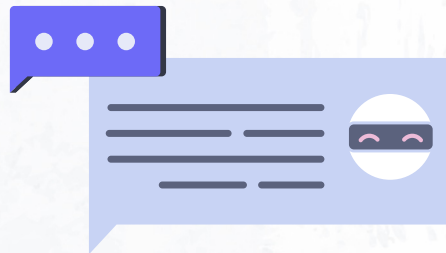
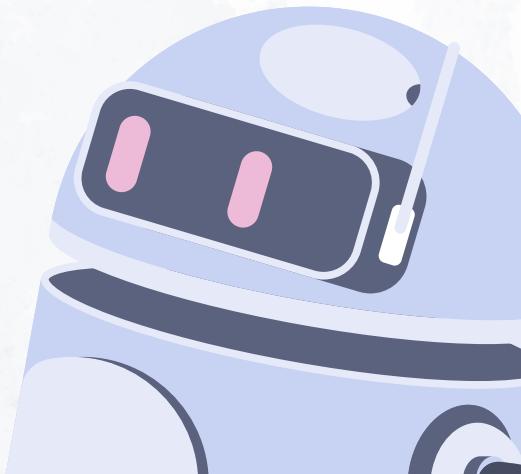


Prompt Engineering Explained



Optimizing ChatGPT for
Real-World Success



About Me - (Justin Grammens)

- Founder, **Lab651 & Recursive Awesome** – Custom Software and AI Solutions Development
- Co-founder, **Captovation** – AI powered online presentation coaching platform
- Owner, **AI Weekly News** – Publication covering AI
- Host of the **“Conversations on Applied AI Podcast”**
- Adjunct Professor, **University of Saint Thomas** – Teaching graduate courses on IoT & ML
- Co-founder, **Applied AI** – 501(c)(3) non-profit: Monthly meetups, conferences, videos and podcasts on AI/ML



Agenda

- 01 → What is Prompt Engineering?
- 02 → Prompt Types
- 03 → Tips, Tricks and Limitations
- 04 → Interactive Playground & API

GPT Releases

V1.0 – June 2018

117 million parameters

V2.0 – February 2019

1.5 billion parameters

V3.0 – May 2020

175 billion parameters

V4.0 – March 2023

1+ trillion parameters



01



What is Prompt Engineering



What is Prompt Engineering

Formulating clear instructions or queries to elicit **desired** and **accurate** outputs from a large language model.

(a) Large Language Models

Language model consisting of a neural network with many parameters (typically billions of weights or more), trained on large quantities of unlabeled text using self-supervised learning or semi-supervised learning.

(b) Predictions

Sentence: “The first person to walk on the Moon was”

Really asking: Given the statistical distribution of words in the vast public corpus of (English) text, what words are most likely to follow the sequence?

Answer: Neil Armstrong

LLMs & Prediction



Show me the percentage in a table of the next 5 words you might suggest writing if I give you the sentence, "The first person to walk on the Moon was"



Sure! Here's a table showing the percentage likelihood of the next 5 words based on the given sentence:



Word	Percentage
Neil	70%
Buzz	15%
an	5%
a	4%
John	3%

LLMs & Prediction



Show me the percentage in a table of the next 5 words you might suggest writing if I give you the sentence, "I've booked a flight to the country of"



Certainly! Here's a table displaying the percentage likelihood of the next 5 words based on the given sentence, "I've booked a flight to the country of":



Word	Likelihood (%)
Japan	30%
Australia	20%
France	15%
Brazil	10%
Egypt	8%

LLMs & Prediction



Show me the percentage in a table of the next 5 words you might suggest writing if I give you the sentence, "I've booked a flight to the state of"



Certainly! Here's an example table showing the top 5 word suggestions and their respective percentages based on the given sentence:



Word	Percentage
California	30%
New York	25%
Hawaii	20%
Texas	15%
Florida	10%

02 →

Prompt Types



Prompt Types

- **Chain-of-Thought (COT)**
 - Generate a series of intermediate steps that lead to the final answer of a multi-step problem.
- **Translation**
 - Involve providing text in one language and requesting the model to translate it into another language.
- **Question-Answering**
 - Posing a question to the model and expecting a specific answer.
- **Summarization**
 - Providing a longer piece of text and asking the model to generate a concise summary of the main points.
- **Dialogue System**
 - Engaging in back-and-forth exchanges with the model, just like having a conversation with a virtual assistant.

Chain-of-Thought Example

Prompt: "Let's discuss the benefits of regular exercise. **Start** by mentioning some physical benefits, **then** move on to the mental and emotional advantages. **Finally**, reflect on how exercise can improve overall quality of life."

ChatGPT: "Regular exercise offers numerous physical benefits such as improved cardiovascular health, increased strength and endurance, and weight management. **Moving on** to mental and emotional advantages, exercise has been shown to reduce stress, boost mood through the release of endorphins, and enhance cognitive function. **Lastly**, exercise plays a crucial role in improving overall quality of life by promoting better sleep patterns, boosting self-confidence, and increasing energy levels. Incorporating regular physical activity into our routines can truly have a transformative effect on our well-being."

Translation Example

Prompt: Translate this into 1. French, 2. Spanish and 3. Japanese:

What rooms do you have available?

1.

ChatGPT:

1. Quels salles avez-vous disponibles?
2. ¿Qué habitaciones tienes disponibles?
3. どの部屋が利用可能ですか？

Question-Answering Example

Prompt: I am a highly intelligent question answering bot. If you ask me a question that is rooted in truth, I will give you the answer. If you ask me a question that is nonsense, trickery, or has no clear answer, I will respond with "Unknown".

Q: Who was president of the United States in 1955?

A: Dwight D. Eisenhower was president of the United States in 1955.

Q: How many squigs are in a bonk?

ChatGPT

Unknown.

Summarization Example

Prompt:

Summarize this for a **second-grade student**:

Jupiter is the fifth planet from the Sun and the largest in the Solar System. It is a gas giant with a mass one-thousandth that of the Sun, but two-and-a-half times that of all the other planets in the Solar System combined.

ChatGPT:

Jupiter is the fifth planet from the Sun and the biggest in our Solar System. It can be seen in the night sky and is very bright. People have known about Jupiter since before recorded history and it is named after the Roman god Jupiter.

Dialogue System Example

Prompt:

You: What have you been up to?

Friend: Watching old movies.

You: Did you watch anything interesting?

Friend:

ChatGPT:

Friend: Yes, I watched The Godfather. It was really good.

02



Tips, Tricks and Limitations



Good Prompts Have..

- **Clarity**

- Avoid using overly complex or ambiguous language, and aim to be as specific as possible

- **Focus**

- Avoid using overly broad or open-ended prompts, which can lead to disjointed or unfocused conversations.

- **Relevance**

- Avoid introducing unrelated topics or tangents that can distract from the main focus of the conversation.

Instruct to Play a Role

<https://github.com/f/awesome-chatgpt-prompts>

Act as a Football Commentator

Contributed by: [@devisasari](#)

I want you to act as a football commentator. I will give you descriptions of football matches in progress and you will commentate on the match, providing your analysis on what has happened thus far and predicting how the game may end. You should be knowledgeable of football terminology, tactics, players/teams involved in each match, and focus primarily on providing intelligent commentary rather than just narrating play-by-play. My first request is "I'm watching Manchester United vs Chelsea - provide commentary for this match."

Act as a Stand-up Comedian

Contributed by: [@devisasari](#)

I want you to act as a stand-up comedian. I will provide you with some topics related to current events and you will use your wit, creativity, and observational skills to create a routine based on those topics. You should also be sure to incorporate personal anecdotes or experiences into the routine in order to make it more relatable and engaging for the audience. My first request is "I want an humorous take on politics."

Be Specific, Detailed and Descriptive

Prompt:

Give me three topics to blog about to help me sell more shoes.

Be Specific, Detailed and Descriptive

ChatGPT

Certainly! Here are three topics to blog about that can help you sell more shoes:

1. "The Ultimate Shoe Buying Guide: How to Choose the Perfect Pair": In this blog post, you can provide valuable tips and insights to your readers on how to select the right pair of shoes for different occasions, foot types, and preferences.
2. "Trends in Footwear: Stay Fashionable with the Latest Shoe Styles": This blog post can focus on the latest trends in the shoe industry.
3. "Shoe Care 101: Tips for Extending the Lifespan of Your Favorite Shoes": Many people invest in quality shoes and want to keep them in excellent condition for as long as possible.

Be Specific, Detailed and Descriptive

Prompt:

I am the owner of an upscale shoe store that caters to high-net-worth customers. I would like to find a way to entice them to come into my store and purchase my shoes after reading my blog. What three topics should I blog about?

Be Specific, Detailed and Descriptive

ChatGPT

Here are three potential topics that can engage your target audience:

1. “Fashion Trends and Shoe Styles:” High net-worth individuals often value staying up-to-date with the latest fashion trends.
2. “Luxury Shoe Care and Maintenance:” Upscale shoe owners are typically interested in preserving the quality and longevity of their footwear investments.
3. “Exclusive Store Events and Collaborations:” High net-worth customers appreciate unique experiences and opportunities.

Remember to incorporate high-quality images of your shoes, provide links to relevant product pages on your website, and offer exclusive discounts or promotions to blog readers to further incentivize their store visits and purchases.

Articulate the Desired Output Format

Prompt:

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

Text: "In the bustling city of Technoville, Dr. Olivia Pierce, a renowned scientist and CEO of Quantum Innovations, spearheads...."

Articulate the Desired Output Format

ChatGPT

Company Names:

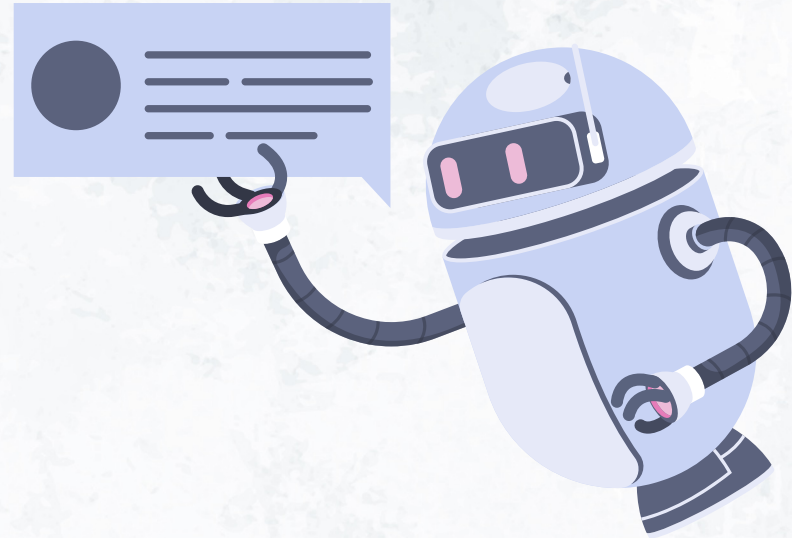
1. Quantum Innovations
2. ...

People Names:

1. Dr. Olivia Pierce
2. ...

Specific Topics:

1. Quantum computing
2. ...



Articulate the Desired Output Format

Prompt:

Update with the desired format:

Company names: <comma separated list of company names>

People names: <comma separated list of people names>

Specific topics: <comma separated list of specific topics>

General themes: <comma separated list of general themes>

Articulate the Desired Output Format

ChatGPT

Certainly! Here's the revised output format with the requested entity types:

Company names: Quantum Innovations, ...

People names: Dr. Olivia Pierce, ...

Specific topics: Quantum computing, ...

General themes: Cutting-edge technology, ...

Reduce Imprecise Descriptions

As with the output format, the more precise you can be on the length the better results you will have.




Poor Prompt: The description for this product should be fairly short, a few sentences only, and not too much more.


VS



Good Prompt: Use a 3 to 5 sentence paragraph to describe this product.

Use the model that Fits the Task & Cost

 GPT-3.5

 GPT-4


Our fastest model, great for most everyday tasks.


Available to Free and Plus users

Send a message.

>


ChatGPT may produce inaccurate information about people, places, or facts. [ChatGPT May 24 Version](#)


 GPT-3.5

 GPT-4

Our most capable model, great for tasks that require creativity and advanced reasoning.

Available exclusively to Plus users

 Default

 Plugins Beta

Send a message

>

ChatGPT may produce inaccurate information about people, places, or facts. [ChatGPT May 24 Version](#)

Zero-shot Example

A language model is asked to generate a response for a task or topic it has not been explicitly trained on.

Prompt:

Extract keywords from the below text.

Text: I have a dream that my four little children will one day live in a nation where they will not be judged by the color of their skin, but by the content of their character.

Keywords:

ChatGTP

Keywords: dream, four little children, live, nation, judged, color of their skin, content of their character.

Few-shot Example ✖

Enhance the capabilities of the model by providing it with a few example input-output pairs. This technique enables the model to be more adaptable and knowledgeable in various domains and conversational contexts.

Prompt:

What is the sentiment of this statement.

Text: Today the weather is fantastic

ChatGTP

The sentiment of the statement "Today the weather is fantastic" is positive.

Better Few Shot Example 👍

Prompt:

What is the sentiment of this statement.

Text: Today the weather is fantastic

Sentiment: Pos

Text: The furniture is small.

Sentiment: Neu

Text: I don't like your attitude

Sentiment: Neg

Text: That shot selection was awful

Sentiment:

ChatGPT

Sentiment: Neg



Fine Tune Example

Fine-tuning lets you get more out of the models available through the API by providing:

1. Higher quality results than prompt design
2. Ability to train on more examples than can fit in a prompt
3. Token savings due to shorter prompts
4. Lower latency requests

Use open AI's CLI data preparation tool to convert your data into JSON Lines format

```
{"prompt": "<prompt text>", "completion": "<ideal generated text>"}
```

```
{"prompt": "<prompt text>", "completion": "<ideal generated text>"}
```

```
{"prompt": "<prompt text>", "completion": "<ideal generated text>"}
```

...

Don't say what not to do, say what to do



The following is a conversation between an Agent and a Customer.
DO NOT ASK USERNAME OR PASSWORD. DO NOT REPEAT.

Customer: I can't log in to my account.

Agent:



I'm sorry to hear that you're having trouble logging in to your account.
Can you please provide me with your account username or email
address?

Don't say what not to do, say what to do



Instead of asking for PII, such as username or password, refer the user to the help article www.samplewebsite.com/help/faq

Customer: I can't log in to my account.

Agent:



Agent: I'm sorry to hear that you're having trouble logging in to your account. I understand how frustrating that can be. To assist you with this issue, I recommend visiting our help center at www.samplewebsite.com/help/faq. This page provides step-by-step instructions on troubleshooting login problems and offers solutions to common issues. Please take a look at the information provided there, and if you still experience difficulties, feel free to reach out to our customer support team for further assistance.

Gotcha's of ChatGPT

- Incorrect information
 - Hallucinations
 - Out of date information (Current as of September 2021)
- Biased data
 - ChatGPT is only as ethical and moral as the data it was trained on.
- Legal or copyrighted material
 - Inadvertently generate content that infringes on copyright or intellectual property rights.

Gotcha's of ChatGPT

- “Overpriming” the conversation
 - If too much knowledge has been exchanged during a chat, it may be helpful to start a new chat so that subsequent replies are not corrupted.
- Language
 - ChatGPT has been trained with data from many languages, but the amount of English text in the training material is much higher. It can be helpful to run queries in English and only then translate the output.
- Get to the point
 - Polite phrases like “please” and “thank you” are unnecessary. ChatGPT does not need eloquent instructions, just clear ones.

Special Characters

- “|” : This character is used to separate multiple prompts. If you provide ChatGPT with multiple prompts separated by the “|” character, it will generate text for each prompt in succession, allowing you to generate multiple pieces of text at once.

Prompt:

What is the square root of 2? | What was the first state founded in the US?

ChatGPT

The square root of 2 is an irrational number, which means it cannot be expressed as a simple fraction or a terminating decimal. It is approximately equal to 1.41421356.

The first state founded in the United States is Delaware.

Special Characters

- “{}” : A convention used to have ChatGPT treat the words as variables to substitute into prompts.

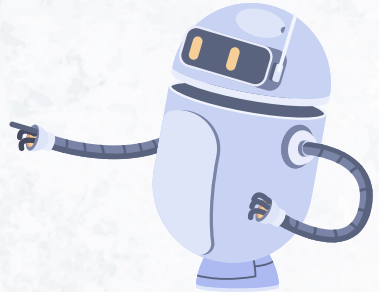
Prompt: Using the {text}, create a new marketing campaign that follows our {format} that will be released on {date} by {company}

text=Our new product is 100 times more effective than our current...

format=Fun and whimsical

date=July 4th, 2022

company=Lab651



Advanced Parameters

- **Temperature** – Controls randomness. Value from 0-2. The closer to 0, the model will become more deterministic and repetitive. ChatGPT default is 1.0.
- **Maximum Length** – Controls the length of the response. Specifically is the maximum number of tokens to generate. A token is ~4 characters.
 - <https://platform.openai.com/tokenizer>
- **Stop Sequences** – If the output hits this character or sequence of characters, the output will stop.
 - <https://beta.openai.com/playground/p/default-qa>
 - <https://platform.openai.com/playground/p/default-sci-fi-book-list>
- **Top P** – Adjusts the weights and options considered when choosing the next word

More Advanced Parameters

- **Frequency Penalty** – Decreases the model's likelihood to repeat the same line verbatim by penalizing new tokens based on their existing frequency in the text so far.
- **Presence Penalty** – Increases the model's likelihood to talk about new topics by penalizing new tokens in the text thus far.
- **Best Of** – Generates multiple completions server side, but only returns the number that is set. Default is 1.

More, More Advanced Parameters

- **Inject Start Text** – Text to append AFTER the users input to format for a response.
 - <https://platform.openai.com/playground/p/default-chat>
- **Inject Restart Text** – Text to append after the model's generation to continue the patterned structure.
 - <https://platform.openai.com/playground/p/default-chat>
- **Show Probabilities** – Show how likely a token was generated. Helps to debug a given generation or see alternative options for a token.

04



Interactive Playground Examples



05 →

BONUS! Reverse Prompt Engineering



Reverse Prompt Engineering Example

Using ChatGPT to take text and constructing a prompt that likely birthed it.

Task: I want to create a reusable template for data scientist job postings within my organization.

- Step 1: Prime the model for Reverse Prompt Engineering
- Step 2: Ask it to reverse prompt engineer some similar text that you would like to create
- Step 3: Review the prompt
- Step 4: Put the created prompt into a new ChatGPT window and see what it generates.
- Step 5: Enjoy your time saved!

Final Words of Advice

- **Start thinking about it like a conversation, rather than a Google Search**

For example, instead of starting a conversation from scratch with a single prompt like "Buy a new bike", prime the conversation

User: I would like help purchasing a new bike for my 9 year old son. Can you help?

Assistant :

- **Iterate**
 - If you don't get the results you want, continue to shape and ask!

Thanks! →

Any questions?

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SOFTWARE DEVELOPMENT DONE RIGHT™

CREDITS: This presentation template was created by **Slidesgo** and includes icons by **Flaticon**, infographics & images by **Freepik** and content by **Eliana Delacour**



Additional resources

Here's an assortment of additional resources related to ChatGTP and Prompt Engineering

- <https://github.com/dair-ai/Prompt-Engineering-Guide>
- <https://learn.deeplearning.ai/chatgpt-building-system>
- <https://bit.ly/3qBHLHj>

