

AI Prompt Engineering

AI platforms can be useful when used as supplementary tools during the writing process. This handout will cover when and how AI can be incorporated into different stages of the writing process, from planning to drafting, with a focus on strategies for engineering prompts and getting effective results.

Note that AI should never be used to generate writing from scratch; that's not what learning writing skills is about. It is never acceptable to have an AI chatbot write your papers for you. Instead, we will look at ways that AI can help you enhance your writing process, while making sure that you're still doing the bulk of the work.

While this handout can help you learn more about applications of AI in writing, it's important to remember that faculty will have different policies about the use of AI in the classroom. **If you are ever in doubt about acceptable applications of AI tools in a specific class, the best thing to do is ask your instructor.**

What is AI?

Broadly defined, Artificial Intelligence (AI) is a branch of computer science research focused on technology that enables machines to utilize learning, intelligence, and environmental context. Some examples of current AI applications are provided below, but be aware that there are many more, and they can (and will) change over time.

Examples of AI Applications

- Web Search Engines
 - Google, Yahoo, DuckDuckGo
- Algorithms
 - YouTube, Instagram, TikTok
- Large Language Models (LLMs)
 - ChatGPT, ClaudeAI, Gemini

Large Language Models (LLMs)

This handout will focus on the Large Language Model (LLM) application of AI. LLMs are Natural Language Processing (NLP) models that are trained on large amounts of text data and complete tasks like language generation. ChatGPT was one of the earliest LLMs available widely for public usage.

What is Prompt Engineering?

Prompt engineering involves designing effective prompts to elicit desired responses from AI.

In this context, a prompt is the text that we input into language-generating AI platforms, like ChatGPT, to generate responses that are relevant, coherent, informational, and useful. The more that you engage repeatedly with the AI—by doing things like submitting follow-up prompts—the more effective your responses will be.

Five Strategies for Effective Prompt Engineering

1. *Be Clear and Specific*

It's essential to make your prompts as clear and specific as possible. Ambiguous or vague prompts can lead to irrelevant or confusing AI-generated responses. Ensure that your prompts explicitly state the desired outcome or response format.

2. *Provide Contextual Information*

Providing context in your prompts is crucial for the generation of accurate responses. By including relevant background information or defining specific terms, you can guide the AI model toward a more informed and appropriate response.

3. *Limit Response Length*

When designing a prompt, consider specifying the desired length of the response. For instance, if you require a brief, concise answer, you may include a phrase like “in one sentence” or “summarize in 100 words.” This step ensures that the AI model generates responses that meet your expectations.

4. *Iterate and Refine*

The process of prompt engineering often involves trial and error. Test your prompts with the AI system and observe the responses. If the generated output is not satisfactory, refine your prompt by making it more specific, adding context, or adjusting the response length. You will likely have to iterate on your initial prompts in the AI system.

5. *Chain Your Prompts*

Sometimes a single prompt may not be enough to obtain the desired response. In such cases, you can use “prompt chaining,” which involves breaking down a complex prompt into simpler, interconnected prompts. This strategy helps guide the AI model step-by-step toward the desired outcome.

Example of Prompt Engineering (with ChatGPT)

1. **The Beginning:** We prompt ChatGPT to “list three primary causes of climate change.”

List three primary causes of climate change.



Certainly! The three primary causes of climate change are:

1. **Greenhouse Gas Emissions:** The burning of fossil fuels like coal, oil, and natural gas releases greenhouse gases such as carbon dioxide (CO₂) and methane (CH₄) into the atmosphere. These gases trap heat, leading to global warming.
2. **Deforestation:** Cutting down forests reduces the number of trees that can absorb CO₂ from the atmosphere. Additionally, when trees are burned or decomposed, they release stored carbon, further contributing to greenhouse gas concentrations.
3. **Industrial Activities:** Industrial processes release various pollutants and greenhouse gases, including CO₂, methane, and nitrous oxide (N₂O). These activities also often involve land use changes that can exacerbate climate change.

These factors together contribute to the warming of the planet, resulting in shifts in climate patterns and more extreme weather events.

2. **The Follow-Up:** We follow-up and utilize the information from the initial response to gain more in-depth and nuanced information on the subject by asking ChatGPT to “discuss the impact of each cause on global temperatures and weather patterns.”

Discuss the impact of each cause on global temperatures and weather patterns.



Each of the primary causes of climate change has significant impacts on global temperatures and weather patterns:

3. **The Result:** The result is a detailed and lengthy explanation on how each of the three causes of climate change impacts global temperatures and weather patterns (shown on the next pages). This information can be used to help you outline a paper on this topic by helping organize and break down your thought process.

1. Greenhouse Gas Emissions

Impact on Global Temperatures:

- **Increased Warming:** Greenhouse gases like carbon dioxide (CO₂) and methane (CH₄) trap heat in the Earth's atmosphere, creating a "greenhouse effect." This leads to a rise in global temperatures, a phenomenon known as global warming. Since the Industrial Revolution, this warming trend has been well-documented, with average global temperatures rising by about 1.1°C (2°F) compared to pre-industrial levels.

Impact on Weather Patterns:

- **More Extreme Weather:** The increase in global temperatures intensifies the water cycle, leading to more extreme weather events. This includes more intense heatwaves, heavy rainfall, and stronger storms.
- **Shifts in Weather Patterns:** Regions may experience altered weather patterns, such as prolonged droughts in some areas and increased precipitation in others. For example, warmer temperatures can shift the jet stream, affecting weather patterns far from the source of the greenhouse gas emissions.

2. Deforestation

Impact on Global Temperatures:

- **Higher CO₂ Levels:** Trees and forests act as carbon sinks, absorbing CO₂ from the atmosphere. When forests are cut down or burned, the stored carbon is released back into the atmosphere, increasing the concentration of greenhouse gases and contributing to global warming.
- **Local Temperature Changes:** Deforestation can also lead to localized warming. Forests contribute to cooling through evapotranspiration, where water is released into the atmosphere, forming clouds and reflecting sunlight. Without this cooling effect, deforested areas can experience higher temperatures.

Impact on Weather Patterns:

- **Altered Rainfall Patterns:** Forests play a key role in the water cycle by influencing regional rainfall patterns. Deforestation can disrupt these patterns, leading to reduced rainfall and potentially more severe droughts in the affected areas.
- **Increased Erosion and Soil Degradation:** Without trees to anchor the soil, deforestation can lead to increased erosion and degraded soil, which can affect local water cycles and agricultural productivity.

3. Industrial Activities

Impact on Global Temperatures:

- **Direct Emissions:** Industrial processes emit greenhouse gases such as CO₂, methane (CH₄), and nitrous oxide (N₂O). These gases contribute to the greenhouse effect and global warming.
- **Aerosols and Particulates:** Some industrial activities release aerosols and particulates that can have a short-term cooling effect by reflecting sunlight away from Earth. However, this is temporary and does not offset the long-term warming effect of greenhouse gases.

Impact on Weather Patterns:

- **Urban Heat Islands:** Industrial activities often lead to the development of urban areas that can become "heat islands." These areas experience higher temperatures than their rural surroundings due to the concentration of buildings, asphalt, and other heat-retaining materials.
- **Disruption of Natural Cycles:** Industrial emissions can affect atmospheric chemistry and disrupt natural weather patterns. For example, pollutants from industrial activities can contribute to acid rain, which can affect soil and water bodies, further impacting local and regional weather.

Overall, the combined effects of these causes lead to a warming planet and altered weather patterns, with significant implications for ecosystems, human health, and global climate systems.

Activity: Practice Prompt Engineering

Now it's your turn to practice prompt engineering. Consider the strategies listed above, the provided example, and the activity steps below while you write and submit your own prompts into a language-generating AI platform (like ChatGPT).

1. **Consider the topic:** Think of a topic that you're interested in knowing more about. It could be something that you're actively working on or just something that you want to learn more about.
2. **Formulate a question:** Once you've determined what subject matter you're interested in exploring, choose a specific question that you want to ask. Submit that question into the language-generating AI platform of your choice.
3. **Submit a follow-up prompt:** Utilize the information provided in the AI's response to your first question to write and submit a follow-up question in order to obtain more detailed and specific information.

References

"The Art of Prompt Engineering Simplified | Explained in 10 mins | Prompt Examples |

ChatGPT 4 | AI." YouTube, uploaded by AI Insights & Innovations, 26 April 2023,

<https://www.youtube.com/watch?v=PJxHKny4qrw>.