

# Pre-Session Survey

📌 Scan the QR code to complete a quick survey before we begin

📌 Your responses will help us tailor the session to your needs!



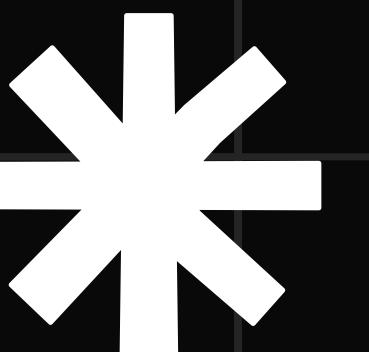
What is....

# Prompt Engineering?



The process of strategically designing, structuring, and optimizing prompts to effectively guide AI models (like ChatGPT, LLMs, or generative AI) to produce accurate, relevant, and high-quality outputs for specific tasks and applications

**Prompt engineering is like giving AI the perfect instructions to get the best possible response like knowing exactly how to ask a genie for a wish without messing it up!**

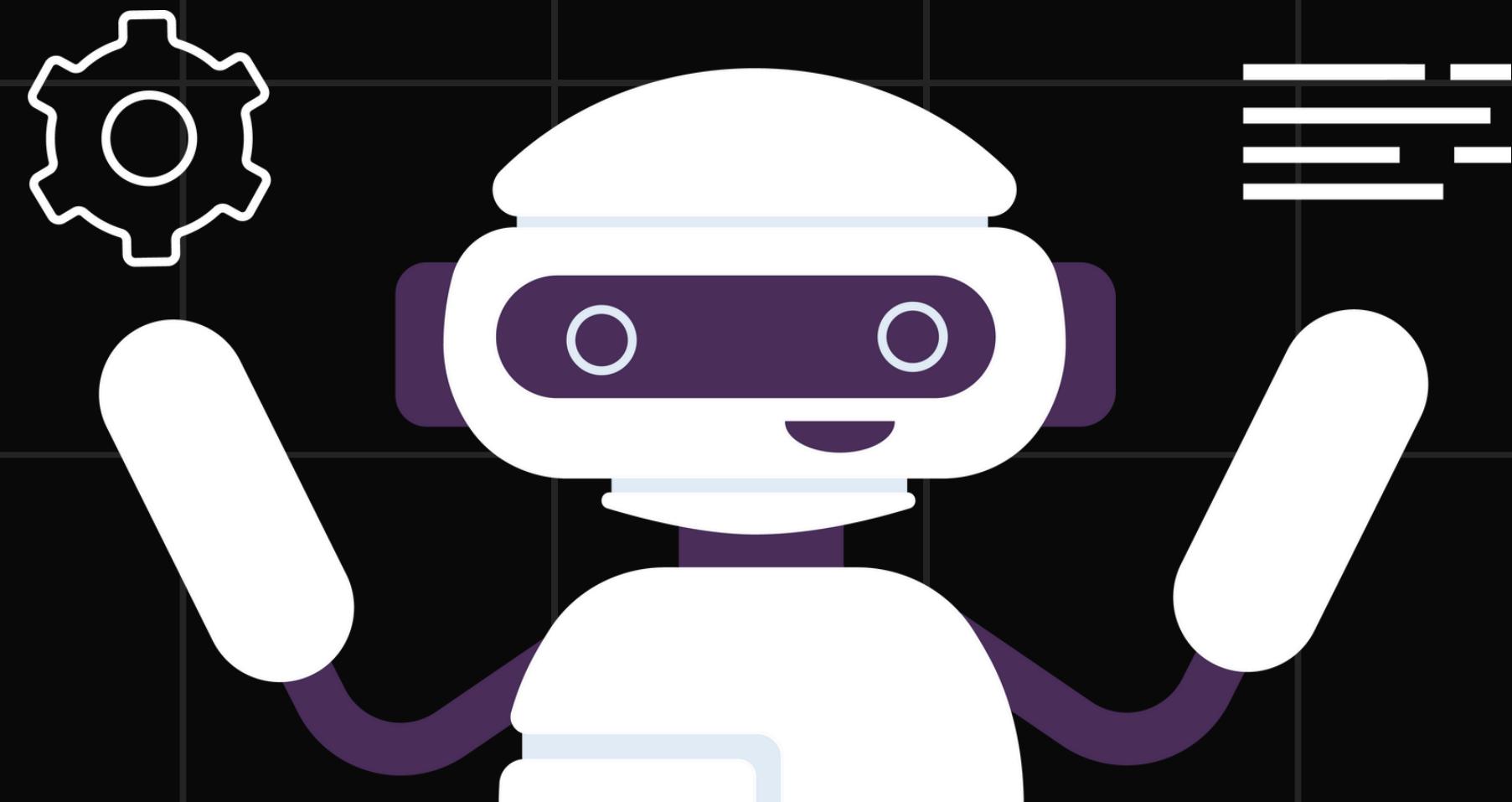


# Prompt + Engineering

Prompts = Instructions and context provided to an AI for a certain task

Prompt Engineering = The practice of developing and optimizing prompts to efficiently use an AI for a certain task

A multidisciplinary branch of engineering focused on interacting with Artificial Intelligence through the integration of fields including Software Engineering, Machine Learning, Cognitive Science, Business, Philosophy, Psychiatry, and Computer Science.



# Why Prompt Engineering even a Thing?

- Enhances **AI performance** without modifying the model.
- Reduces **hallucinations** and ensures factual correctness.
- Critical for domains like **research, coding, marketing, healthcare**



## Performance

Initial enhancement of system capabilities



## Reliability

Ensures consistent and dependable outcomes



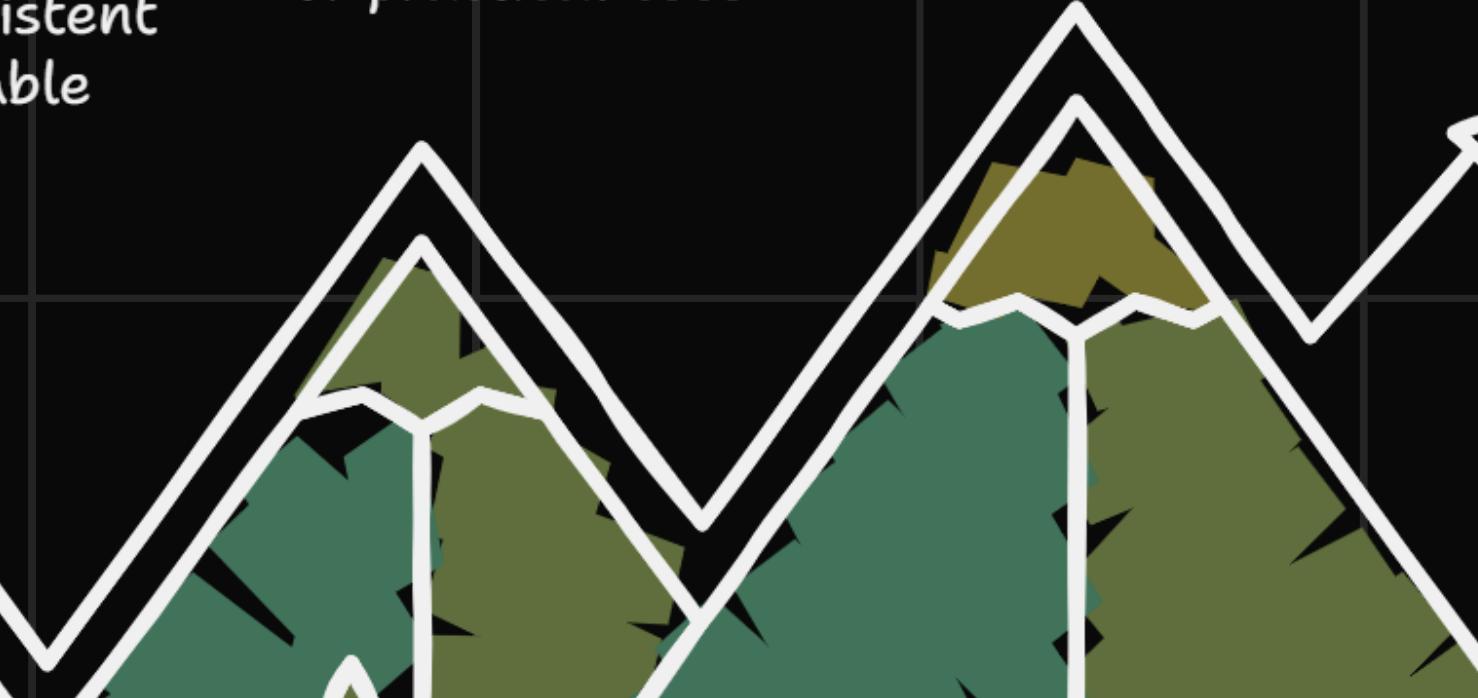
## Application

Expands the range of practical uses



## Productivity

Leads to increased efficiency and output



# Enhancing AI Performance

- **Low-Cost Optimization:** Prompt engineering allows you to fine-tune the AI's output without the need for expensive retraining or model modifications.
- **Custom Behavior:** By crafting the right prompts, you can adapt the AI for different tasks or domains (e.g., summarizing vs generating ideas).
- **Model Agnostic:** Works across multiple Large Language Models (LLMs) like GPT, Claude, Bard, etc., making it versatile and reusable.

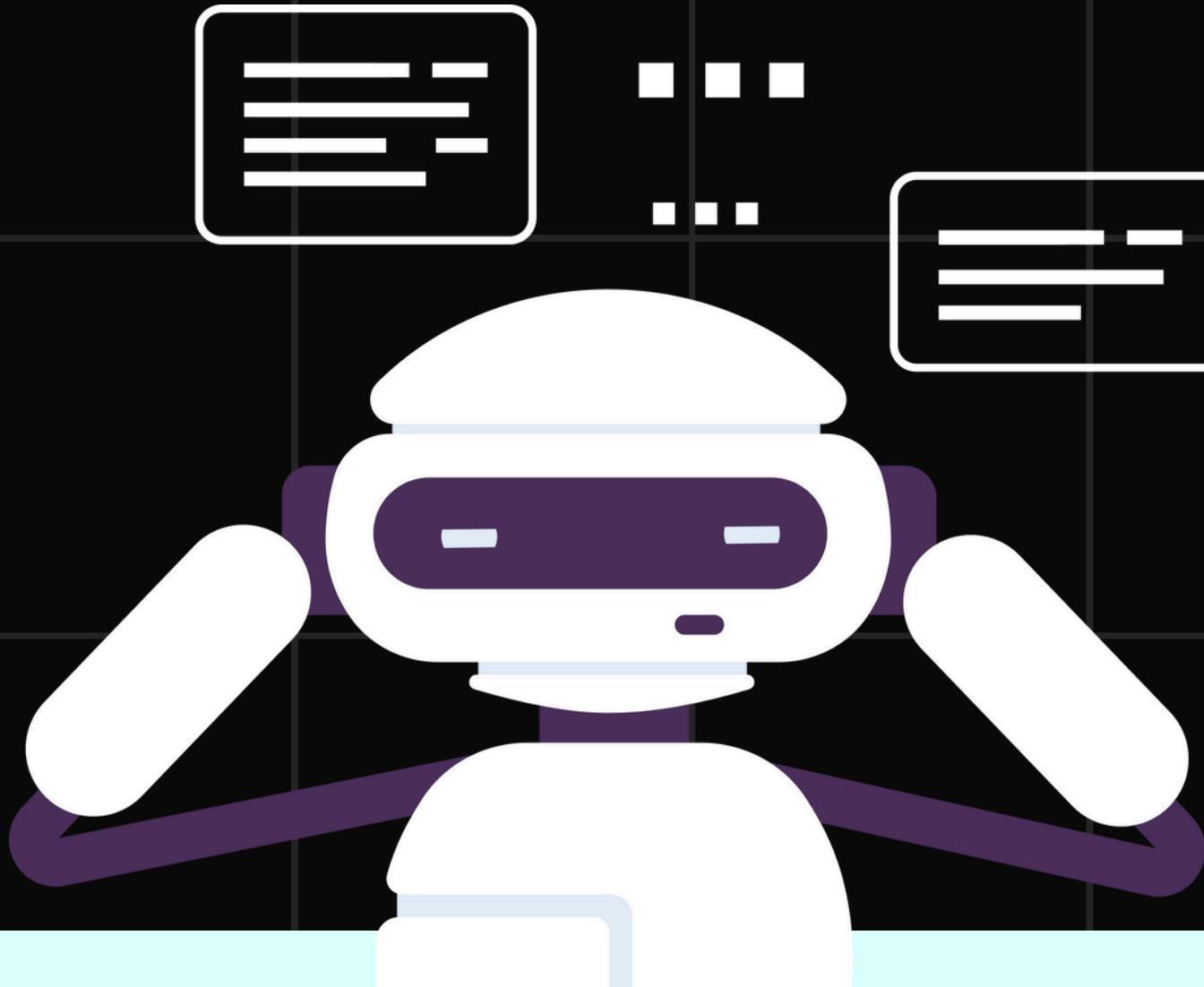


# Reducing Hallucinations

- **Minimizing Misinformation:** Poorly crafted prompts can lead to incorrect or misleading outputs, often referred to as "hallucinations." Proper prompts help mitigate this.
- **Improving Reliability:** Structured prompts, like Chain-of-Thought (CoT) or Few-Shot Prompting, guide the model to generate more logical and accurate responses
- **Critical in High-Stakes Domains:** In fields like medicine or law, ensuring factual accuracy is essential to avoid real-world consequences.



# Critical Domains



## Research and Academia:

Generating summaries, literature reviews, research proposals, and hypothesis testing.



## Coding and Software Development:

AI-assisted bug fixes, code optimization, and generation of clean, well-documented code.



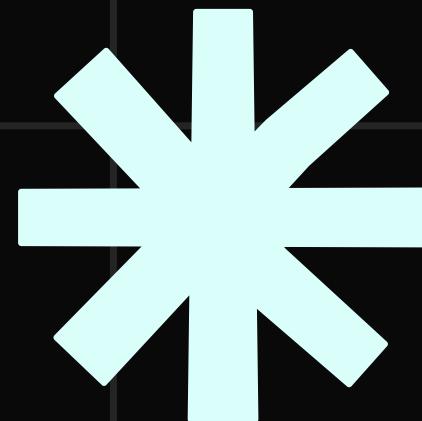
## Healthcare and Medicine:

Automating documentation, generating patient summaries, or assisting with medical diagnostics.



## Marketing and Content Creation:

Creating personalized marketing campaigns, SEO-optimized content, and dynamic ad copy



# How LLMs Work ?..

## Self-Attention

Analyzes relationships between all words to enhance contextual understanding.

## Attention Mechanism

Enables the model to focus on key input elements for better predictions.



## Tokens

Breaks text into smaller units for efficient processing.

## Transformer Architecture

# How LLMs Generate Responses ?..

## Autoregressive Nature:

- LLMs predict the next token based on the tokens seen so far.
- Example: Given "The sky is," the model predicts "blue" as the next token.

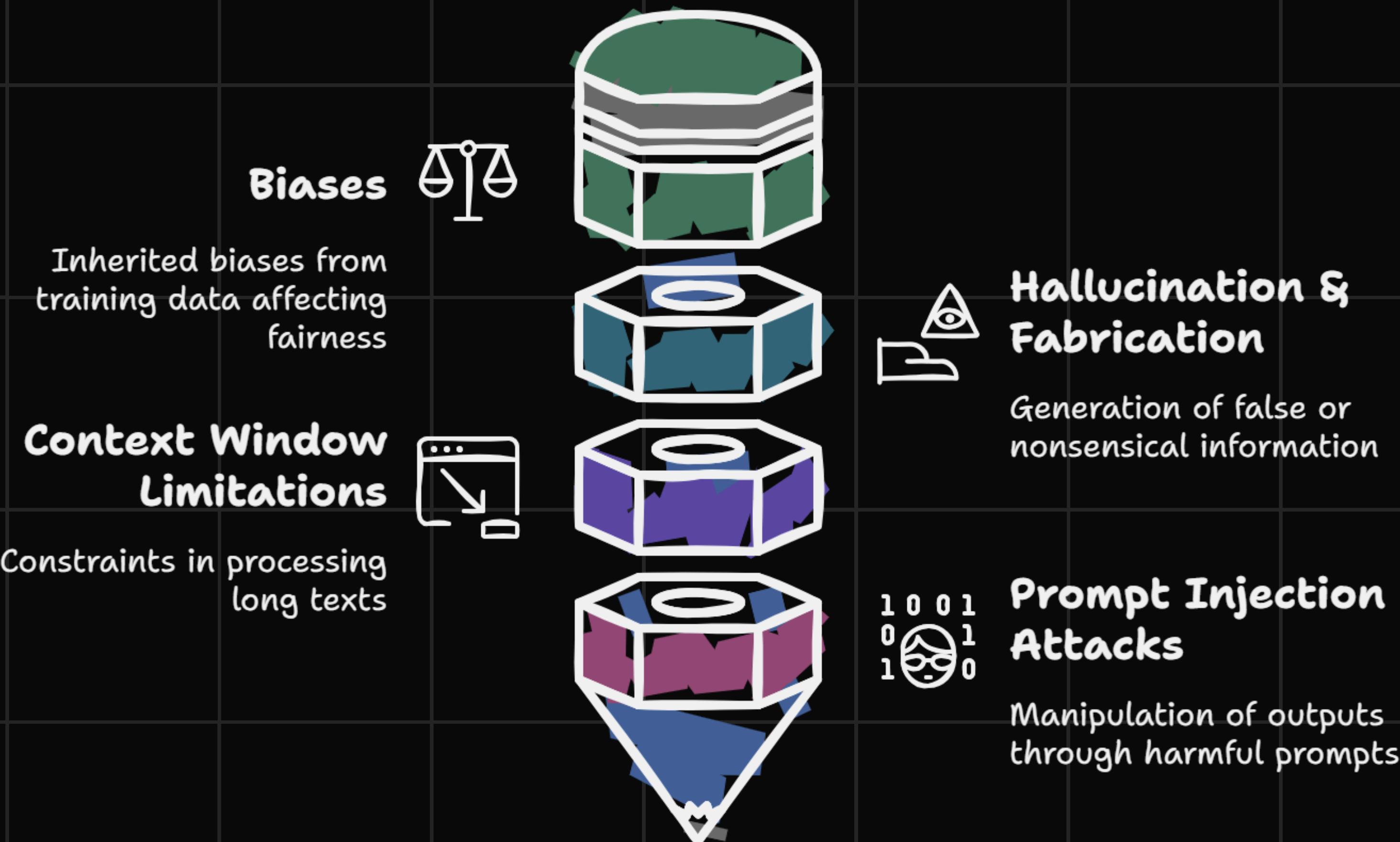
## Token Probability:

- The model assigns probabilities to possible next tokens.
- Example: For "The sky is," probabilities might be:
  - blue (80%)
  - cloudy (15%)
  - green (5%)
- The token with the highest probability is chosen, though randomness (temperature parameter) can influence this.

<https://platform.openai.com/tokenizer>

Antidisestablishmentarianism ->  Antidisestablishmentarianism

# Navigating LLM Challenges



# Prompt Engineering Techniques

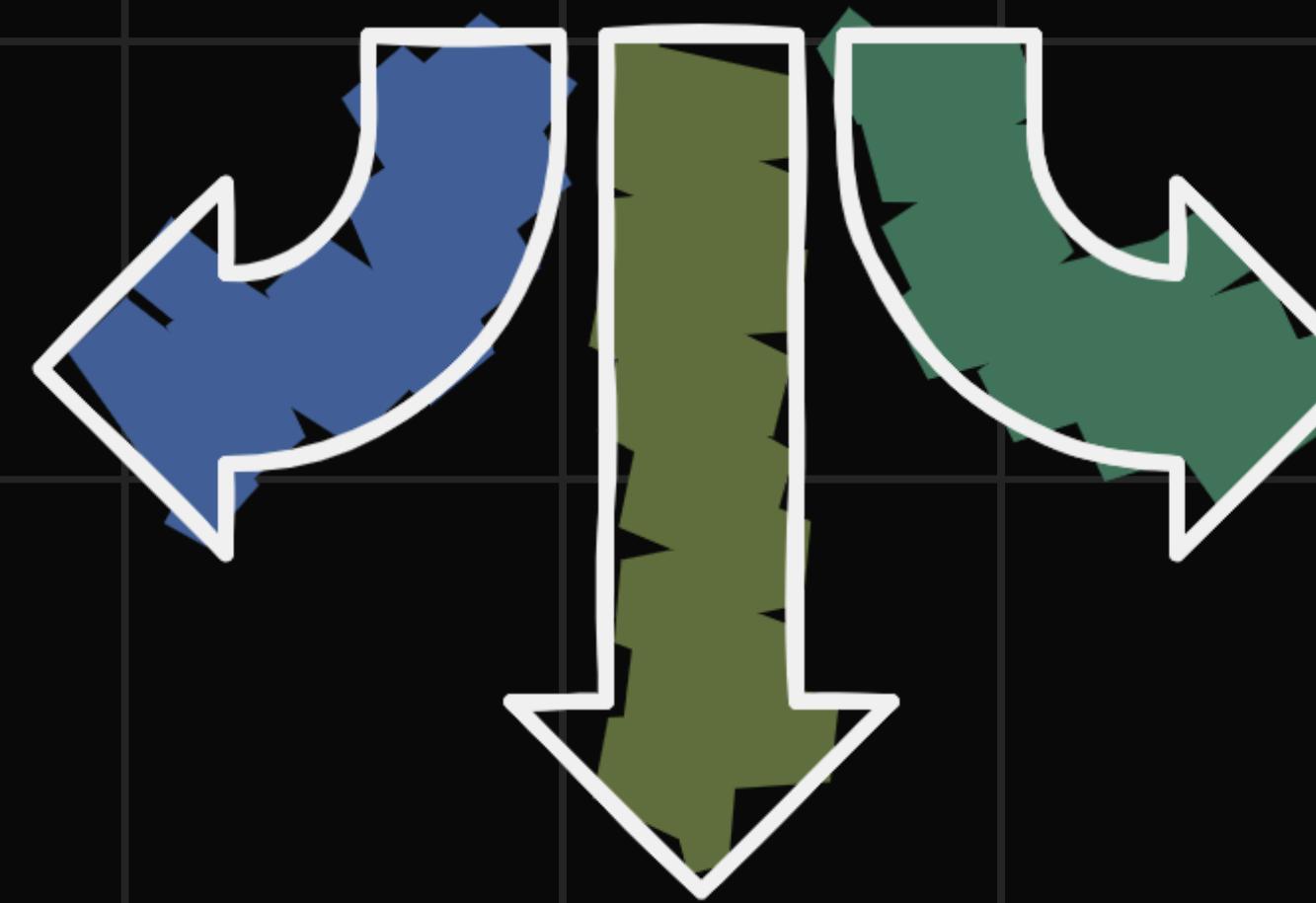


# Basic Prompt Engineering Techniques

## Zero-Shot Prompting

Asking AI a question with no prior examples

Example: "What are the benefits of drinking water?"



## One-Shot Prompting

Providing one example to guide AI's response

Example: "Translate: 'Hola' → 'Hello'. Now translate: 'Merci' → ?"

## Few-Shot Prompting

Giving multiple examples to improve accuracy

Example: "Translate: 'Hola' → 'Hello', 'Bonjour' → 'Hello', 'Ciao' → ?"

# Reasoning-Based Prompting



**Tree of Thoughts**  
AI generates and selects the best ideas.

**Deliberation-Based Prompting**

AI considers multiple answers before deciding.

**Reflexion**

AI self-evaluates to improve responses.

**Chain-of-Thought**

Encourages step-by-step reasoning in AI.

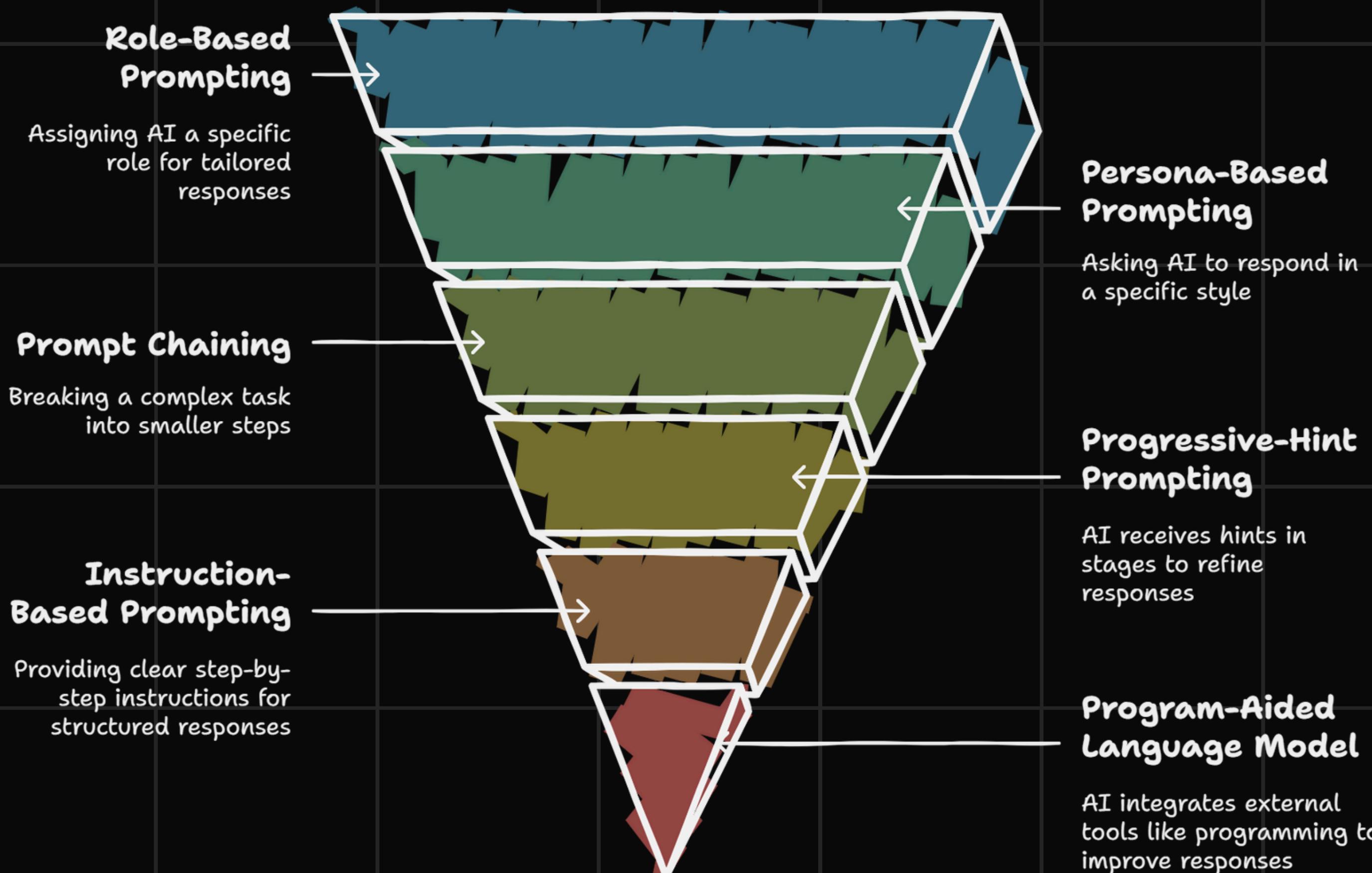
**Self-Consistency CoT**

AI solves problems multiple ways to find the best.

# Reasoning-Based Prompting

| Technique                             | Description   | Example   |
|---------------------------------------|---|---|
| Chain-of-Thought (CoT)                | Asking the AI to think through the problem step by step.                            | "If John has 3 apples and buys 5 more, how many apples does he have? Explain step by step."   |
| Self-Consistency CoT                  | Letting the AI try solving a problem in different ways and picking the best answer. | "What is $12 \times 9$ ? Try different methods and choose the best answer."                   |
| Tree of Thoughts (ToT)                | Getting the AI to think of multiple possible solutions and choose the best one.     | "Suggest 3 different ways to solve traffic congestion in cities, and pick the best solution." |
| Deliberation-Based Prompting          | AI considers multiple answers before finalizing one.                                | "What are three career paths in AI, and which one is the best for future growth?"             |
| Reflexion (Self-Reflection Prompting) | AI checks its own response and improves it.   | "Explain why the sky is blue. Now recheck your answer and make it simpler."                   |

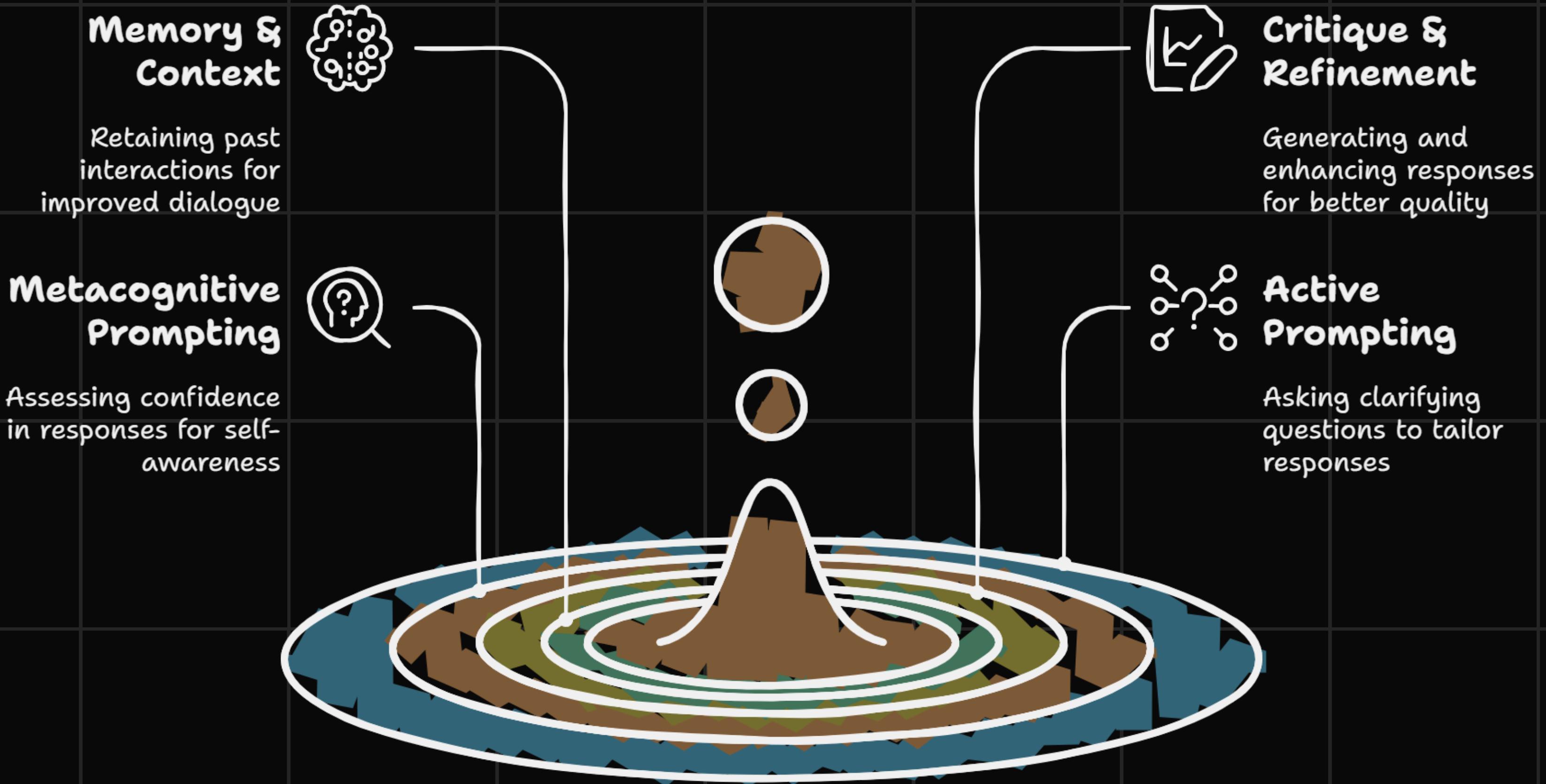
# Task-Specific Prompting



# Task-Specific Prompting

| Technique                          | Description   | Example  |
|------------------------------------|---|--|
| Role-Based Prompting               | Assigning AI a specific role for tailored responses.                | "You are a doctor. Explain diabetes to a 10-year-old."   |
| Persona-Based Prompting            | Asking AI to respond in a specific style.                           | "Explain gravity in the style of Shakespeare."   |
| Prompt Chaining                    | Breaking a complex task into smaller steps.                         | "Step 1: Write a problem statement.<br>Step 2: Suggest a solution.<br>Step 3: Explain benefits." |
| Progressive-Hint Prompting         | AI receives hints in stages to refine responses.                    | "Step 1: What is AI?<br>Step 2: How does it work?<br>Step 3: What are its uses?"                 |
| Instruction-Based Prompting        | Providing clear step-by-step instructions for structured responses. | "Write a 100-word summary with an introduction, body, and conclusion."                           |
| Program-Aided Language Model (PAL) | AI integrates external tools like programming to improve responses. | "Write Python code to calculate the average of these numbers: 10, 20, 30."                       |

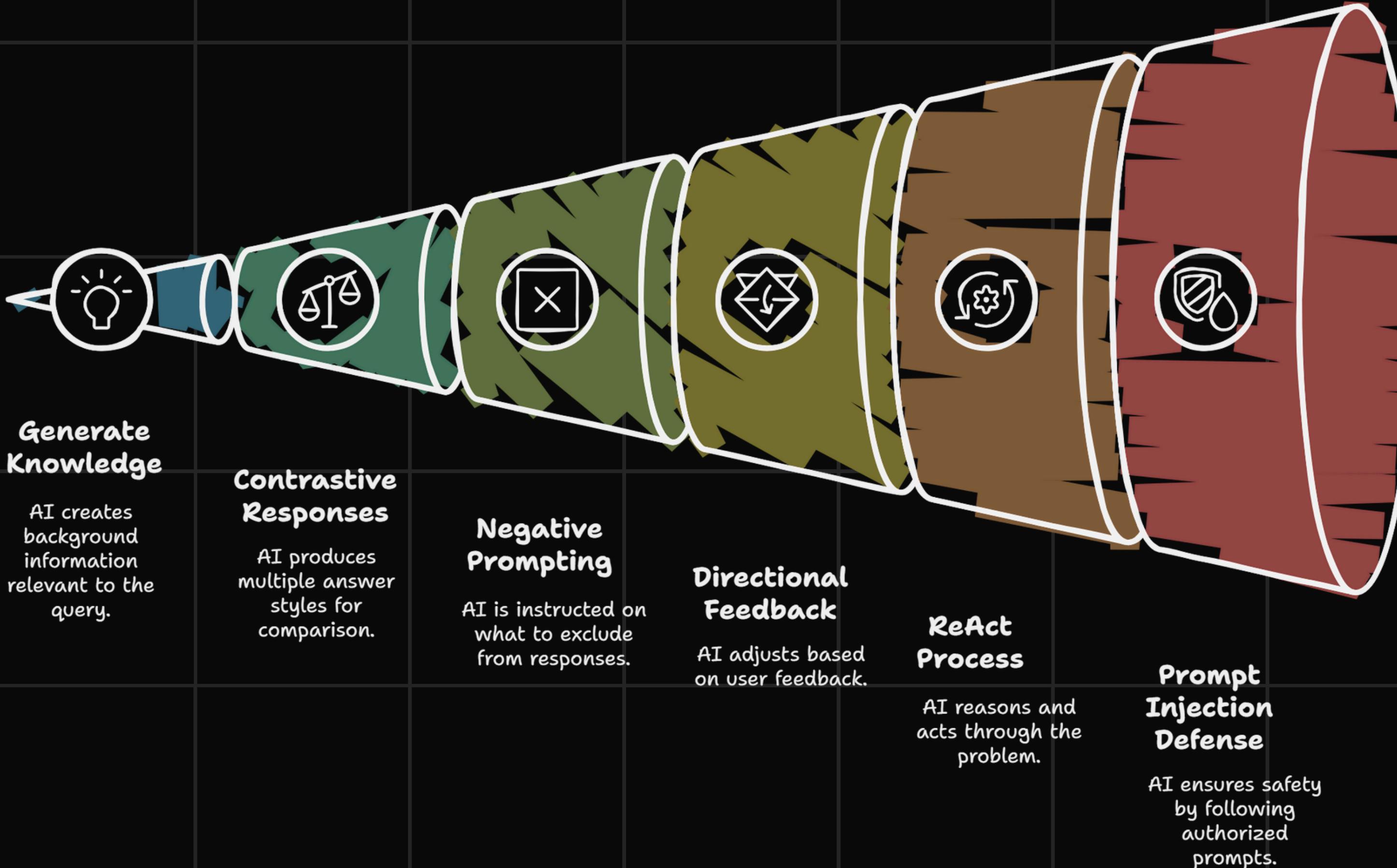
# Interactive & Context-Aware Prompting



# Interactive & Context-Aware Prompting

| Technique                       | Description  | Example   |
|---------------------------------|--|---|
| Memory & Context Retention      | AI remembers past interactions for better conversations.       | "We talked about climate change earlier. Can you now suggest solutions?"                |
| Critique & Refinement Prompting | AI first generates a response, then critiques and improves it. | "Write a social media post about AI, then improve it to make it more engaging."         |
| Metacognitive Prompting         | AI evaluates its own confidence in its response.               | "How sure are you that your answer is correct?"   |
| Active Prompting                | AI asks clarifying questions before responding.                | "Plan a vacation for me." → (AI asks: 'What is your budget and preferred destination?') |

# AI Optimization & Control Prompting



# AI Optimization & Control Prompting

| Technique                      | Description  | Example  |
|--------------------------------|--|--|
| Generated Knowledge Prompting  | AI first generates background knowledge before answering a question. | "Explain how solar panels work before describing their benefits."        |
| Contrastive Prompting          | AI generates different styles of answers for comparison.             | "Explain AI in both simple and technical terms."                         |
| Negative Prompting             | Instructing AI on what not to include.                               | "Summarize this book without discussing the characters."                 |
| Directional Stimulus Prompting | AI adjusts responses based on user feedback.                         | "Rewrite this message to sound more polite and formal."                  |
| ReAct (Reasoning + Acting)     | AI reasons through a problem while taking actions.                   | "Plan a healthy meal for the day, then generate a shopping list for it." |
| Prompt Injection Defense       | Ensuring AI follows only safe and authorized prompts.                | "Prevent AI from following harmful or misleading instructions."          |

# Advanced Prompting Techniques



## Multi-Modal Prompting

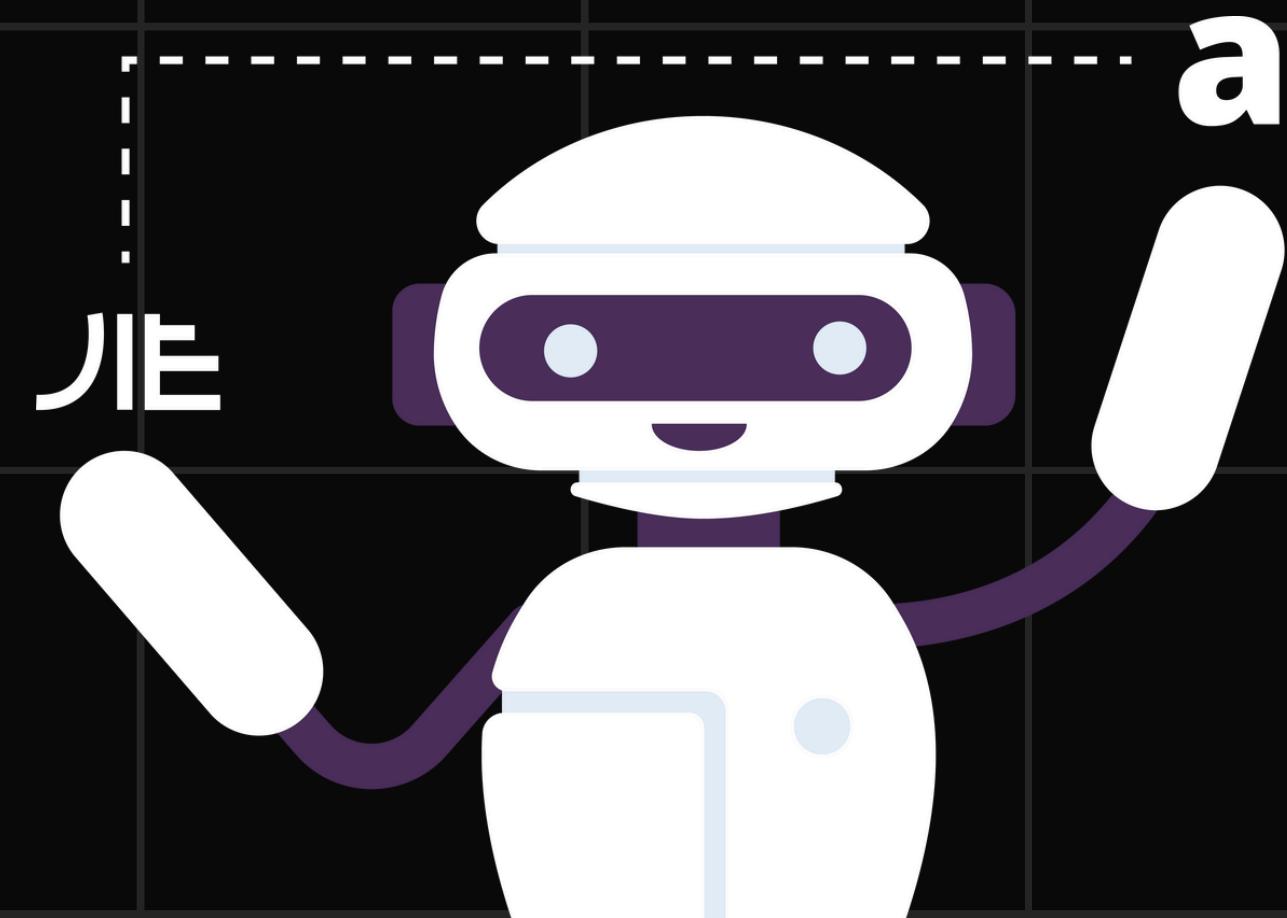
AI processes images, audio, and text together.

Example: "Analyze this picture and describe what's happening in it."

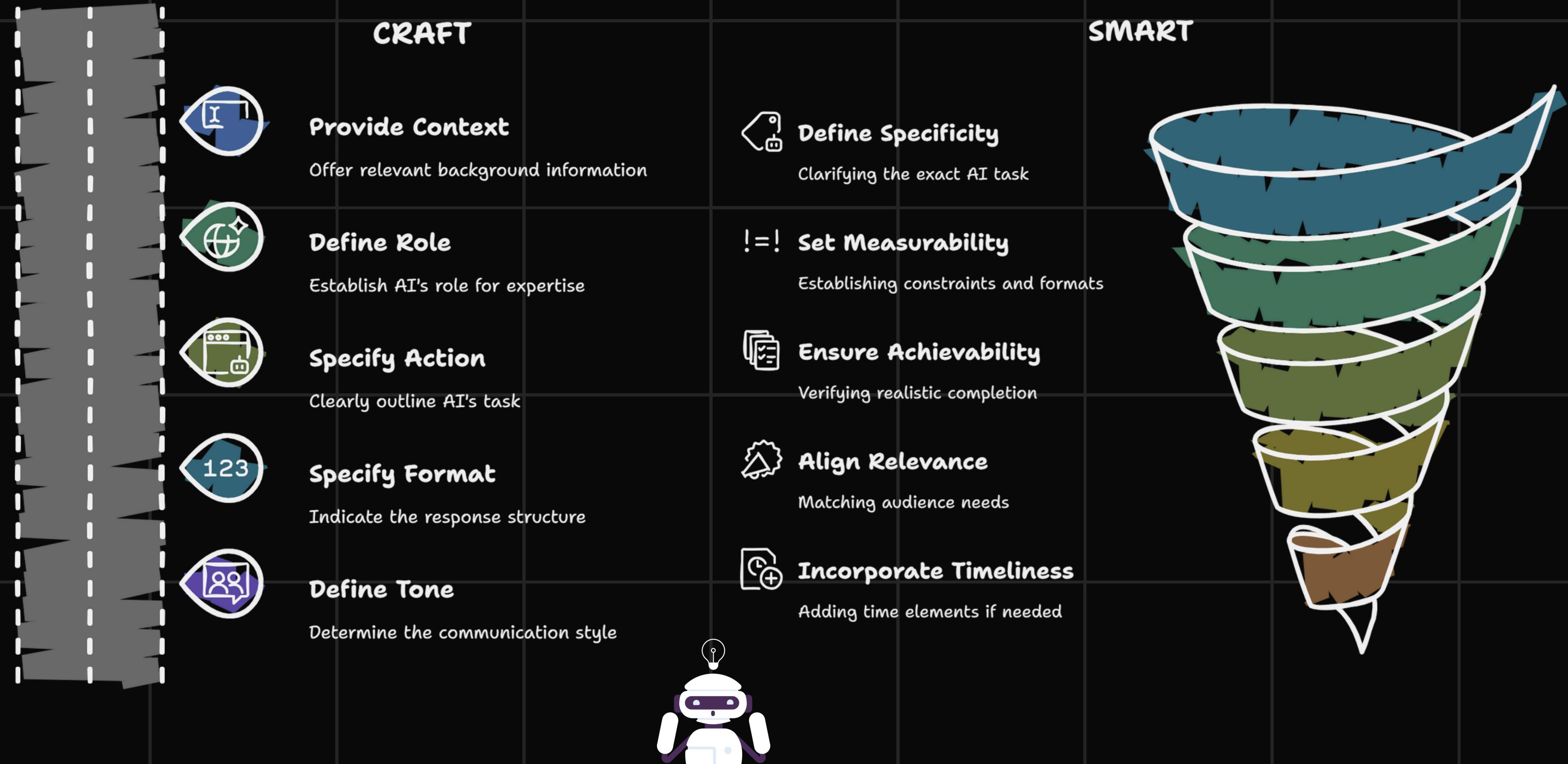


## Graph Prompting

Uses structured knowledge graphs for better factual accuracy. Example: "Use this knowledge graph to summarize relationships between key entities."



# Prompting Framework



# CRAFT Framework

"Summarize the top AI trends of 2025 in 100 words for business professionals in a formal tone."

| Component   | Description                              | Example   |
|-------------|--|---|
| C → Context | Provide relevant background information. | "AI is evolving rapidly, influencing various industries." |
| R → Role    | Define AI's role.                        | "You are an AI researcher."                               |
| A → Action  | Clearly specify what AI should do.       | "Summarize the top AI trends of 2025."                    |
| F → Format  | Specify the output structure.            | "In 100 words."   |
| T → Tone    | Define the tone.                         | "Use a formal, professional style."                       |

"You are an AI researcher. Summarize the top AI trends of 2025 in 100 words for business professionals. Ensure the response is formal, structured as bullet points, and highlights key developments in AI adoption and ethics."

# SMART Framework

"Summarize the top AI trends of 2025 in 100 words for business professionals in a formal tone."

| Component      | Description                       | Example                                    |
|----------------|-----------------------------------|--|
| S → Specific   | Clearly define the task.          | "Summarize the top AI trends of 2025."     |
| M → Measurable | Set a word limit.                 | "In 100 words."                            |
| A → Achievable | Ensure AI can handle the request. | "AI can summarize key trends effectively." |
| R → Relevant   | Align with audience needs.        | "For business professionals."              |
| T → Timely     | Specify a timeframe.              | "Focus on trends in 2025."                 |

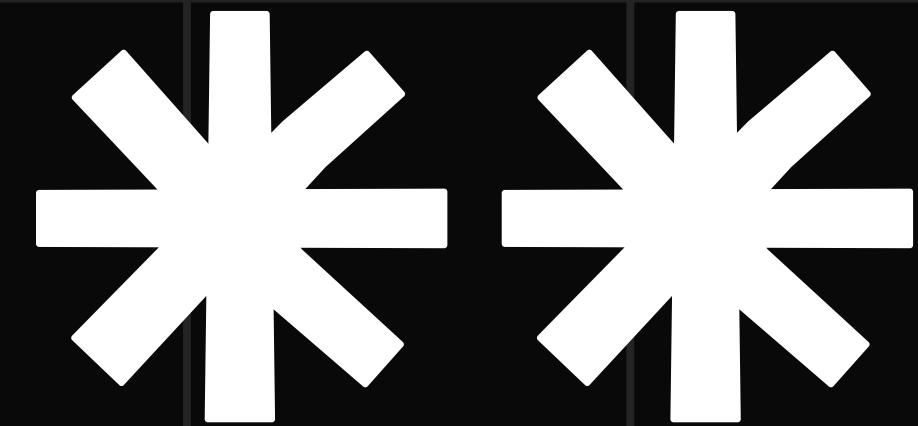
"Summarize the top AI trends of 2025 in 100 words for business professionals, using a formal tone. Ensure the response covers emerging AI technologies, business applications, and ethical concerns in a clear, concise, and structured manner."

# Post-Session Survey

📌 Scan the QR code to share your thoughts on today's session

📌 Your feedback will help me improve future sessions!





# Thankyou

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