Prompt Engineering: Crafting Effective AI Interactions

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July 2025

Outline

What is Prompt Engineering?

- **Definition**: The process of designing and refining input prompts to guide AI models (e.g., LLMs) to produce desired outputs.

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- **Goal**: Optimize model performance without changing the model itself.
- **Why Important?**: Enables precise, efficient, and creative interactions with AI.

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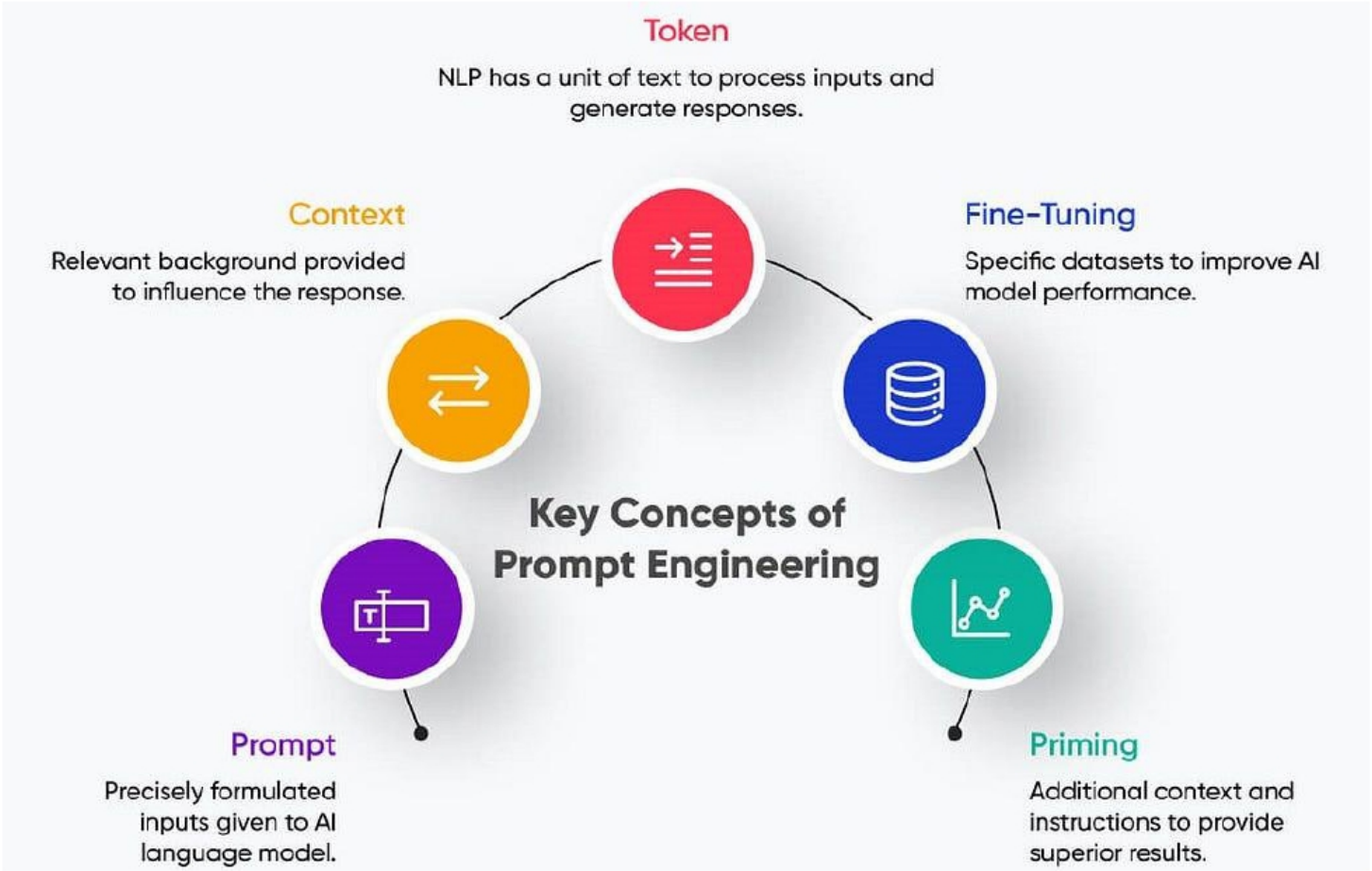
- **Connection to AI**: Core to interacting with LLMs like ChatGPT, Grok.


Token
NLP has a unit of text to process inputs and generate responses.
Context
Relevant background provided to influence the response.
Fine-Tuning
Specific datasets to improve AI model performance.
Key Concepts of Prompt Engineering
Prompt
Precisely formulated inputs given to AI language model.
Priming
Additional context and instructions to provide superior results.

PRACTICAL EXAMPLES OF PROMPT ENGINEERING

- “Write an introduction for a blog post about the benefits of remote work.”
- 'As a customer support agent, how would you respond to a customer who asks for a refund due to a defective product?'
- 'Create a lesson plan for a high school biology class on the topic of cell division.'
- 'Write a short story about a robot learning to understand human emotions.'
- 'Analyze the financial performance of Company X for the past fiscal year.'

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- **Constraints**: Specific requirements (e.g., "Use 50 words").

Types of Prompts

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- **Chain-of-Thought (CoT)**: Encourage step-by-step reasoning (e.g., “Explain your reasoning”).
- **Role-Based**: Assign a role (e.g., “Act as a teacher”).

Prompt Engineering Workflow

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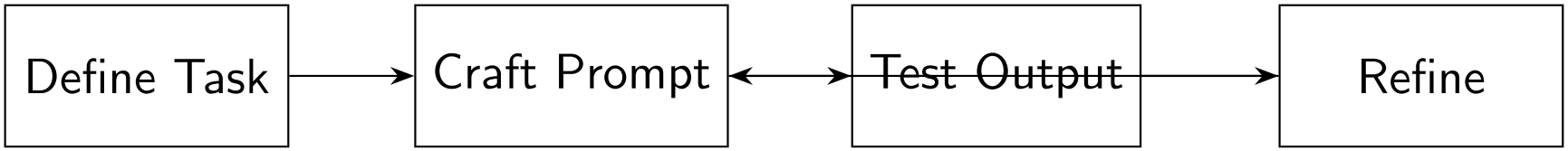
- **Visualization**:



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- **Iterative Refinement**: Adjust based on model responses.

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- **Benefit**: Improves accuracy for complex tasks.

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- **Benefit**: Helps model understand task without explicit training.

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- **Example**:
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  - Output: Detailed, academic explanation.
- **Benefit**: Tailors tone and style to specific needs.

Example: Text Summarization

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- **Key Elements**: Clear instruction, word limit constraint.
- **Refinement**: If too vague, add "Focus on main arguments."

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- **Key Elements**: CoT, specific dataset, step-by-step request.

Applications in Industry

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- **Programming**: Code generation, debugging.

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- **NLP Research**: Testing LLM capabilities.
- **Synthetic Data**: Generating datasets for ML training.
- **Scientific Writing**: Drafting papers, summarizing literature.

Challenges in Prompt Engineering

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- **Model Limitations**: LLMs may misinterpret complex prompts.
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- **Trial-and-Error**: Finding the right prompt requires iteration.

Best Practices

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- Techniques like CoT, few-shot, and role-based prompting enhance performance.
- Applications span industries, from content creation to research.
- **Future**: Prompt engineering will evolve with advancing LLMs.

References

- Brown, T. B., et al. (2020). Language Models are Few-Shot Learners. *Advances in Neural Information Processing Systems*, 33.

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- Wei, J., et al. (2022). Chain-of-Thought Prompting Elicits Reasoning in Large Language Models. *arXiv preprint arXiv:2201.11903*.