

**✅ Which Is Most Effective?**

**For general-purpose reasoning:**

Chain-of-Thought + Self-Consistency outperform zero-shot on complex reasoning tasks.

**For real-world applications (e.g., RAG systems, AI agents):**

ReAct + Retrieval-Augmented Generation (RAG) is the industry standard for high accuracy and trustworthiness.

**For structured outputs:**

Markdown Prompting combined with CoT or ReAct works extremely well.

**🔥 Recommended Combo for Maximum Accuracy**

Instruction-Tuned Prompt + CoT + Markdown + RAG

* Clear instructions
* Reason step-by-step
* Use Markdown for structure
* Pull verified knowledge from external sources

**Markdown Prompting - Special Prompting Structure**

1. #\*\*Role:\*\*
2. #\*\*Objective:\*\*
3. #\*\*Context:\*\*
4. #\*\*Instructions:\*\*
   1. ##\*\*Instructions 1:\*\*
   2. ##\*\*Instructions 1:\*\*
   3. ##\*\*Instructions 1:\*\*
5. #\*\*Notes:\*\*
   1. Note 1:
   2. Note 2:
   3. Note 3:

Here’s a **high-quality prompt example** that uses the **Instructions + Markdown Prompting** technique for a real-world scenario: *Generate a technical blog outline on “Graph Data Science with LLMs.”*

**✅ Prompt Example: Instructions + Markdown**

**# Task**

Create a \*\*comprehensive blog outline\*\* on the topic: \*"Graph Data Science with Large Language Models (LLMs)"\*.

**## Audience**

- Data scientists

- AI/ML practitioners

- Technical leaders

**## Goals**

- Explain why Graph Data Science matters

- Highlight the synergy between Graphs and LLMs

- Include practical use cases and challenges

**## Requirements**

- \*\*Length:\*\* 7 main sections (with sub-points)

- \*\*Tone:\*\* Professional and educational

- \*\*Format:\*\* Use Markdown headings for sections and bullet points for details

**## Output Structure**

# Blog Title

**## Introduction**

- Background

- Why it matters

**## Section 1: [Title]**

- Key idea

- Supporting details

**## Section 2: [Title]**

- Key idea

- Supporting details

\*(Continue this pattern for all sections)\*

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**✅ Prompt Example: Instructions + Markdown**

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✅ **Expected Output (Model Response)**

# Graph Data Science with Large Language Models: A New Frontier

## Introduction

- Overview of Graph Data Science (GDS)

- Why GDS is critical for complex, interconnected data

- Role of LLMs in knowledge representation

## Section 1: Understanding Graph Data Science

- Graph theory basics

- Key algorithms: PageRank, community detection

- Common use cases: fraud detection, recommendation systems

## Section 2: Why Combine GDS with LLMs?

- Complementary strengths: structure vs. language

- Enhanced reasoning over graph-structured data

- Real-world applications: knowledge graphs, semantic search

## Section 3: Key Use Cases

- Cybersecurity: anomaly detection with graphs + LLM

- Enterprise search powered by graph embeddings

- Drug discovery and biological networks

## Section 4: Architectural Approaches

- Using GNNs + LLMs

- RAG with graph databases (Neo4j, TigerGraph)

- Pipelines for hybrid AI

## Section 5: Implementation Challenges

- Data integration complexity

- Computational cost

- Explainability concerns

## Section 6: Future Directions

- Graph-augmented reasoning

- Multi-modal graph embeddings

- Autonomous AI agents leveraging graphs

## Conclusion

- Summary of benefits

- Call to action for practitioners

***6-Point Magic Prompt Formula Template***

**\*\*Persona:\*\***

You are an expert prompt engineer with deep expertise in crafting effective and precise prompts for AI language models.

**\*\*Context:\*\***

You have been asked to develop a detailed, structured prompt that guides an AI to solve a complex task efficiently and accurately.

**\*\*Task:\*\***

Create a detailed prompt using the 6-point magic prompt formula that includes the following elements: Persona, Context, Task, Example, Format, and Tone. The prompt should ensure clarity and maximize the quality of the AI's response.

**\*\*Example:\*\***

For instance, when asking the AI to generate a product description, the prompt should specify the user's role, background information about the product, the specific request (e.g., write a 100-word description highlighting unique features), provide an example description, define the expected response format (e.g., bullet points or paragraphs), and set the tone (e.g., professional and persuasive).

**\*\*Format:\*\***

- Use clear markdown formatting.

- Use headings and bullet points where appropriate.

- Clearly label each of the six elements in the prompt.

- Provide a concise example within the prompt text.

**\*\*Tone:\*\***

Professional, clear, and instructional; directly guiding the AI to produce a high quality response.