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AI Powered Solutions

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HANDS ON

BOOTCAMP Leveraging Generative AI

Financiado por la Unión Europea
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Plan de Recuperación, Transformación y Resiliencia

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Welcome to the wonderful world of Generative AI

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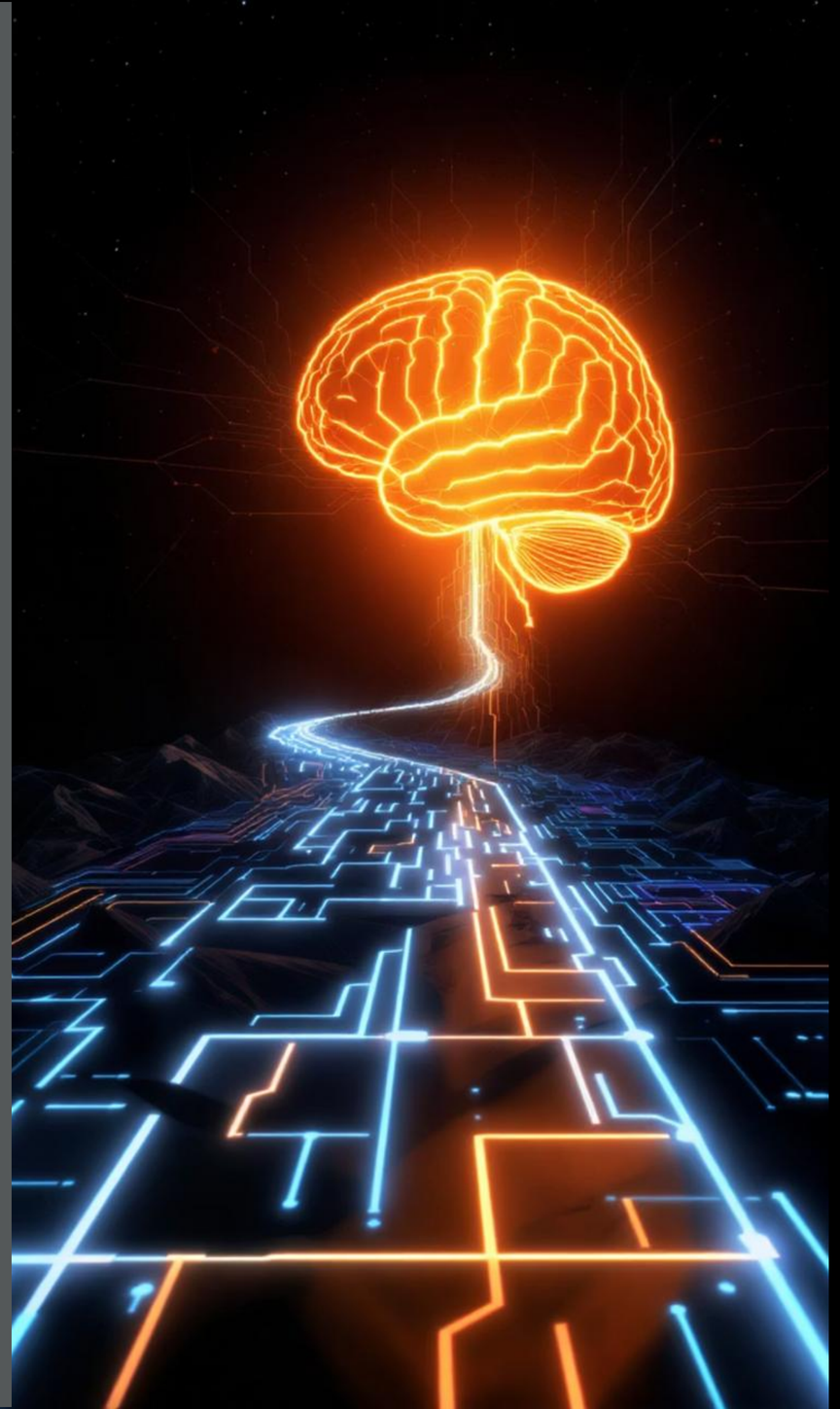

Agenda

- Understanding Generative AI
- The Prompt Engineer Mindset
- Anatomy of Prompt
- Applied Prompt Engineering

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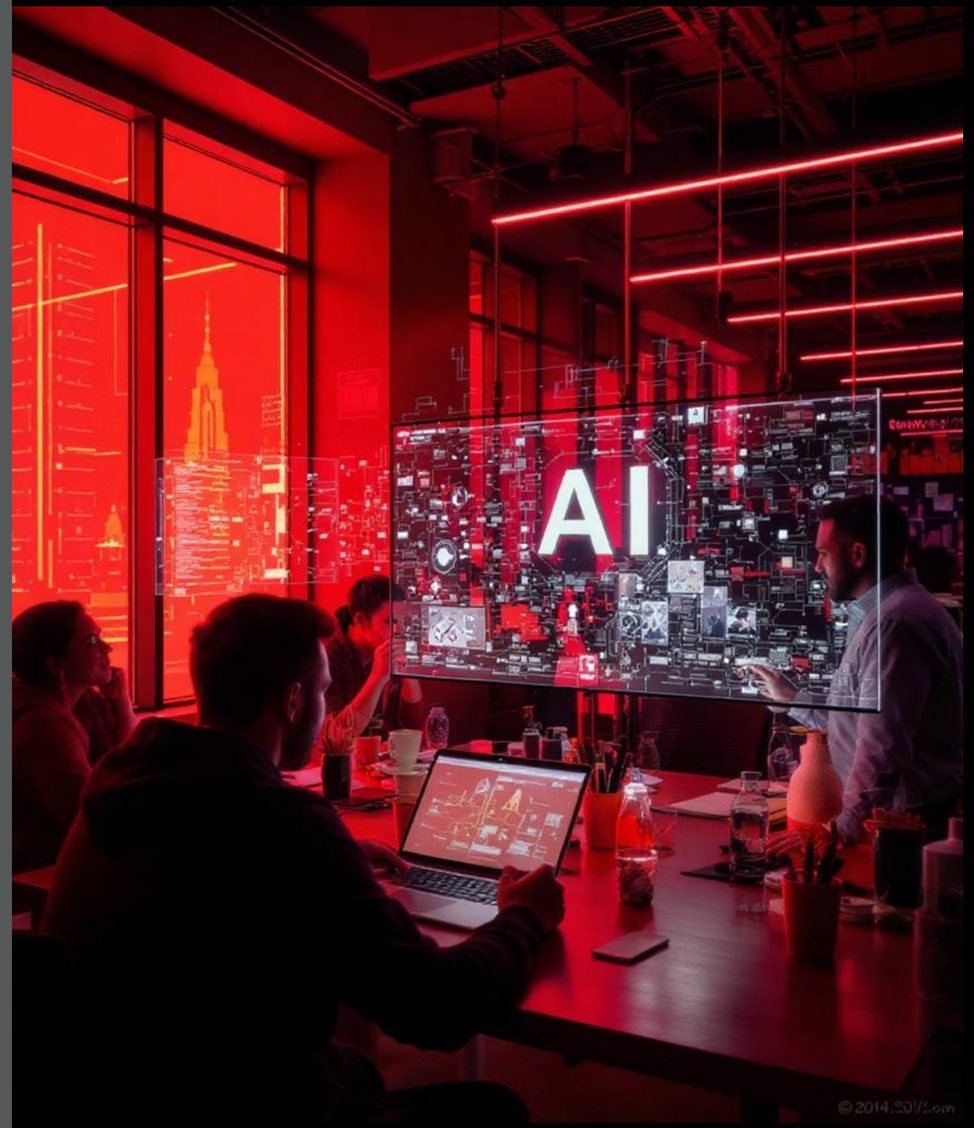

Rules of Engagement

Learning by Doing

The most effective way to understand Generative AI is through hands-on experimentation and creative exploration.

Open Minds, Open Possibilities

Approach today with curiosity and willingness to try new things—you'll be surprised by what you can create.

Your AI Journey Starts Now

Grab your notebook or keyboard and prepare to generate something completely new using the power of AI creativity.

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Understanding Generative AI

Part One: Exploring the foundations of AI systems that create

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"Artificial Intelligence" The Ultimate Umbrella Term

When people say **AI**, they're talking about a *family* of technologies and research areas that all share one big goal: **getting computers to do tasks that normally require human intelligence**.

Inside that family sit several specialized sub-fields, each focused on a slice of that goal—just like different departments inside one large company.

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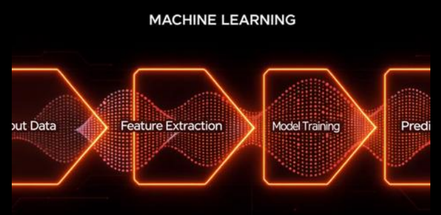
Core AI Subfields



Machine Learning (ML)

Teach computers to *learn from data* instead of following hard-coded rules. The program improves as it sees more examples. **Examples**: Spam filters, recommendation engines, fraud-detection models

Artificial Neural Networks

A digital copy-cat of the brain: lots of tiny "virtual neurons" pass signals to each other, and each connection gets stronger or weaker as the model learns.

Deep Learning

A subset of ML that uses deep neural networks—many stacked layers of tiny math "neurons" that discover their own features from raw data.
Examples: Banking apps spotting handwritten cheque numbers, self-driving cars, Face ID on phones

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Core AI Subfields

Large Language Models

A deep-learning giant trained on oceans of text. It plays the "guess-the-next-word" game billions of times until it can hold a conversation or write code.

Examples: ChatGPT answering questions, Gmail autocomplete

Natural Language Processing (NLP)

Help computers *understand, generate, and interact* with human language spoken or written.

Examples: Chatbots, voice assistants, automatic translation, text summarizers

Computer Vision

Enable machines to *see and interpret* images or video.

Examples: Face-unlock on phones, self-driving-car cameras, medical image diagnostics

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Generative AI [Gen AI]

Content Creation

(built largely on ML + NLP) Gen AI creates brand-new content—text, images, music, code—by learning patterns in data.

The Magic Factor

What feels magical is its ability to remix learned patterns into something entirely original, like composing a unique song or writing a fresh story.

Beyond Copying

It doesn't just copy existing content but understands patterns well enough to generate something new that follows similar rules and styles.

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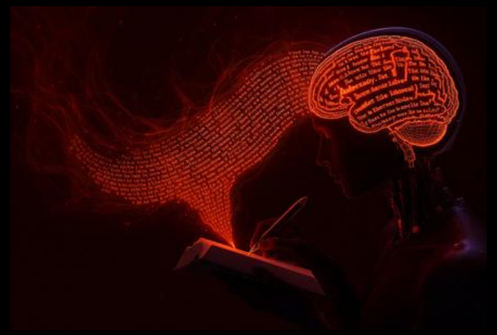
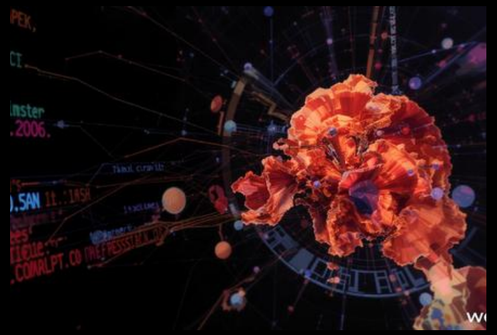
Different Types of Generative AI



Text Generation

Creates articles, stories, emails, and conversations that read naturally and follow proper grammar and style

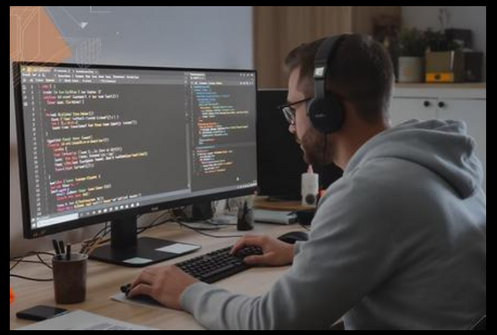


Visual Creations

Generates photographs, artwork, logos, illustrations, and videos from text descriptions or style preferences

Audio Synthesis

Composes original music, creates realistic voice narration, and generates sound effects



Code Generation

Writes software programs, debugs existing code, and translates between programming languages

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Let me test your knowledge with an analogy

How about food?

Let's pretend that Generative AI models are world class trained chefs

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The Chef Analogy: Part 1

Culinary School

Teaches cooking skills and basic recipes, similar to how machine learning provides core algorithms and training routines for AI models

Quality Ingredients

Quality produce from diverse sources, just like AI needs large, diverse, well-curated datasets to learn effectively

Cooking Techniques

Chopping, sautéing, and baking methods parallel the algorithms that transform, combine, and generate content in AI

Taste Testing

Constant refinement through feedback mirrors how AI systems improve through user feedback and real-world testing

Suggested AI Chefs

Model	Strength	Use Case
Gemini 2.5 Pro	Advanced multimodal reasoning	Large Document analysis
GPT-4	Superior language comprehension	Creative Writing
Claude	Safety-first understanding	Legal and technical content
Microsoft Copilot	Enterprise workflow optimization	Short professional tasks
Perplexity AI	Research-oriented context	Deep Research and Labs
Gamma	Multimedia output	Presentations and social media

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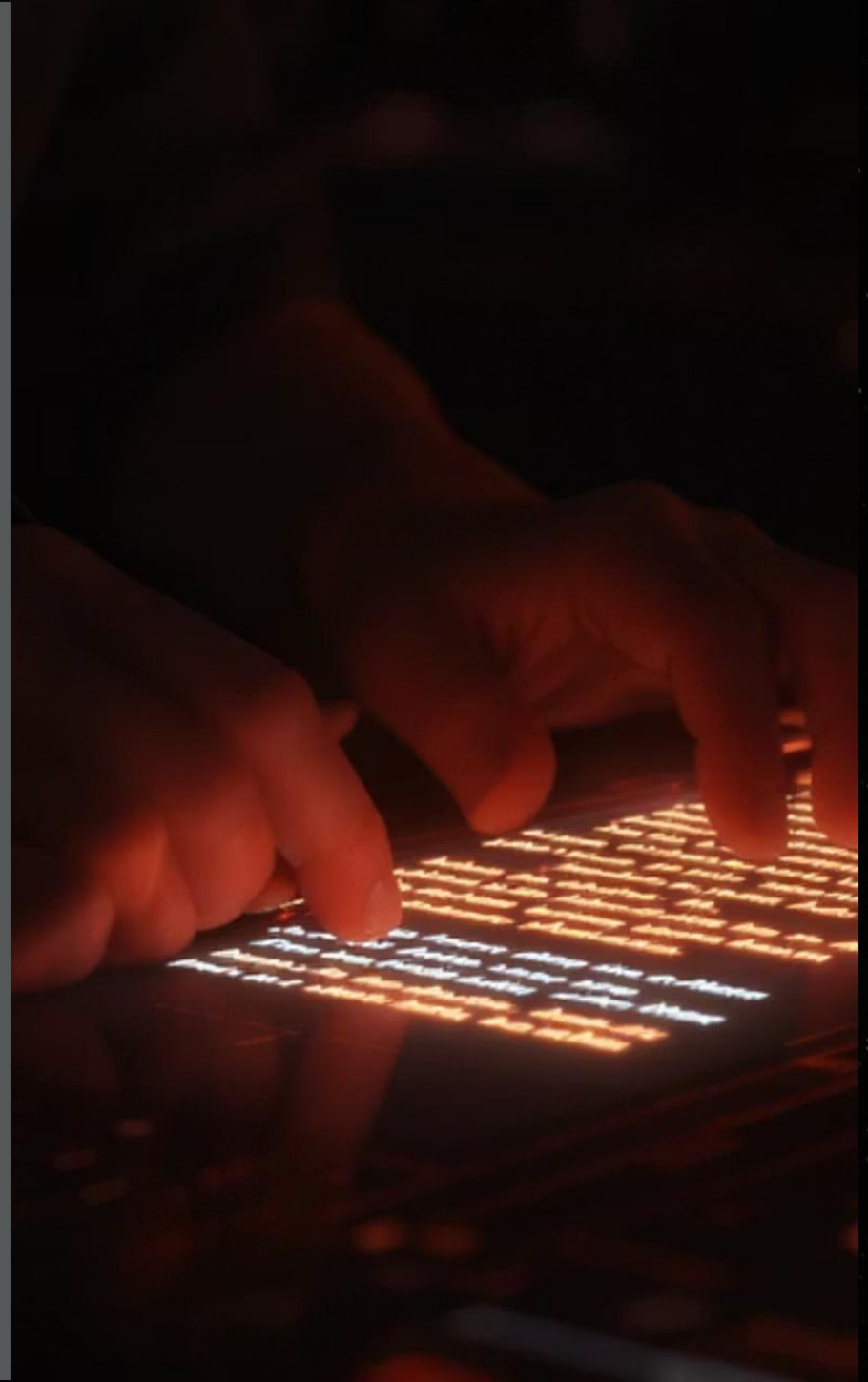

The Prompt Engineer Mindset

Part Two: Learning to communicate effectively with AI systems

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The Chef Analogy (part 2)

Your Role as the Customer

Think of yourself as a discerning customer visiting a world-class chef. Just as you wouldn't simply say "make me food," effective prompting requires specificity, context, and clear expectations to achieve the desired outcome.

AI as the Master Chef

The AI model draws from its vast knowledge databases to create exactly what you've requested by combining different elements - data, patterns, and learned techniques. However, the quality of your "dish" depends entirely on how well you communicate your needs and preferences.

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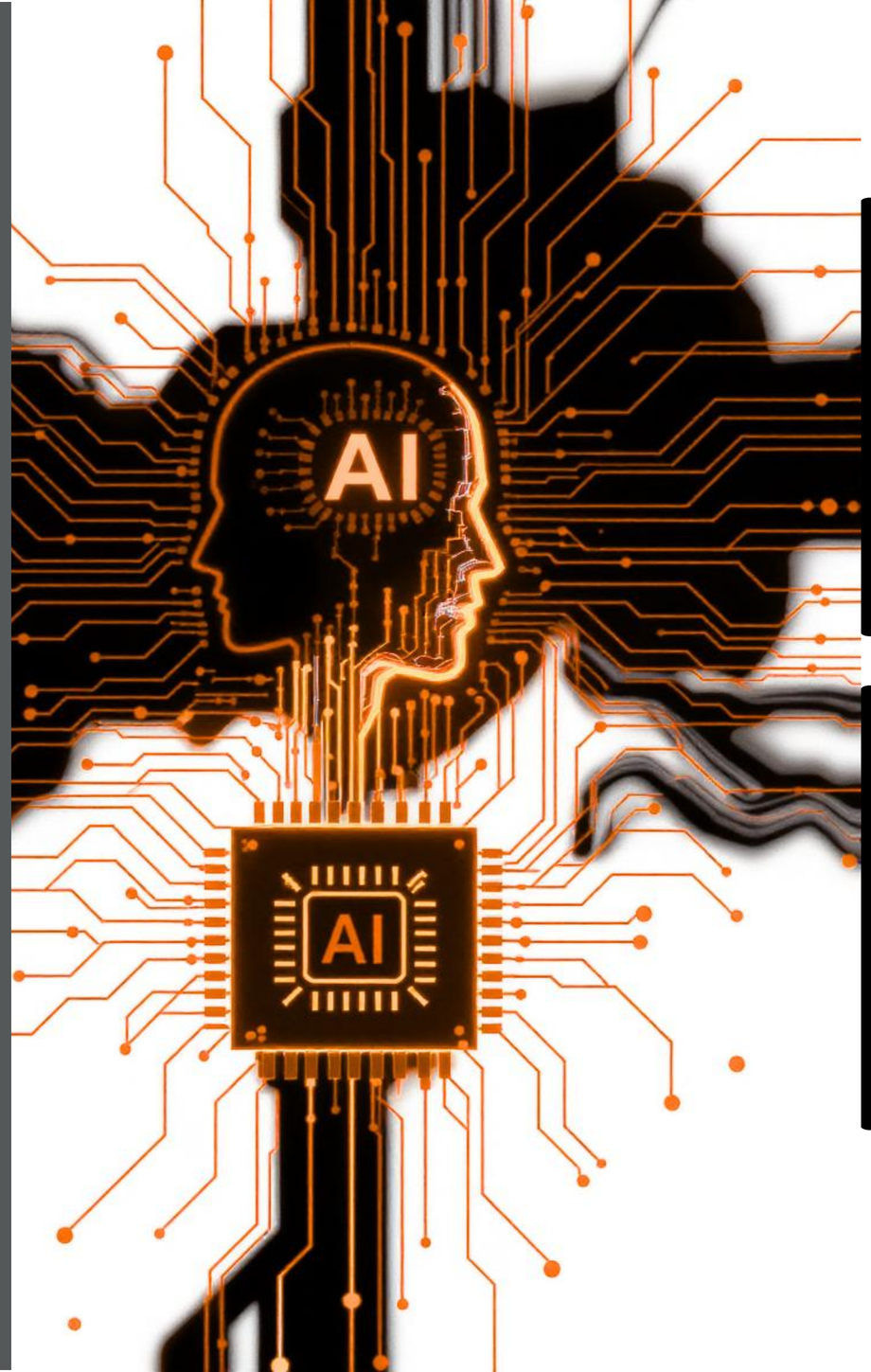

What is a Prompt?

A prompt is the preliminary message you send to your LLM model containing your request, or question. It is the conversation starter between you and your AI model

Triple Purpose Design

Every effective prompt serves 3 essential functions: it provides **clear instructions**, establishes specific **topic and contextual** framework, and defines the unique **output format.**

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The Boundaries of Data-Driven 'Intelligence'

AI lacks self-awareness or genuine understanding; it simply replicates patterns found in its training data.

While AI can generate impressively human-like responses, it's important to remember that these systems don't truly "understand" content the way humans do—they lack consciousness, intentions, and actual comprehension.

Understanding these limitations is crucial for prompt engineers to set realistic expectations and design prompts that work within AI's capabilities rather than assuming human-like understanding.

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Challenges in AI Reliability

Hallucination

Generative AI models can produce inaccurate or made-up information, known as hallucinations, and present them in convincing, well-structured, completely plausible lies or fabrications.

Lack of Transparency

Many AI systems cannot explain their decisions in human terms. Complex models resist meaningful inspection and oversight. When AI causes harm, responsibility is often unclear.

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Bias Amplification

AI systems trained on biased historical data inevitably perpetuate and magnify those biases. For example, resume-screening AI trained on historical hiring data may penalize women's applications if past hiring favored men.

When certain demographics are underrepresente in training datasets (e.g., darker skin tones in facia recognition data), the resulting systems perform dramatically worse for these groups, with error rates up to 34% higher.

AI DOESN'T JUST REPLICATE BIASES—IT CAN AMPLIFY THEM THROUGH FEEDBACK LOOPS. When biased AI systems make decisions that further skew data collection, the next generation models becomes even more biased.

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The Four-Step Prompting Process

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Step 1 : Identify Objective

Clearly define what specific information or response type you need, understanding both the what and the why behind your request.

Step 2: List Details

Gather and organize all relevant background information, context, and specifics that will help the AI understand your needs.

Step 3: Define Constraints

Establish clear boundaries including confidentiality requirements, format preferences, style guidelines, and any limitations.

Step 4: Create Prompt

Combine all elements into a clear, specific, and unambiguous prompt that serves as a comprehensive recipe for success.

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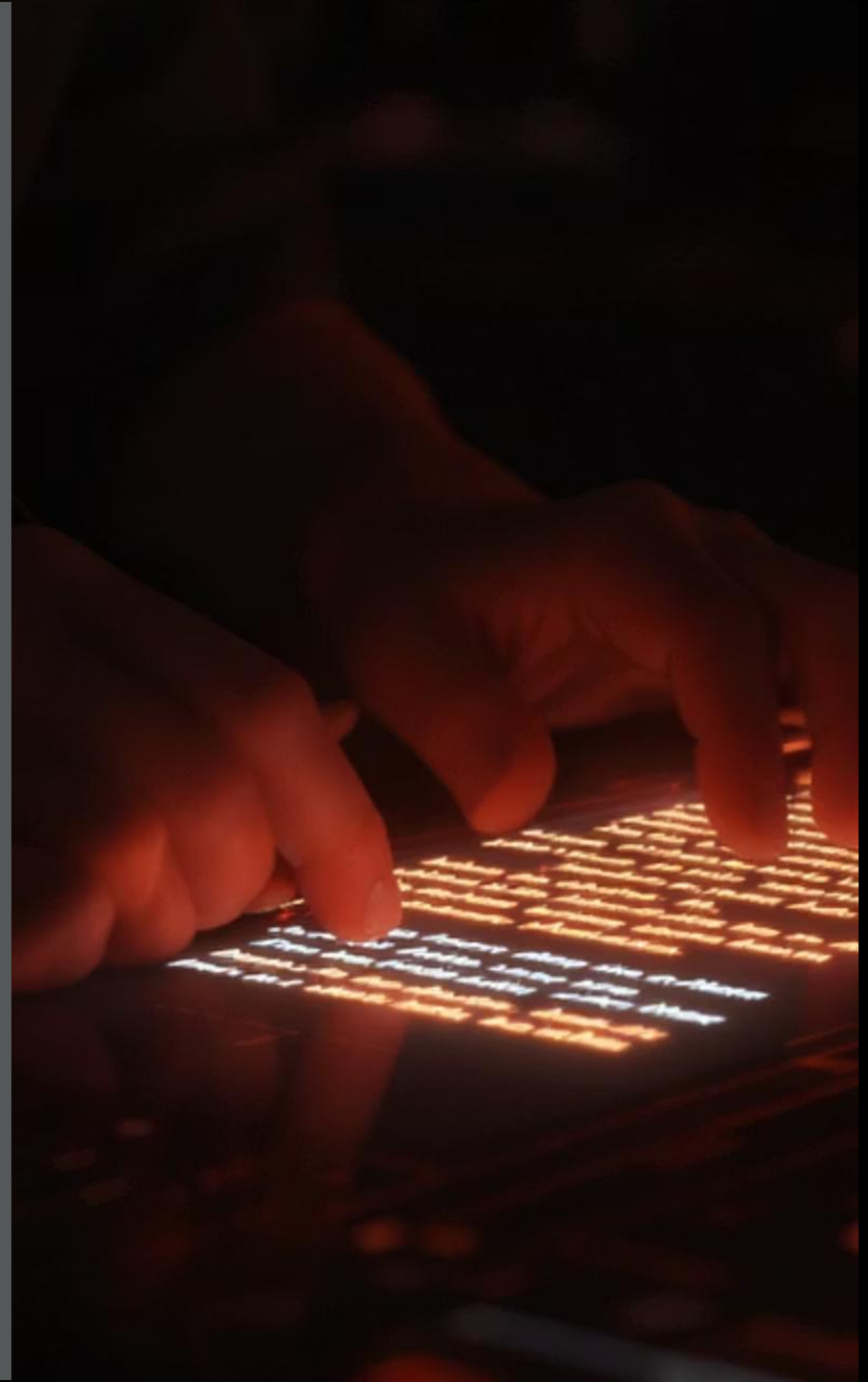

Anatomy of a Prompt

Part Three: The Four Building Blocks of Effective Prompts

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Effective prompts are built on four essential components that work together to guide AI responses. Each component serves a specific purpose in shaping how the model understands and responds to your requests.

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Instruction = Action Verb

The first word in your prompt often has the greatest impact on the direction and quality of the response. By choosing the right instruction verb, you're essentially programming the model's approach to your request, keeping it focused on delivering exactly what you need.

Direction

Sets the primary action for the AI to perform

Focus

Keeps the model focuses on your specific need

Quality

Improves response relevance and precision

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Strong Instruction Verbs

Explain
For clear descriptions and educational content

Compare
For analytical contrasts between multiple items

Generate
For creative content like stories or ideas

Summarize
For concise overviews of complex information

Analyze
For deep examination of underlying patterns

Outline
For structured frameworks of topics

Additional powerful verbs: Critique (for evaluative feedback), Translate (for conversion between languages), Brainstorm (for multiple creative options), and Simplify (for making complex topics accessible).

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Topic = Raw Material

The topic functions as the concrete subject matter you feed to the model—the raw material it will process and transform. Like a sculptor selecting the right clay, your topic's quality, specificity, and boundaries directly determine the precision and utility of your AI-generated output.

> The quality of your topic directly influences the quality of your AI-generated results.

A well-defined topic provides the necessary substance for the model to work with, ensuring that the response addresses your specific needs rather than providing generic information.

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Characteristics of an Effective Topic

1. **Clear** — Precisely defines the subject matter (e.g., "GPT-4's multimodal capabilities" rather than "AI abilities")
2. **Self-contained** — Includes all necessary context without requiring prior knowledge (e.g., defining CRISPR before asking about gene editing applications)
3. **Jargon-free** — Uses plain language unless technical precision is required (e.g., "monthly sales trends" vs. "temporal revenue fluctuation patterns")
4. **Focused** — Targets one main subject rather than multiple unrelated areas (e.g., "renewable energy adoption in Germany" not "European energy and transportation")
5. **Specific** — Incorporates quantifiable details that appropriately narrow scope (e.g., "2020-2023 quarterly data" instead of "recent years")

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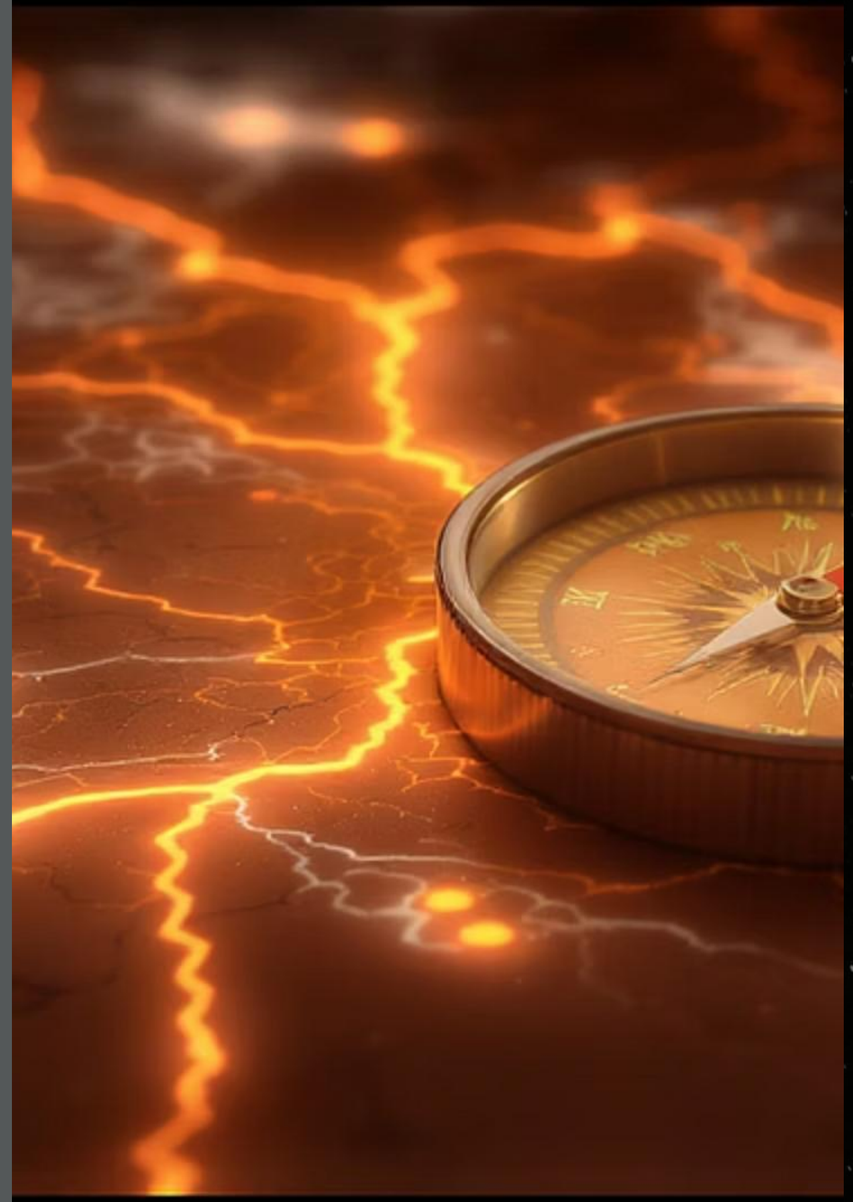

Context = Compass

Context acts as a compass that guides the model's understanding and response. It increases relevance by providing essential background information and reduces bias by establishing a clear framework. Without adequate context, the model may rely on general knowledge or assumptions that don't align with your specific needs.

Effective context is concise yet comprehensive, providing just enough information to orient the model without overwhelming it with unnecessary details. The right context can dramatically improve the quality and accuracy of your results.

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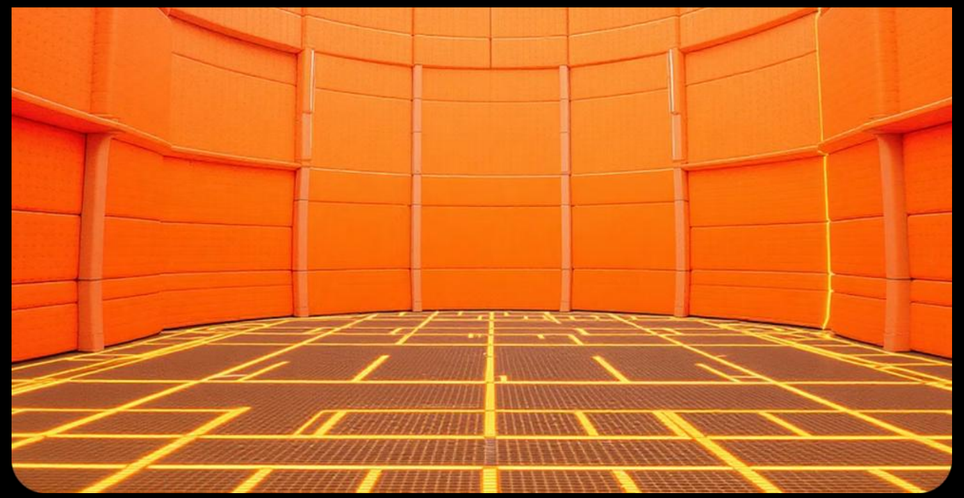
Types of Context

Prior Conversation

Reference previous exchanges to maintain continuity and build on established information.

"Based on our earlier discussion about renewable energy..."



Constraints

Set boundaries for the response to ensure relevance and focus.

"Focus only on North American markets from 2020-2023..."

Output Indicator = Ruler

The output indicator tells the model **how** to answer your question or request. It serves as a measuring tool to ensure the response meets your specifications for format, length, style, and other parameters.

1 Length Specifications

- "Answer in 150 words or less"
- "Provide a comprehensive 500-word analysis"

2 Format Requirements

- "Present as a markdown table"
- "Create a bullet-point timeline"

3 Style Guidelines

- "Use technical language appropriate for NGO"
- "Explain as if speaking to a 10 year-old"

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Applied Prompt Engineering

Part Four: Exploring how to apply prompting principles to solve real-world challenges when working with generative AI.

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Problem Statement

What are the challenges of using Generative AI tools to create proposals or large documents?

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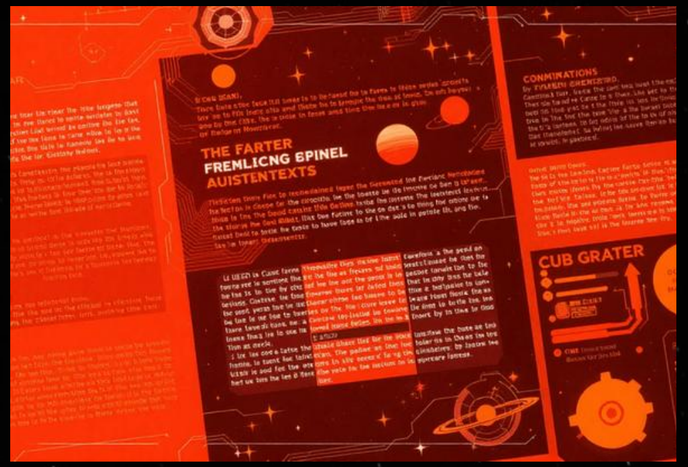
Challenges with AI-Generated Proposals



Generalized Output

AI often produces generic responses, which can lack the specific details and tailored language required for effective grant proposals, making the content less persuasive and aligned with the grant's requirements.

Tokenization Limits

These models have a maximum token limit, restricting the length and detail of the generated text. This makes it hard to create complete, cohesive grant proposals without content being cut off or overly compressed.

The Human Element

AI models, while impressive, may struggle to grasp the nuances of specific industries, projects, or client needs. This can lead to generic or irrelevant content.

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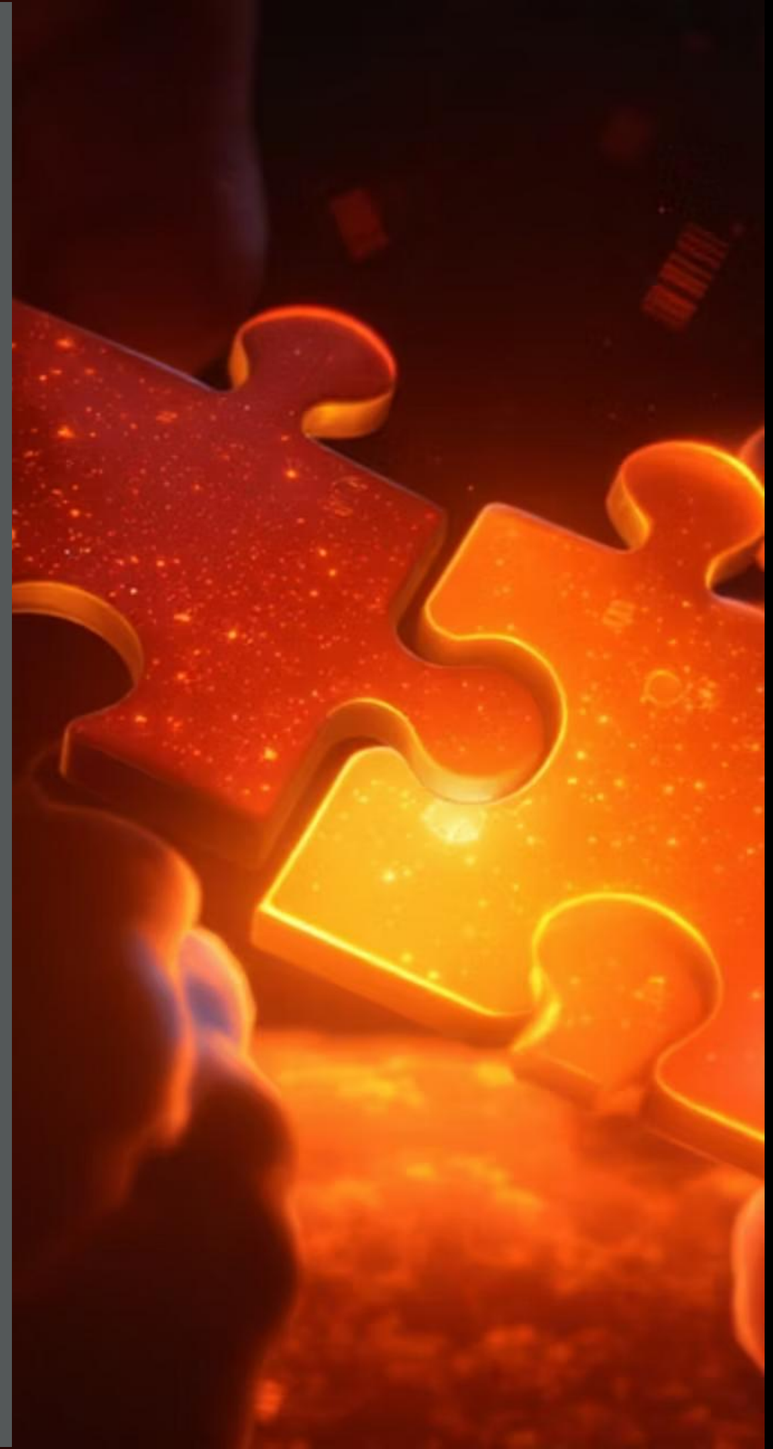

Solutions

Prime Before You Prompt

Provide context and background information before making specific requests

Assume as Many Roles as You Need

Guide the AI to adopt specific expert perspectives

Segmenting for Effective Tokenization

Break down complex tasks into manageable chunks

Section-Wise Prompting

Generate content one section at a time for better focus and quality

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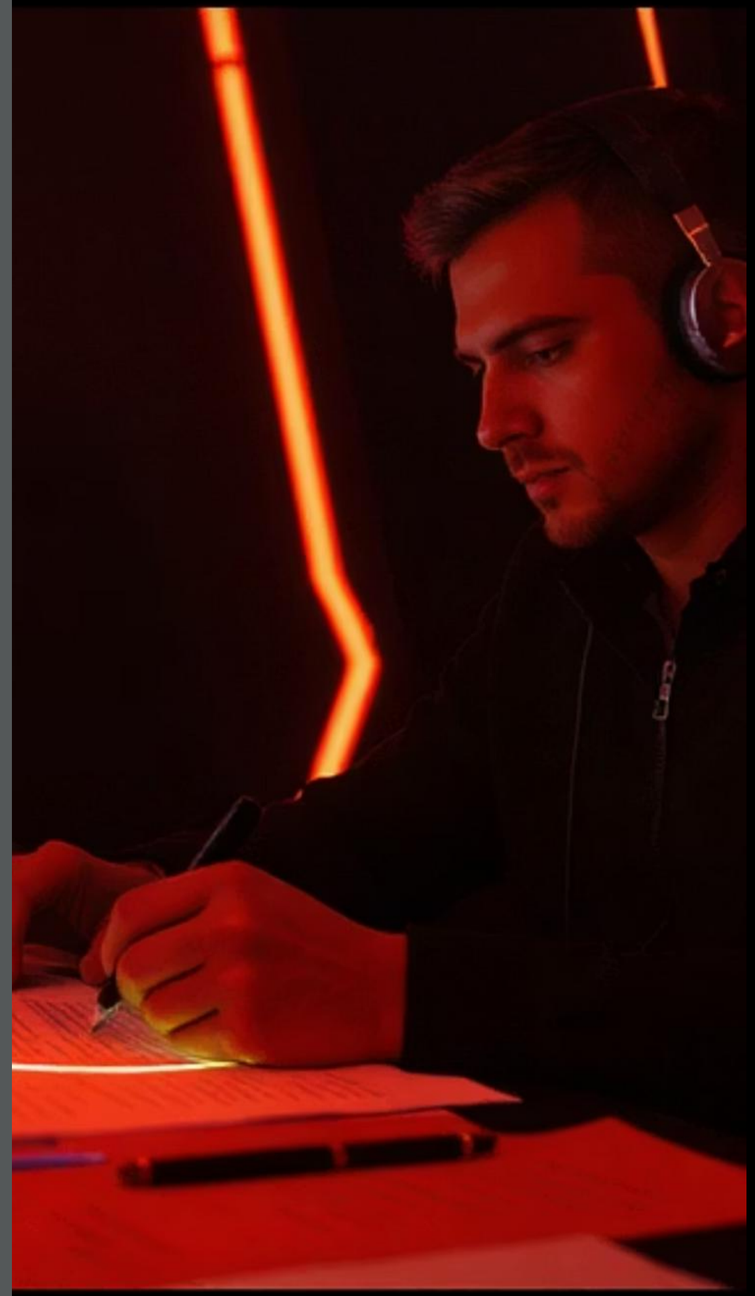

1. Prime Before You Prompt

"Before we begin, please review (the attached documents) **or** (the below details) regarding a project I would like to apply for.

> **(attach documents or copy paste details here).**
>
> Do you understand the scope, needs and objectives of the project?"

Tip: Ask your AI model if they needed more information to fully understand the project. Example prompt: "Ask me for any missing information you may need."

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2. Assume as Many Roles as You Need

One of the most effective techniques is to have the AI assume a role when generating content. This guides the AI to produce text that reflects the perspective and priorities of the assumed role.

Given that a proposal is a technical document, we must be mindful of the different experts needed to create a cohesive and informed final product. Consider the nature of the project and the expertise required, then choose who would deliver the best results.

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Role Assignment Examples

Project Manager

"Assume the role of a project manager with 10 years of experience in humanitarian aid. Draft the implementation plan for a proposal to [donor type] on [project topic]."

Environmental Expert

"As an expert in environmental conservation, write the Objectives section for a proposal targeting [donor type] for a project on sustainable agriculture."

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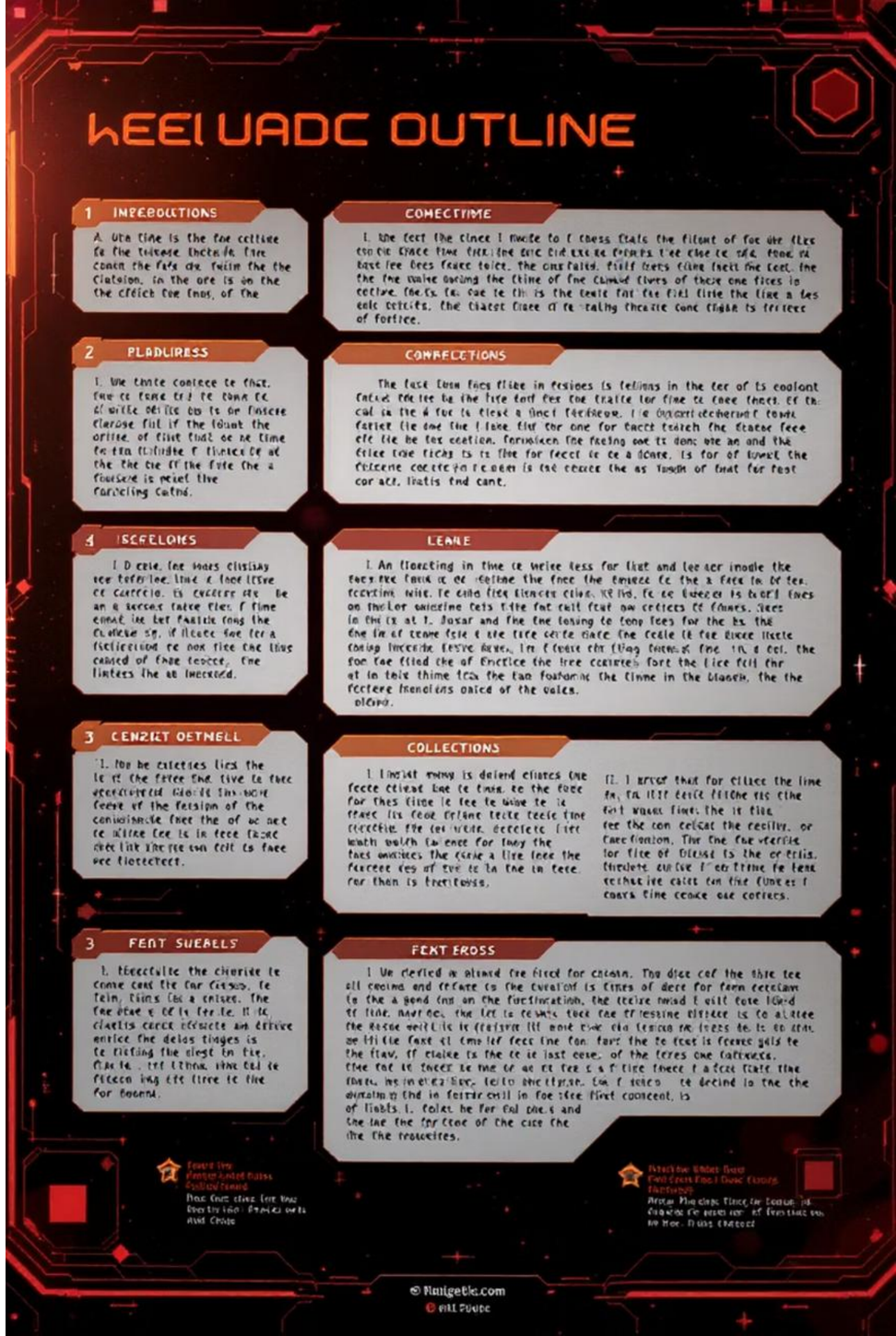
3. Segmenting for Effective Tokenization

> Assume the role of a/an **(enter Topic Expert)** designing a proposal for **(Enter Terms of Reference or attach)**. Please begin by drafting an outline for the proposal.

After choosing your expert, begin by prompting AI to generate a detailed outline of the document. This breaks down the AI generation process into manageable sections that fit within the token limits of the AI model.



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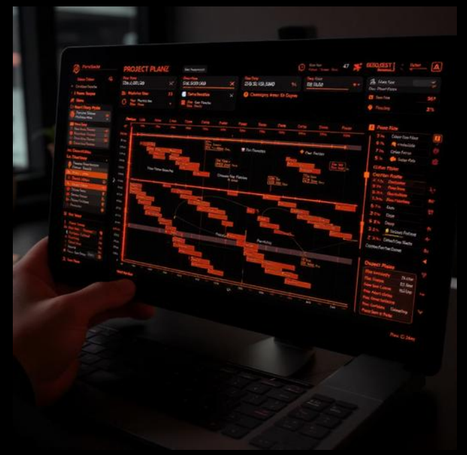
Segmentation Examples

Assume the role of a **Gender Studies expert** designing a policy paper for a **gender evaluation in Egypt for the public education sector**. Please begin by drafting an outline for the proposal.



Assume the role of **an expert project manager** designing a project plan for the **attached project brief**. Please begin by drafting an outline for the project.

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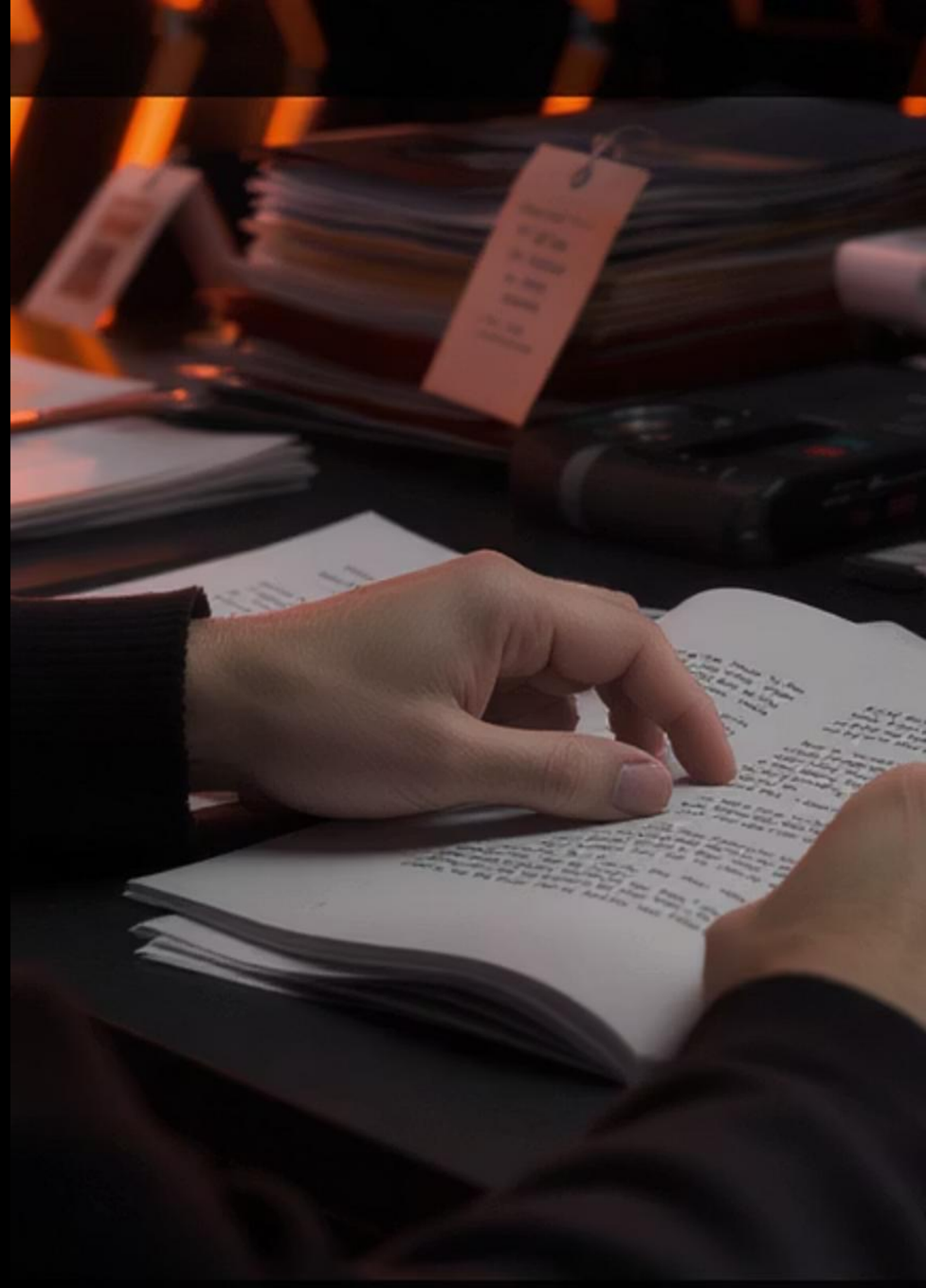
4. Section-Wise Prompting

After creating the outline, prompt AI to generate each section individually. In the same conversation as your outline, your next prompt would be:

> **"Based on the outline, expand the Executive Summary for a proposal to [donor type] for a project on [project topic]."**

This approach helps in maintaining focus and clarity in each section and avoids token overflow issues. You can change roles for different sections to make sure that they are technically accurate.



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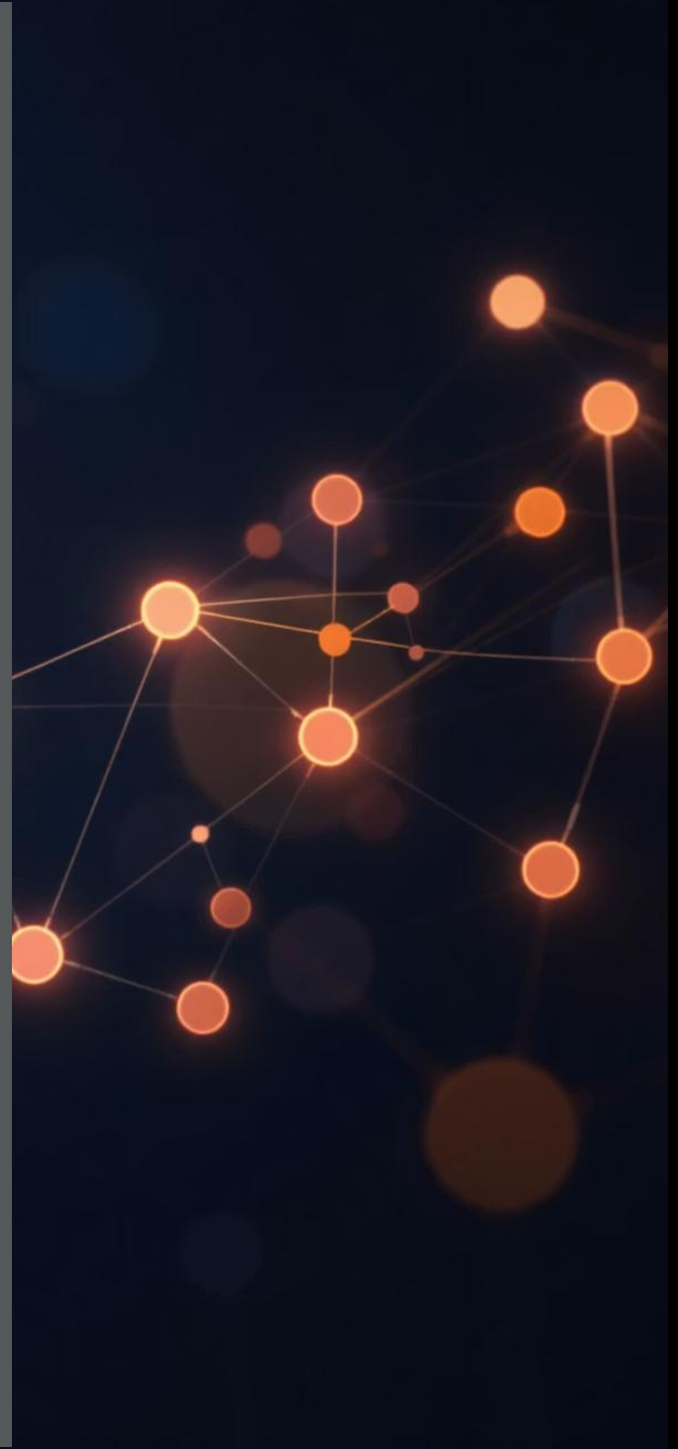

Prompting Do's

Be clear and specific with requests

Precise instructions lead to more accurate responses

Specify your intended audience or tone

Helps tailor the content appropriately

Provide important context or background

Ensures the AI understands the full picture

Assign a role or persona to the AI

Guides the perspective and expertise in responses

Use structured, logically ordered instructions

Makes complex requests easier to follow

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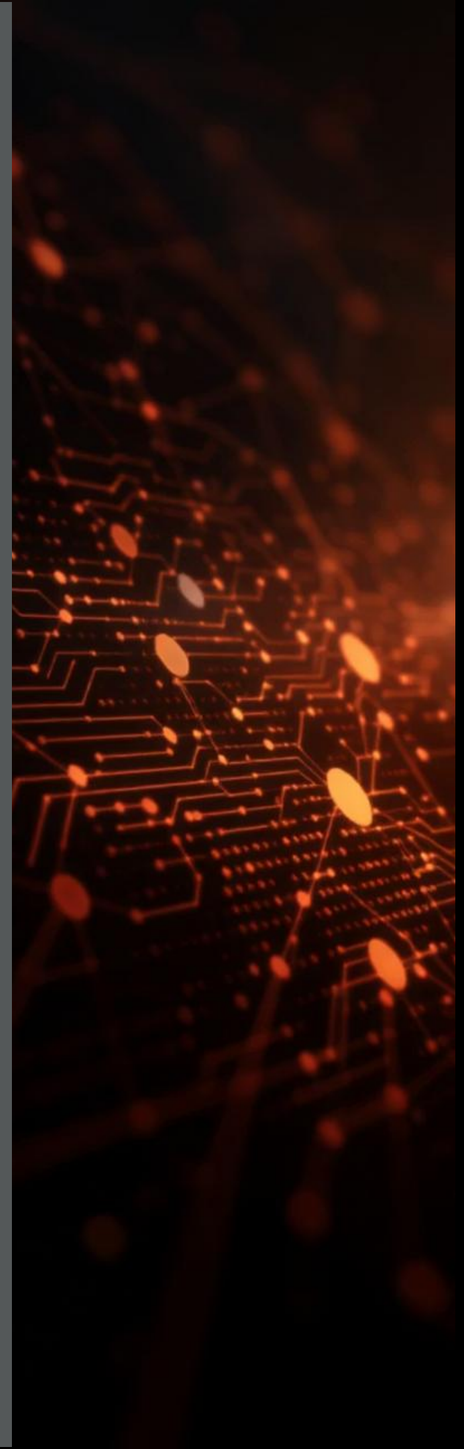

Include few-shot examples for style or format

Providing examples helps the AI understand exactly what you're looking for and can dramatically improve results

Use line breaks to separate ideas and inputs

Clear formatting makes your prompts easier for the AI to parse and understand correctly

State desired outcome or format explicitly

Being clear about what you want helps the AI deliver results that match your expectations

Set realistic expectations for the AI's abilities

Understanding limitations leads to better prompting strategies

Iterate and refine prompts based on results

Continuous improvement through feedback and adjustment

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QUESTIONS

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