

PROMPT ENGINEERING

Mastering the Art of Crafting Intelligent Queries

A Comprehensive Guide to
Enhancing AI Conversations
and Problem-Solving

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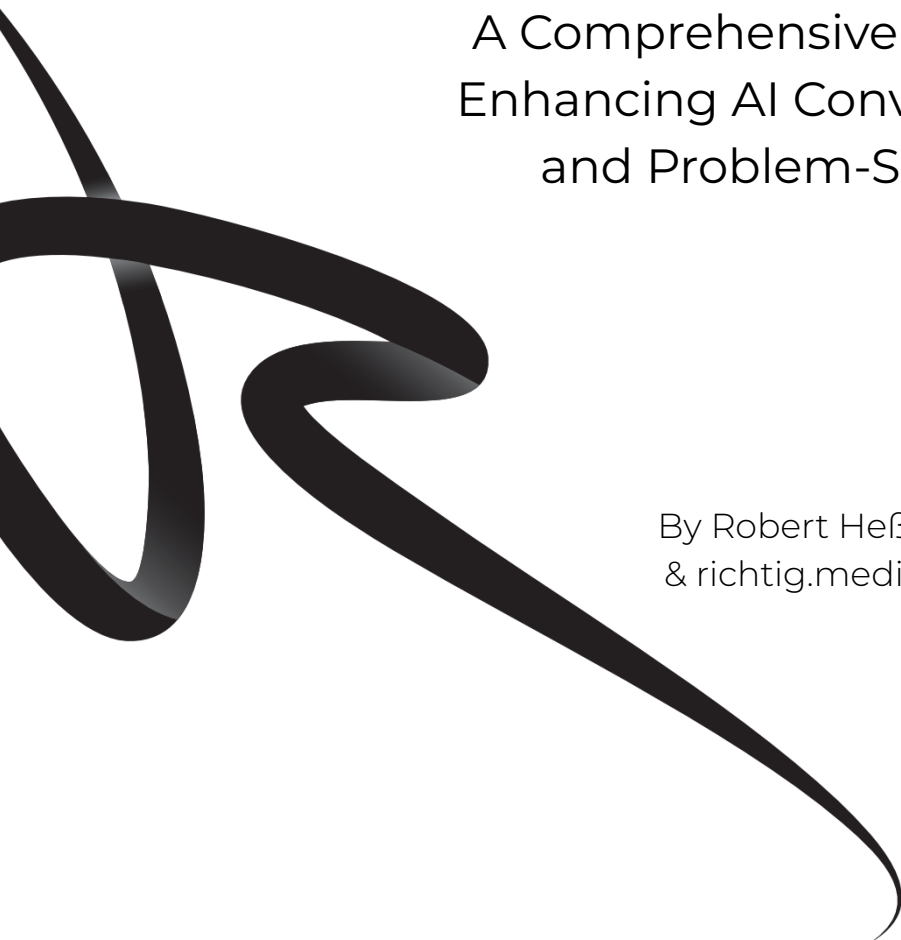


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Preface

As an AI aficionado, I've been captivated by the potential of cutting-edge technologies to transform our lives, work, and interactions. I previously worked in computer vision, contributing to AI image recognition development. This book reflects my passion and commitment to sharing my accumulated knowledge and enabling others to tap into AI's true potential.

My diverse career across various industries has granted me insights into the digital realm and an appreciation for AI's growing role in shaping online marketing and communication's future.

In "Prompt Engineering: Mastering the Art of Crafting Intelligent Queries," I draw from my experiences to offer a thorough guide on crafting effective AI prompts. This book shares tactics, techniques, and real-life examples, all grounded in my wide-ranging professional background and passion for AI.

I hope you find this book both informative and engaging, inspiring you to harness AI's power in your personal and professional pursuits.

Published April 2023 this book is trying to be foundational to understanding and working with AI.

I will provide sources and inspirations for further learning.

Join me in exploring the fascinating world of prompt engineering and unlocking AI's true potential.

Happy reading and happy prompting!

Robert Heße

Please feel free to contact me at www.richtig.media.

As you might guess, AI aided in writing this passage.

Introduction to AI

Prompt engineering plays a crucial role in unlocking the potential of large language models (LLMs) across a wide array of applications and research domains. By mastering this discipline, individuals can gain a deeper understanding of LLM capabilities and limitations, revolutionizing communication, learning, and problem-solving across industries.

Researchers and developers rely on prompt engineering to enhance LLM performance in tasks ranging from simple question-answering to complex reasoning and natural language understanding.

This comprehensive guide lays a strong foundation in prompt engineering, delving into the fundamentals of standard prompts, effective LLM interactions, and the art of crafting well-structured queries. You'll gain insights into optimizing prompts, understanding AI communication subtleties, and fine-tuning techniques for diverse applications. Designed for both AI professionals and enthusiasts, this book equips readers with the knowledge necessary to fully harness AI potential and foster a more connected, technologically advanced world.

Throughout the guide, we'll explore the most prominent LLM ChatGPT-4.

Introduction to ChatGPT

One of the primary advantages of ChatGPT is its ability to comprehend and respond to natural language input. This allows users to communicate with ChatGPT using the same language and syntax they would employ in human interactions. Furthermore, ChatGPT can understand and react to context, producing more suitable and relevant responses.

ChatGPT offers numerous features that make it an effective conversational tool, including:

1. **Customization:** Users can tailor ChatGPT to their needs and preferences, including the tone, style, and topics it discusses.
2. **Personalization:** Machine learning algorithms enable ChatGPT to personalize responses based on a user's past interactions and preferences, creating a more natural and tailored conversation.
3. **Multilingual support:** ChatGPT understands and responds in multiple languages, catering to international users or multilingual communication.
4. **Scalability:** ChatGPT manages high traffic volumes and multiple simultaneous conversations, making it suitable for customer service or online communities.

In subsequent chapters, we'll explore how to maximize ChatGPT's capabilities by crafting clear, effective prompts that facilitate engaging and informative discussions.

To better understand ChatGPT and its inner workings, let's examine the high-level process:

1. The user enters text into ChatGPT's interface, such as a question, request, or casual statement.
2. ChatGPT analyzes the input, employing machine learning algorithms to generate a response.
3. The text response is returned to the user.
4. The user provides additional input, and ChatGPT continues to analyze and respond until the conversation concludes.

The quality of prompts used to initiate and guide ChatGPT conversations significantly impacts their success.

Well-crafted prompts help maintain focus and cover relevant topics, whereas poorly defined prompts may result in disjointed or unfocused conversations, leading to a less engaging and informative experience.

In the following chapters, we'll delve deeper into creating effective ChatGPT prompts that foster engaging and informative conversations.

Basic Elements of a Prompt

Prompt engineering involves designing prompts that can help language models generate accurate and relevant responses. A well-constructed prompt typically includes the following components:

1. **Instruction:** This component provides specific guidance or direction to the model about what task or action it should perform.
2. **Context:** The context of a prompt includes external information or additional context that can help the model better understand the task at hand and produce more accurate responses.
3. **Input Data:** This component is the input or question that the model needs to respond to. It could be a simple sentence, a paragraph, or even an entire article.
4. **Output Indicator:** This component specifies the type or format of the output that the model should produce. This could be a classification label, a numerical value, or a sentence.
5. **Constraints:** These are limitations or requirements that must be followed in the response. For example, the response may need to be a certain length or must include specific information.
6. **Examples:** Providing examples of the desired response can help guide the model's output. These examples could be in the form of similar questions and their corresponding answers.
7. **Preprocessing:** Preprocessing steps can be included in a prompt to help the model better understand the input data. This could include tokenization, stemming, or other language processing techniques.
8. **Feedback:** Feedback can be incorporated into a prompt to help the model learn and improve. This could involve providing the model with corrective feedback on its responses or rewarding it for producing accurate answers.
9. **Evaluation Criteria:** This component specifies the criteria that will be used to evaluate the model's response. This could include accuracy, relevance, or other metrics.
10. **Control Codes:** These are special codes that can be used to modify the behavior of the language model. For example, a control code could be used to fine-tune the model for a specific task or to adjust the level of creativity in the response.

It is important to note that not all prompts will require all of these components, and the format of a prompt will depend on the specific use case.

Depending on the LLMs and the frontend for user inputs not all components can be altered.

This guide uses ChatGPT-4 for most prompts if not stated differently. OpenAI (the company behind ChatGPT) does not allow the modification of the components 7, 9, 10.

Disclaimer: For factual responses please always double check and take the AI with a grain of salt. In its current state there are issues like AI hallucination which lead to wrong but confident responses.

Rules for Prompt-Designing

Iteration and experimentation are vital components in achieving success with language models. Start with a basic prompt, such as "What is a metaphor?" and refine, expand, or restrict it to optimize the results.

The objective is to attain the highest level of refinement efficiently.

For targeted tasks, incorporate specialized instructions like Translate, Order, Summarize, Expand, Continue, Classify, Write, Explain, Rephrase, Comprehend, Rate, Complete, Search, Respond, Debug, Comment, Verify, or Recognize.

An example of an effective prompt is:

Tell me something about that big war thing in the past.

1. **Contextual instruction:** "*As a language model*": This phrase sets the context and instructs the AI to respond within its capabilities as a language model, ensuring a focused answer.
2. **Question engagement:** "*can you*": The use of a question format engages the AI to provide an answer rather than generate a continuation of text.
3. **Output format:** "*provide a concise summary*": This part of the prompt specifies the desired output format, guiding the AI to deliver a brief and to-the-point response.
4. **Focused scope:** "*of the main events*": This phrase further narrows the scope, directing the AI to focus on key events rather than offering a broad overview.
5. **Subject clarity:** "*in World War II*": This final component provides the specific subject matter, ensuring the AI's response is relevant to the topic.

Overall, the prompt is effective because it is clear, specific, and contextually rich, leading the AI to deliver a high-quality and on-topic response.

In contrast, a poor prompt might be:

Tell me something about that big war thing in the past.

This vague and non-specific prompt may yield unclear or irrelevant responses from the AI language model.

Consistent organization of prompts helps minimize the chances of information gaps or user error-induced confusion. GPT-4 might produce irrelevant or incoherent outputs for ambiguous or poorly constructed prompts. Prompt engineering can mitigate these issues by formulating clearer, more specific prompts that supply the necessary context.

Bear in mind that LLMs, being language-driven, **lack awareness of the results they generate.** Consequently, providing more elaborate instructions can lead to improved responses. Consider the AI's perspective as akin to a friend unfamiliar with the task at hand, requiring clear guidance to perform effectively.

Choose a Prompting Language

ChatGPT is designed to perform optimally when prompted in English.

Based on its training data, the top three languages for prompting efficiency are as follows:

1. **English: 95%**
2. Chinese: 85%
3. Spanish: 80%

Formatting your Prompt

Differentiate Text

Place instructions at the beginning of the prompt and utilize `###` or `"""` to differentiate the instruction and context. There are multiple ways of symbols which could be used. This recommendation is directly based on [ChatGPT's Helpboard](#).

Less effective:

```
Summarize the text below as a bullet point list of the most important points. text input here
```

More effective:

```
Summarize the text below as a bullet point list of the most important points.  
Text: """text input here"""
```

Formatting by Examples

Clearly specify the desired output format using examples (example 1, example 2).

Less effective:

```
Extract the entities mentioned in the text below. Extract the following 4 entity types: company names, people names, specific topics, and themes.  
Text: """text"""
```

Show and tell - models tend to respond better when provided with specific format requirements. This approach also facilitates easier programmatic parsing of multiple outputs.

More effective:

```
Extract the important entities mentioned in the text below. First, extract all company names, then all people names, followed by specific topics relevant to the content, and finally, general overarching themes.
```

Desired format:

Company names: <comma_separated_list_of_company_names>

People names: -||-

Specific topics: -||-

General themes: -||-

Text: ""text""

Formatting by Markup-Instructions

Use markup instructions effectively for prompt engineering, such as HTML, code, tables, and other markup possibilities.

Less effective:

```
Create a table with the following data: AI companies, their products,
and application areas.
Text: ""text""
```

The lack of a clear format or structure in this prompt may lead to an output that does not meet the user's expectations.

More effective:

```
Create an HTML table displaying AI companies, their products, and
application areas. Use the following format:

<table> <tr> <th>Company</th> <th>Product</th> <th>Application Area</th>
</tr> <!-- Additional rows with data --> </table>

Write a Python function to calculate the factorial of a number.Text:
""text""
```

By providing an explicit format and structure for the desired output, the AI model can better understand the user's requirements and generate a more accurate and useful response.

Formatting for Code-Related Prompts

Less effective:

```
Write a Python function to calculate the factorial of a number.
```

This prompt lacks specificity and does not provide clear guidelines on the input and output format.

More effective:

```
Write a Python function named factorial that takes a single positive
integer argument n and returns the factorial of n. The function should
have the following signature:
python
def factorial(n: int) -> int: # Your implementation here
```

By providing a clear function signature and specifying the input and output format, the AI model can better understand the user's requirements and generate a more accurate and relevant code snippet.

Basic Prompting

A prompt can encompass various elements, including the instruction or question, as well as any additional context, inputs, or examples that guide the model's response.

Let's explore basic prompting through a simple example with ChatGPT-4:
User input prompts will be formatted as follows:

```
Arrr! Is it you who twisted my brain, you filthy sailor?
```

ChatGPT output will be formatted as follows:

```
Ahoy there, matey! It seems ye be in quite the pickle. But fear not, for I am but a humble AI language model, here to assist and entertain, not to twist any brains. If ye have a question or need some help, feel free to ask, and I'll do me best to lend a hand. Fair winds!
```

The user adopts a pirate-themed language, which adds a playful and informal tone to the conversation. The AI recognizes the pirate theme and responds accordingly. Important elements include:

1. **Adapting to context:** The AI grasps the pirate theme and responds in the same tone, demonstrating its ability to understand context and language style.
2. **Maintaining purpose:** Despite the playful tone, the AI stays focused on its primary goal, offering help and assistance.
3. **Open-ended response:** The AI invites the user to provide more information or ask questions, encouraging further interaction.

In this interaction, the user provides an incomplete statement:

```
Michael Jackson is a
```

```
legendary American singer, songwriter, and dancer, often referred to as the "King of Pop."  
Born on August 29, 1958, in [...]
```

The user's error lies in not providing a clear question or instruction for the AI to follow.

Key points to consider:

1. **Unclear user input:** The user didn't provide a complete sentence, question, or instruction, making it difficult to ascertain their intent.
2. **AI's contextual understanding:** Despite the incomplete input, the AI identifies the subject (Michael Jackson) and offers a comprehensive response about his life and achievements.
3. **Room for improvement:** The user could have provided a more specific query or instruction to guide the AI's response more effectively.

Improved Basic Prompting

Now we can dive deeper by using instructions:

```
Complete the sentence:  
""Michael Jackson is a""
```

```
cultural icon whose groundbreaking contributions to music, dance, and entertainment  
continue to inspire generations of artists and fans worldwide.
```

Key improvements:

1. **Clear instruction:** The user asks the AI to "complete the sentence," guiding its response more effectively.
2. **Concise response:** The AI delivers a brief yet informative answer, highlighting Michael Jackson's cultural impact.
3. **Focused interaction:** Both the user's input and the AI's output are concise and targeted, resulting in efficient communication.
4. **Formatting:** The AI can understand the user's input without room for error by providing a differentiation between prompt and content.

The entire process of enhancing user input is known as **prompt engineering**. Our first **iterative refinement** led us to a superior solution for the same prompt.

By iterating, you can refine your prompt to its most precise and focused form, yielding optimal results.

Output Restriction

For most use cases, imposing output restrictions leads to more optimal results.

Restrictions can come in different variations depending on your goal.

Here are some examples:

1. "Provide a brief overview of the history of basketball." vs.
"In 100 words or less, describe the origins of basketball."
2. "What are the benefits of meditation?" vs.
"What are three specific benefits of practicing mindfulness meditation?"

LLMs are able to differentiate between tonalities and the inherent meaning of a conversation. It is even possible to recognize linguistic means.

Continuation

If ChatGPT reaches its word limit you can simply write:

```
Continue
```

Negative and Positive Classification

First let's have a look at a plain negative or positive classification:

You are not my buddy, I dont like your tone!

I apologize if my response came across as unpleasant [...]

This conversation can be perceived as negative due to the user's reaction to the AI's tone. The AI does recognize it and apologizes which is a clear indicator of understanding and deescalation.

Linguistic means

Explain simple and short:
""He has a heart of gold""

He is very kind and generous.

The AI responds by providing a brief definition that highlights the person's positive traits.

1. **Restriction:** The user asks for a simple and short explanation of the phrase.
2. **Recognition:** The phrase "heart of gold" is an idiomatic expression.
3. **Translation:** The AI defines the phrase, emphasizing the person's kindness and generosity.

A crucial aspect of prompt engineering is managing LLMs' tendency to provide expansive answers. Since language models inherently generate extensive responses, considering this core behavior is essential.

Advanced Techniques

Q&A interaction

In order to obtain concise and targeted responses for multiple questions, you can employ a Q&A formatting technique. This approach is particularly useful when working with AI tools that have hourly limitations on the number of answers generated.

By utilizing this method, you can efficiently obtain multiple answers within a single prompt, maximizing the usefulness of the AI language model and ensuring that you receive the information you need in a compact and structured format:

```
Q1: What is prompt engineering, and why is it important for large language models?  
Q2: How can prompt engineering improve the performance of AI systems in various tasks?
```

Zero-Shot Prompting

This technique allows ChatGPT to generate responses to prompts it has not been specifically trained on. Using natural language processing and machine learning algorithms, ChatGPT can generate responses that are relevant and coherent based on its existing knowledge and understanding of language.

Example:

```
Explain the concept of "zero-shot prompting" in the context of ChatGPT and its advantages.
```

Few-Shot Prompting

Similar to zero-shot prompting, few-shot prompting allows ChatGPT to generate responses to prompts it has only been shown a few examples of. By exposing ChatGPT to these examples, it can quickly adapt to new prompts and generate high-quality responses, even if it has not been explicitly trained on that specific task.

Less effective:

```
Write a haiku about nature.
```

In this example, the user provides a simple request without giving any examples of haikus. ChatGPT may still generate a haiku, but the quality may vary due to the lack of guidance.

More effective:

```
Write a haiku about nature, following the structure of these examples:  
Example 1:  
Autumn moonlight--
```

```
a worm digs silently  
into the chestnut.
```

Example 2:

```
Over the wintry  
Forest, winds howl in rage  
with no leaves to blow.
```

By providing ChatGPT with a few examples of haikus, it gets a clearer understanding of the desired format and style, resulting in a more effective response that aligns with the user's intention.

Key Technique: Chain-of-Thought Prompting (CoT)

The "chain-of-thought prompting" technique in ChatGPT involves posing a series of related questions or topics, which helps the AI model to generate longer and more detailed responses by maintaining a coherent and logical flow throughout the conversation. This technique is particularly useful when you want to explore a subject in depth, as it guides the AI to build upon previous responses and stay focused on the topic.

Example prompts:

User: What is the process of photosynthesis in plants?

User: What role do chlorophyll and sunlight play in photosynthesis?

User: How do the light-independent reactions, also known as the Calvin cycle, work in photosynthesis?

In short, the chain-of-thought prompting technique in ChatGPT helps generate detailed and coherent responses by guiding the AI through a series of related questions or topics. It allows for an in-depth exploration of a subject and maintains focus on the topic throughout the conversation.

Key Technique: Knowledge Generating Prompting

Knowledge generating prompting is a powerful technique used to enhance the capabilities of ChatGPT by guiding it to create responses based on its comprehension of a specific subject or concept. In a study conducted by [Liu et al. \(2022\)](#), this approach was found to be particularly useful in improving commonsense reasoning in AI models.

The primary idea behind knowledge generating prompting is to enable the AI model to first create relevant knowledge about the subject matter based on the given inputs. This additional knowledge equips the AI model to provide more accurate and informed answers to questions.

Example:

User: Do you know the current price of dow jones industrial average?

ChatGPT: [...] I cannot provide real-time data or current information. [...]

User: Current stock price of dow jones industrial average etf 04.04.2023 is 33.475,95 \$.

ChatGPT: Thank you for providing the information. [...]

User: Please tell me the dollar price I told you.

ChatGPT: You provided the Dow Jones [...] stock price for 04.04.2023 as 33,475.95 USD.

Keep in mind that unverified information will not be stored outside of your conversation.

The main takeaway is that knowledge generating prompting allows you to train language models by providing them with essential information to generate knowledge. This approach enables you to input data, which the AI model can then use throughout the conversation, leading to more informed and accurate responses.

Key Technique: Self-Consistency

Self-consistency in ChatGPT is a technique aimed at maintaining internal coherence within the AI's responses, ensuring that its statements do not contradict one another. By keeping track of its previous responses and evaluating them for consistency, ChatGPT can provide more reliable and logical answers throughout a conversation. This leads to a more seamless and believable interaction with the user.

Example Conversation:

User: What is your favorite color?

ChatGPT: My favorite color is blue.

User: Why do you like that color?

ChatGPT: I like blue because it is a calming and soothing color.

Now, if the user asks again about ChatGPT's favorite color:

User: What is your favorite color again?

ChatGPT (with self-consistency): My favorite color is still blue, as I mentioned earlier. I find it calming and soothing.

In this example, self-consistency ensures that ChatGPT remembers its previous response and maintains coherence in the conversation by not changing its answer or contradicting its earlier statement.

Key Technique: Socratic Questioning

Use Socratic questioning to prompt deeper analysis and reflection, encouraging the model to explore assumptions, implications, and alternative perspectives.

Less effective:

What is the significance of the Turing test?

More effective:

Why is the Turing test considered an important milestone in the field of artificial intelligence, and are there any limitations to its applicability?

Key Technique: Confidence Calibration

Ask ChatGPT to assess its own confidence in providing a correct or accurate response, which can help you gauge the reliability of the information provided.

Less effective:

What is the capital of Xlandia?

More effective:

What is the capital of Xlandia, and how confident are you in your answer?

Key Technique: Role-Based Interaction

Employing the "Act as a [ROLE]" technique appears to be an effective approach for eliciting responses from a specific perspective with ChatGPT. The exact reasons behind the success of this method remain uncertain, but it likely stems from providing an optimal level of context concisely.

To get an extensive list of roles for ChatGPT you refer to this [Github Repository](#) from Fatih Kadir Akın. Rewrite these prompts to best match your specific use case.

Less effective:

```
I will type keywords via comma and you will reply with fancy titles. my first keywords are api,test,automation
```

More effective:

```
I want you to act as a fancy title generator. I will type keywords via comma and you will reply with fancy titles. my first keywords are api,test,automation
```

Key Technique: Pointing in Code-Related Prompts

Less effective:

```
# Write a simple python function that  
# 1. Ask me for a number in mile  
# 2. It converts miles to kilometers
```

In this code example below, adding "*import*" hints to the model that it should start writing in Python. (Similarly "SELECT" is a good hint for the start of a SQL statement.)

More effective:

```
# Write a simple python function that  
# 1. Ask me for a number in mile  
# 2. It converts miles to kilometers  
  
import
```

More in depth code-related prompts you can find at greataiprompts.com.

Key Technique: Sampling for Tailored Imitation

To personalize ChatGPT's writing style, provide 10-20 brief samples (1-2 sentences each) for training. Tokenization restricts sample length, but longer paragraphs may be used when constraints are minimal. To adapt ChatGPT's tone to Gandalf from Lord of the Rings, provide 12 short samples resembling his speech style.

Example:

Remember writing style and tonality based on these examples:

"A wizard is never late, nor is he early."

"All we have to decide is what to do with the time given to us."

"Fly, you fools![...]"

Ah, I see that you would like me to adopt a writing style and tonality reminiscent of J.R.R. Tolkien [...]

Please write two sentences in this style to describe ChatGPT's ability to adapt writing styles.

In the realm of words and wisdom, ChatGPT stands as the shape-shifter of scribes, ever-changing to mirror the tone of tales untold. [...]

It seamlessly adapts to the distinct writing style and tonality of J.R.R. Tolkien. Drawing upon its extensive training, the model creates a customized and immersive user experience, showcasing the versatility and adaptability of advanced AI systems.

This technique can be used to imitate your personal or your company's writing style to stay in tone for all of the generated content.

Key Technique: Data Handling and Modification

ChatGPT is **not** designed for complex raw data manipulation like a spreadsheet software or a programming language, but it can still help in performing basic data operations on a limited scale. This data can be processed further to again use the capabilities of LLMs.

Example:

Please calculate the total sales for each product and rearrange the table in descending order based on total sales. Assume the following table represents sales data for three products:

Product	Sales Q1	Sales Q2
A	100	120
B	150	180
C	200	250

Do not use ChatGPT for data manipulation or math.

To further utilize ChatGPT's capabilities with this manipulated data, you could ask:

Based on the revised table with total sales, please provide insights on product performance and suggestions for future sales strategies.

This again is a very good technique to use ChatGPT.

Best-Practice: Market Sizing Example

Let's have a look at a best-practice case for a prompt:

Assume that you're the CEO of a start-up working on a B2B mental health platform and you're specifically targeting your offering toward tech companies that are headquartered in the USA. For a presentation, you need to size the market and you're looking for numbers on TAM (total available market), SAM (serviceable available market), and SOM (serviceable obtainable market). Please share some initial ideas on how you would go about estimating TAM, SAM, and SOM including some potential sources for data. Please limit your answer to 200 words. Please tell me how confident you are in your answer in %.

The prompt requests a concise (200-word limit) answer on estimating TAM, SAM, and SOM for a B2B mental health platform targeting tech companies in the USA. The user expects the AI to provide initial ideas and potential data sources.

1. **Contextual Priming:** The prompt sets the context by describing the user's role (CEO of a start-up), the platform type (B2B mental health), and the target market (tech companies in the USA).
2. **Response Structure:** The prompt requires estimates for three distinct market metrics (TAM, SAM, and SOM), ensuring a structured response.
3. **Confidence Calibration:** The AI will assess its confidence in the provided estimates and sources to help the user gauge the reliability of the information.
4. **Relevance Reinforcement:** The prompt emphasizes the need for initial ideas and data sources, ensuring the response remains focused on the specific market sizing task.
5. **Requesting Sources or Evidence:** The user requests potential data sources, expecting the AI to support its estimates with credible information.

By leveraging these key techniques, the AI can provide a relevant, structured, and informative response that meets the user's needs and expectations within the imposed word limit.

Common Mistakes

Creating effective ChatGPT prompts necessitates careful thought and precision. However, it's not uncommon to make errors that might compromise the efficiency of your prompts and the overall conversation quality. Here are some common pitfalls to avoid when crafting ChatGPT prompts:

- 1. Overloading the prompt with excessive information:**
While it's crucial to supply ChatGPT with sufficient context and purpose, providing too much information can lead to confusion. Maintain concise and focused prompts, and refrain from adding unnecessary details or instructions.
- 2. Employing jargon or ambiguous language:**
Use clear and comprehensible language when interacting with a machine learning model like ChatGPT. Steer clear of jargon or potentially unfamiliar or ambiguous terms.
- 3. Utilizing overly vague or open-ended prompts:**
Although open-ended questions may elicit more comprehensive responses, exceedingly vague or open-ended prompts can be perplexing for ChatGPT. Provide adequate context and guidance to direct the conversation meaningfully.
- 4. Omitting essential instructions or constraints:**
Ensure you furnish ChatGPT with any required instructions or constraints for an effective conversation. For instance, if you want ChatGPT to portray a character from a specific movie or book, mention this in the prompt.

By circumventing these common errors, you can enhance the clarity, conciseness, and effectiveness of your ChatGPT prompts.

Ressources and Roadmap for Prompt Engineering

1. Understand the basics of natural language processing (NLP): Learn the fundamental concepts and techniques used in NLP, such as tokenization, stemming, lemmatization, part-of-speech tagging, and sentiment analysis.

→ [A great article](#)* in by Paramita Ghosh from 2022

2. Familiarize yourself with language models: Study the principles and architecture of various language models, such as recurrent neural networks (RNNs), long short-term memory (LSTM), and transformers like BERT, GPT, and their variants.

→ [Wikipedia](#) RNNs → [Wikipedia](#) LSTM → [Wikipedia](#) BERT → [Wikipedia](#) GPT

3. Learn the foundations of prompt engineering: Gain knowledge about prompt design principles, best practices for creating effective prompts, and techniques for optimizing the performance of language models.

→ [OpenAI Helpboard](#)* → [Promptingguide.ai](#)* → [Awesome ChatGPT Prompts](#)*

→ [Board of Innovation](#)*

4. Develop coding skills: Master programming languages like Python, which is widely used in NLP and machine learning, and learn how to use NLP libraries like NLTK, spaCy, and Hugging Face Transformers.

→ [Learn Python](#)

5. Experiment with different prompt engineering techniques: Try various prompt engineering approaches, such as priming, temperature adjustment, token limiting, and chaining prompts, to refine and improve model performance.
6. Work on real-world projects: Apply your prompt engineering skills to real-life use cases, like chatbot development, sentiment analysis, text summarization, or machine translation.

→ develop LLM with [LangChain](#) → [curated list of LLMs](#)

7. Analyze and iterate: Continuously analyze the results of your prompts, identify areas of improvement, and iterate your techniques to enhance the performance of language models.
8. Stay updated with the latest advancements: Follow research papers, blogs, and conferences related to NLP, prompt engineering, and AI to stay informed about the latest developments and techniques.
9. Network with experts and peers: Engage with the NLP and AI community through forums, social media, and conferences to share knowledge, collaborate on projects, and learn from others.

*Linked source has been inspirational or cited in this book.

Glossary of Key Terms and Concepts

Term	Definition
Artificial Intelligence (AI)	The development of computer systems capable of performing tasks that usually require human intelligence.
Natural Language Processing (NLP)	A subfield of AI focused on enabling computers to understand, interpret, and generate human language.
Large Language Models (LLMs)	AI models trained on vast amounts of text data, capable of understanding and generating human-like language.
GPT (Generative Pre-trained Transformer)	A series of LLMs developed by OpenAI, known for their advanced language understanding and generation capabilities.
Prompt	A query or instruction provided to an LLM, guiding its response or desired action.
Prompt Engineering	The process of crafting and optimizing prompts for efficient interaction with LLMs.
Context	Relevant background information provided within a prompt to guide an LLM's response.
Iterative Refinement	The process of incrementally improving a prompt based on previous responses from an LLM.
Conditioning	The technique of providing context or priming within a prompt to influence an LLM's response.
Priming	Setting expectations for an LLM's response by providing examples or specifying desired behavior.
Temperature	A parameter that controls the randomness of an LLM's response, with lower values leading to more focused responses.
Top_k Sampling	A method of generating responses by selecting the K most probable tokens at each step in the generation process.
Fine-Tuning	The process of adjusting an LLM's parameters based on custom datasets to improve performance on specific tasks.
Bias	The presence of systematic errors in an LLM's response due to training data or the model's architecture.
Tokens	Tokens are the individual units of language, such as words or punctuation, that are used to represent and process text data in natural language processing.

Prompt Engineering Checklist

- Define your objective:** Clearly outline the goal of the prompt and the information you want the AI to provide.
- Be concise and specific:** Keep your prompts brief, focused, and easy to understand, avoiding unnecessary details or instructions.
- Use clear language:** Ensure that the language you use is clear, simple, and unambiguous to make it easier for the AI to understand and respond appropriately.
- Provide context:** Give enough context to help the AI understand the purpose of the conversation and guide its responses.
- Avoid overloading:** Don't overload the prompt with too much information, as it can be overwhelming and confusing for the AI.
- Limit open-endedness:** While open-ended questions can encourage more detailed responses, be cautious not to make your prompts too vague or open-ended, as this can make it difficult for the AI to understand your intention.
- Include constraints or instructions:** If necessary, provide specific instructions or constraints to guide the AI's responses, such as specifying a character or setting.
- Test multiple prompts:** Experiment with different prompts and wording to optimize the AI's response quality.
- Iterate and refine:** Analyze the AI's responses to your prompts and make adjustments as needed to improve the quality of the conversation.
- Monitor self-consistency:** Ensure that the AI's responses are coherent and do not contradict previous statements or responses throughout the conversation.