

Putting AI to Work

# 9

## Prompting Techniques

# Learning Objectives

- Generate AI output by formulating clear instructions without providing any examples
- Enhance prompt effectiveness by including a small number of examples to guide AI responses
- Guide an AI through a step-by-step reasoning process to improve accuracy and logic in complex tasks
- Evaluate multiple AI outputs and select the most consistent or well-reasoned response
- Instruct an AI to produce relevant background knowledge before addressing the main task
- Design and link a sequence of prompts that build on one another to handle complex or multistep workflows
- Analyze a desired output and construct an input prompt that would logically produce it

# Module 9.1: Zero-Shot Prompting

- Zero-shot prompting involves writing a clear, direct instruction without providing any examples.
- The AI relies entirely on how well the prompt communicates your intent.
- This works best when tasks are familiar to AI (for example, summarizing and translating).
- This is the ideal starting point for exploring tasks or testing AI understanding.
- Common applications:
  - Summarization
  - Translation
  - Categorization
  - Email writing

# Module 9.1: Ethics in Action

- Zero-shot prompts can produce confident but inaccurate results.
- Vague or ambiguous language leads to potential errors.
- Always verify outputs before using them to make important decisions.
- Special caution is needed for professional or educational purposes.

# Module 9.1: Techie Dive

- Performance depends on the model's pretraining from broad, diverse datasets.
- LLMs like GPT-4 generalize well with minimal instruction.
- Certain domains (for example, legal and medical) may require more precise guidance.
- Temperature and top-p settings influence response variability.

# Module 9.1: Business Lens

- Zero-shot prompting enables quick wins (for example, in tasks such as drafting slogans, writing emails, summarizing notes).
- It reduces preparation time and allows teams to experiment freely.
- It's cost effective for rapid prototyping and initial content generation.
- High-accuracy tasks may require example-based prompting instead.

# Module 9.2: Few-Shot Prompting

- It strengthens AI performance by providing examples of the desired output.
- Two components:
  - Sample input/output pairs
  - New input following pattern
- Showing the AI what you want improves the clarity, structure, tone, and formatting.
- This works because LLMs learn by observing patterns in examples.
- Few-shot prompting is best for matching tone/genre/structure and avoiding vague interpretations.

## Module 9.2: Ethics in Action

- Examples involving people, politics, or cultures can influence AI bias.
- There's a risk of reinforcing stereotypes or excluding diverse perspectives.
- Always consider the ethical impact of the samples provided.
- Responsible example selection is crucial for the generation of fair outputs.



## Module 9.2: Techie Dive

- Few-shot prompting activates a form of in-context learning (temporary pattern recognition from examples).
- This is different from fine-tuning, which permanently retrains the model.
- It works well in high-parameter models with large attention windows.
- Flexible pattern matching enables prediction based on the provided structure.

## Module 9.2: Business Lens

- Few-shot prompting is a practical way to improve quality without the need for extra tools or training.
- It's useful in customer service and in generating sales copy, reports, and code.
- Teams can build libraries of few-shot templates for consistency.
- Guide the tone, layout, and phrasing simply by adding examples.

# Module 9.3: Chain-of-Thought Prompting

- It encourages the AI to think out loud and walk through problems step by step.
- It guides through a logical sequence rather than providing a direct answer.
- Two forms:
  - Single prompt approach
  - Multistep prompting sequence
- It reduces hallucinations and reveals hidden assumptions.
- It's best for multistep logic, calculations, pros/cons analysis, and comparisons.

## Module 9.3: Ethics in Action

- The reasoning path can reflect biases in the AI's training data.
- The AI may unknowingly include unfair stereotypes in decision analysis.
- Always evaluate whether the logic is based on fair, factual, and ethical reasoning.
- A well-explained answer is not necessarily correct or just.

## Module 9.3: Techie Dive

- LLMs trained to complete patterns of structured reasoning respond well to chain-of-thought prompting.
- It activates latent reasoning paths encoded during training.
- Research shows reasoning cues unlock hidden capabilities.
- A model generates text mimicking thoughtful problem-solving behavior.

## Module 9.3: Business Lens

- Chain-of-thought prompting is useful for decision-making, identifying trade-offs, and prioritization.
- The structured output is easier to review, validate, and present to stakeholders.
- It traces how the AI arrived at its suggestions.
- It increases transparency and accountability in AI-assisted recommendations.

# Module 9.4: Self-Consistency Prompting

- It generates multiple outputs from the same prompt to help the user select the most logical one.
- It reduces randomness and improves reliability for complex tasks.
- Methods:
  - Manual repetition
  - Automatic sampling with temperature settings
- It exposes weak reasoning, reveals patterns, and reduces hallucinations.
- Quality control is achieved through comparison rather than through single-response reliance.

## Module 9.4: Ethics in Action

- A single AI response can unintentionally reinforce bias or misinformation.
- Self-consistency prompting acts as safeguard to spot outliers and compare reasoning.
- This type of prompting is important when AI is summarizing sensitive topics or making impactful recommendations.
- It allows for the selection of the most thoughtful or fair result among options.



## Module 9.4: Techie Dive

- Self-consistency prompting leverages the stochastic (random) nature of AI models with varied outputs.
- Sampling multiple outputs forces a model to reveal different reasoning paths.
- Tools allow users to set a number of responses and the temperature for randomness.
- The truth often emerges from comparing diverse results.

## Module 9.4: Business Lens

- Self-consistency prompting is a quality-control tactic for email copy, reviews, and feedback analysis.
- After reviewing multiple outputs, the user selects the most polished, on-brand message.
- It's a low-effort way to improve quality without rewriting prompts.
- It reduces the risk of publishing weak or off-message content.

# Module 9.5: Generated Knowledge Prompting

- With this type of prompting, the AI explains the background knowledge before completing the main task.
- Two-step process:
  - Generate background information first (teach me the topic).
  - Apply it (solve the problem).
- This is useful for complex tasks or when the user is uncertain about the AI's current facts.
- This differs from chain-of-thought prompting, as it focuses on facts and not on logical reasoning.

## Module 9.5: Ethics in Action

- AI-generated knowledge doesn't guarantee accuracy.
- It may include outdated or biased information.
- Always review generated facts before use.
- This is especially important for educational or public-facing content.

## Module 9.5: Techie Dive

- Generated knowledge prompting relies on retrieval-augmented generation (RAG) with internet access.
- It uses internal training data when offline.
- Some platforms allow reasoning chains in a single prompt.
- The platform's capabilities determine the optimal implementation.

## Module 9.5: Business Lens

- Generated knowledge prompting is useful for training staff, generating reports, and creating public content.
- Summarize the product specs before drafting press releases.
- It ensures foundational understanding before application.
- It improves business communications by providing relevant context.

# Module 9.6: Prompt Chaining

- This involves multiple prompts in sequence, where each builds on the previous result.
- It breaks complex challenges into manageable steps with review points.
- It helps the AI stay focused, reduces hallucinations, and improves accuracy.
- It's ideal for step-by-step workflows and content-creation pipelines.
- It focuses on task structure through modular steps.

## Module 9.6: Ethics in Action

- Chained prompts produce longer, complex outputs requiring review.
- Review the intermediate steps for fairness in automated decision making.
- Don't just accept final result without checking each step.
- Transparency in the chain process is crucial for accountable AI use.



## Module 9.6: Techie Dive

- Prompt chaining mimics modular programming with functions passing results.
- It's effective in API-based AI tools and scripting platforms.
- It can automate with Zapier, Make, or custom Python workflows.
- It enables scalable, repeatable AI-assisted processes.

## Module 9.6: Business Lens

- Prompt chaining adds reliability through quality checking at each stage.
- Verify each part rather than relying on a single, giant prompt.
- It ensures brand alignment, voice consistency, and strategic messaging.
- It enables generative tools at scale with maintained quality control.

# Module 9.7: Reverse Prompting

- Define the desired outcome first and then figure out what prompt produces it.
- This flips the usual approach: If this is the answer, what prompt leads to it?
- Two methods:
  - Manual reverse engineering
  - AI-assisted suggestion
- It's helpful when the output must meet a specific format, tone, or goal.
- It builds prompt-writing skills by working backward from examples.

## Module 9.7: Ethics in Action

- Reverse prompting can be used to manipulate outputs or support misleading narratives.
- Use it for transparency and clarity, not distortion.
- Avoid matching personal biases or generating predetermined conclusions.
- Responsible use focuses on improving communication quality.

## Module 9.7: Techie Dive

- Some tools support prompt tuning or prompt interpolation.
- These methods find patterns in effective input phrasing from multiple outputs.
- In simple tools, reverse prompting looks like feeding the AI a sample and asking what prompt would create it.
- Advanced techniques automate the discovery of optimal prompt structures.

## Module 9.7: Business Lens

- Use reverse prompting to define a brand-appropriate voice, response formats, and customer service patterns.
- Collect successful communication examples to develop prompt templates.
- Templates mirror high-performing outputs for consistency.
- This enables the standardization of AI communications while maintaining quality.

# Key Takeaways

- Seven prompting techniques serve different purposes based on task requirements.
  - Zero-shot for simplicity
  - Few-shot for examples
  - Chain-of-thought for reasoning.
  - Self-consistency for reliability
  - Generated knowledge for preparation.
  - Prompt chaining for complex workflows
  - Reverse prompting for outcome-focused design.
- All techniques require human oversight for accuracy, bias checking, and ethics.
- Complex tasks benefit from combining multiple techniques.
- The goal is shaping AI responses for accuracy, reliability, and alignment with intent.
- Business applications include content creation, decision support, and quality control.
- Understanding the technical foundations helps users choose optimal strategies.
- Prompting is a skill that improves with practice and technique selection.