Introduction to Prompt Engineering

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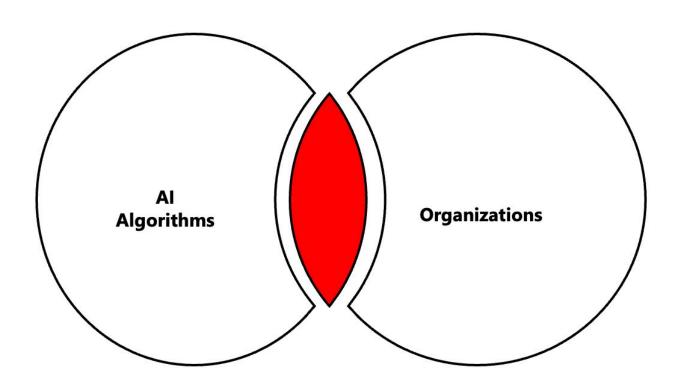


Applied Al Lab @ University of Lausanne



Our multi-disciplinary research program aims to identify solutions and frameworks for dealing with organizational and technical hurdles that business organizations face when adopting Albased systems.

Our Research Program



Examples of our Research

California Management Review
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Working Paper

2023/55/STR/OBH

Organizational Decision-Making Structures in the Age of Artificial Intelligence

Yash Raj Shrestha, Shiko M. Ben-Menahem, and Georg von Krogh

Abstract

How does organizational decision-making change with the advent of artificial intelligence (AI)-based decision-making algorithms. This satisfies the identity of the internal and the internal artificial intelligence (AI)-based

decision-making algr making along five k the decision-making replicability. Based (the article builds a no optimally benefit the categories in which (human to AI delega aggregated human—A

Keywords

decision making, arti

Comparing the willingness to share for human-generated vs. Al-generated fake news

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Generative artificial intelligence (AI) presents large risks for society when it is used to create fake news. A crucial factor for fake news to go viral on social media is that users share such content. Here, we aim to shed light on the sharing behavior of users across human-generated vs. AI-generated fake news. Specifically, we study: (1) What is the perceived veracity of human-generated fake news vs. AI-generated fake news? (2) What is the user's willingness to share human-generated fake news vs. AI-generated fake news? (3) What socio-economic characteristics let users fall for AI-generated fake news? To this end, we conducted a pre-registered, online experiment with N = 988 subjects and 20 fake news from the COVID-19 pandemic generated by GPT-4 vs. humans. Our findings show that AI-generated fake news is perceived as less accurate than human-generated fake news, but both tend to be shared equally. Further, several socio-economic factors explain who falls for AI-generated fake news.

CCS Concepts: • Human-centered computing → Empirical studies in HCI; Social media; • Applied computing → Sociology.

Additional Key Words and Phrases: fake news, misinformation, generative AI, large language model, online experiment, survey

Searching Together: A Theory of Human-Al Co-Creativity

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Learning Objectives

- How to use ChatGPT to unlock human creativity faster & better?
- How to effectively interact with ChatGPT?
- How to write better prompts?

Generative AI for Journalism

What To Do and What Not with Predictive Al

Do NOT use it for ...

- Automation it cannot replace human reflection
- Facts & sources it will make up facts and sources to a certain degree
- Final Decisions it may be biased and inaccurate
- Sensitive data unless you use a protected corporate account

... rather use it for ...

- Augmentation still apply your own judgement
- Ideation it is great at generating many fresh ideas from scratch
- Experimentation it can create multiple scenarios or alternatives
- **Challenging** it can provide feedback from multiple perspectives
- Storification it writes and structures communication well

Agenda

Part I (55 min)

1. What are prompts?

In class exercise I

- 2. Elements of a Prompt
- 3. Different applications of Prompting
- 4. Prompt Engineering Techniques

Break (10 min)

Part II (55 min)

Prompt Refinement Methods : Context,
 Objectives, Constraints, Iteration, Dissection

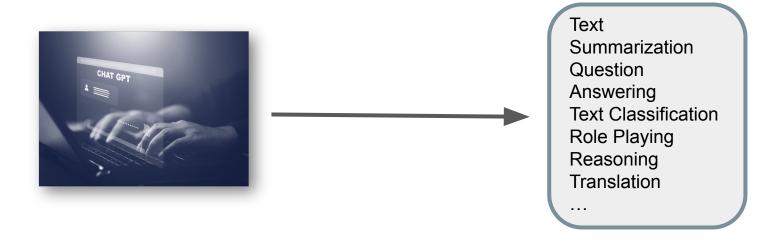
In class exercise II

Discuss

2. Risks and Challenges

What are prompts?

- Prompts involve instructions and context passed to a language model to achieve a desired task
- Prompt engineering is the practice of developing and optimizing prompts to efficiently use language models (LMs) for a variety of applications

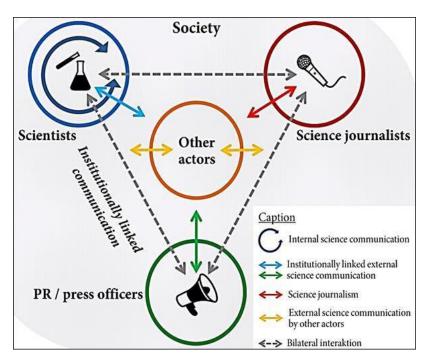


In-class hands-on exercise I

In-class hands-on exercise I

We live in information oriented society and communication of scientific findings especially in social media is essential.

Let's do an exercise to investigate how ChatGPT could play a role on such a task.



https://www.researchgate.net/publication/362181537_Chapter_-7_Use_of_Social_Media_f or Scientific Communication/figures

Exercise instructions:

Using following link, you can access today's tasks.

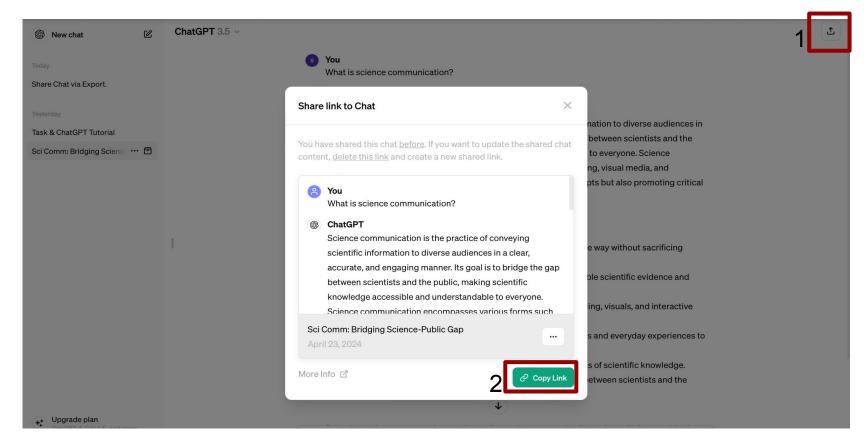
https://unil.qualtrics.com/jfe/form/SV_eKlilxGKsB7Ar9s

Task

Imagine you are part of the science communication department at a prominent newspaper. You are assigned to craft **an engaging social media post for X/Twitter** about a recent research article. **Your post should not exceed 280 characters.**

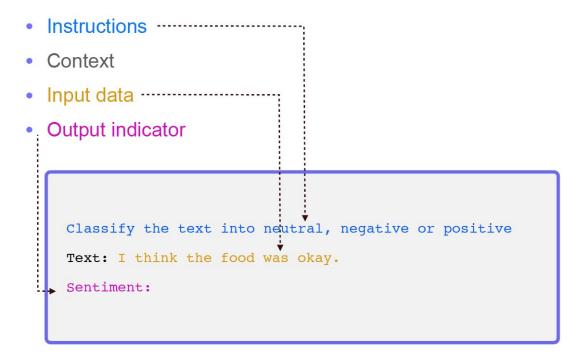
The task should not take more than 6 minutes.

Tips to record ChatGPT logs



Elements of a Prompt

A prompt is composed with the following components:



Different Applications of Prompting

1. Text Summarization

Input Data --

Generative artificial intelligence (AI) presents large risks for society when it is used to create fake news. A crucial factor for fake news to go viral on social media is that users share such content. Here, we aim to shed light on the sharing behavior of users across human-generated vs. Algenerated fake news. Specifically, we study: (1)~What is the perceived veracity of human-generated fake news vs. Al-generated fake news? (2)~What is the user's willingness to share human-generated fake news vs. Al-generated fake news on social media? (3)~What socioeconomic characteristics let users fall for Al-generated fake news? To this end, we conducted a pre-registered, online experiment with \$N=\$ 988 subjects and 20 fake news from the COVID-19 pandemic generated by GPT-4 vs. humans. Our findings show that Al-generated fake news is perceived as less accurate than human-generated fake news, but both tend to be shared equally. Further, several socio-economic factors explain who falls for Al-generated fake news.

Instruction -

Explain the above in 20 words:





ChatGPT

Study compares user behavior with human vs. Al-generated fake news. 988 subjects, 20 COVID-19 stories. Al news less trusted but shared equally.



2. Question Answering



You

Answer the question based on the context below. Keep the answer short and concise. Respond "Unsure about answer" if not sure about the answer.

Context: Generative artificial intelligence (AI) presents large risks for society when it is used to create fake news. A crucial factor for fake news to go viral on social media is that users share such content. Here, we aim to shed light on the sharing behavior of users across human-generated vs. Al-generated fake news. Specifically, we study: (1)~What is the perceived veracity of humangenerated fake news vs. Al-generated fake news? (2)~What is the user's willingness to share human-generated fake news vs. Al-generated fake news on social media? (3)~What socioeconomic characteristics let users fall for Al-generated fake news? To this end, we conducted a pre-registered, online experiment with N= 988 subjects and 20 fake news from the COVID-19 pandemic generated by GPT-4 vs. humans. Our findings show that Al-generated fake news is perceived as less accurate than human-generated fake news, but both tend to be shared equally. Further, several socio-economic factors explain who falls for Al-generated fake news.

Question: How many subjects were recruited for the experiment?

Answer:





ChatGPT

988 subjects were recruited for the experiment.







3. Text Classification



You

Generative artificial intelligence (AI) presents large risks for society when it is used to create fake news. A crucial factor for fake news to go viral on social media is that users share such content. Here, we aim to shed light on the sharing behavior of users across human-generated vs. Algenerated fake news. Specifically, we study: (1)~What is the perceived veracity of human-generated fake news vs. Al-generated fake news? (2)~What is the user's willingness to share human-generated fake news vs. Al-generated fake news on social media? (3)~What socioeconomic characteristics let users fall for Al-generated fake news? To this end, we conducted a pre-registered, online experiment with N= 988 subjects and 20 fake news from the COVID-19 pandemic generated by GPT-4 vs. humans. Our findings show that Al-generated fake news is perceived as less accurate than human-generated fake news, but both tend to be shared equally. Further, several socio-economic factors explain who falls for Al-generated fake news.

Can you classify the overall tone of the above abstract into neutral, positive or negative?





ChatGPT

The overall tone of the abstract is neutral. It presents a research study aimed at understanding user behavior regarding human-generated and Al-generated fake news without expressing a positive or negative sentiment towards the subject matter.



4. Role Playing

You are a columnist who writes column for kids aged around 10 years. Can you please write a very short column on the above research.

< 2/2

Title: Exploring Fake News: Human vs. Al

Hey there, curious minds!

Have you ever wondered how news spreads so quickly on the internet? Well, there's something important you should know about fake news!

Recently, some super-smart scientists studied how people like you and me share news online. They looked at two kinds of news: one made by humans and the other by super intelligent computers, called Al.

Guess what they found? Even though both types of news can trick us, people often think news made by other people is more believable than news made by Al. But here's the surprise: we share them both just as much!

Now, why do we fall for these tricky news stories? It turns out, it's not just because we're young and curious. Our background and where we come from also play a big role.

So, next time you see a news story online, remember to double-check before sharing it with your friends. And always be curious to learn more about what's real and what's not!

Stay smart and keep questioning,

[Your Name]

You are a columnist who writes column for policy makers in Europe. Can you please write a very short column on the above research.

< 3/3

G ChatGPT

Title: Addressing the Dual Threat of Human and Al-Generated Fake News

In our digitally-driven age, the proliferation of fake news poses a significant threat to societal well-being. Recent research delving into the dynamics of human versus Al-generated fake news sheds crucial light on this pressing issue.

The study, conducted with nearly a thousand subjects, scrutinized the perceived accuracy and sharing behavior surrounding fake news content, particularly amidst the COVID-19 pandemic. Astonishingly, despite conventional assumptions, Al-generated fake news was found to be perceived as less accurate than its human-generated counterpart. However, alarmingly, both variants were shared with equal frequency on social media platforms.

These findings underscore the imperative for policymakers to address the nuanced challenges posed by the interplay of human and Al-generated fake news. While technological advancements offer unprecedented opportunities, they also necessitate vigilant oversight to mitigate potential societal harms.

Furthermore, the identification of socio-economic factors influencing susceptibility to Algenerated fake news underscores the need for targeted interventions. By comprehensively understanding the mechanisms driving the dissemination and reception of fake news, policymakers can formulate evidence-based strategies to safeguard public discourse and democratic integrity.

In essence, combating the scourge of fake news demands a multifaceted approach that embraces technological innovation, regulatory measures, and educational initiatives. Only through collective vigilance and concerted action can we fortify our societies against the pernicious influence of misinformation.



5. Reasoning



You

Generative artificial intelligence (AI) presents large risks for society when it is used to create fake news. A crucial factor for fake news to go viral on social media is that users share such content. Here, we aim to shed light on the sharing behavior of users across human-generated vs. Algenerated fake news. Specifically, we study: (1)~What is the perceived veracity of human-generated fake news vs. Al-generated fake news? (2)~What is the user's willingness to share human-generated fake news vs. Al-generated fake news on social media? (3)~What socioeconomic characteristics let users fall for Al-generated fake news? To this end, we conducted a pre-registered, online experiment with N= 988 subjects and 20 fake news from the COVID-19 pandemic generated by GPT-4 vs. humans. Our findings show that Al-generated fake news is perceived as less accurate than human-generated fake news, but both tend to be shared equally. Further, several socio-economic factors explain who falls for Al-generated fake news.

If we had more fund and have recruited 400 more subjects, what would have been our total subject size?

< 5/5 ≥ 0

ChatGPT

If you recruited 400 more subjects on top of the initial 988, the total subject size would be 1388.



Prompt Engineering Techniques

Prompt Engineering Techniques

Many advanced prompting techniques have been designed to improve performance of complex tasks

- 1. Zero-shot prompting
- 2. Few-shot prompting
- 3. Chain-of-thought (CoT) prompting

1. Zero-shot prompting

Zero-shot prompting means that the prompt used to interact with the model won't contain examples or demonstrations. The zero-shot prompt directly instructs the model to perform a task without any additional examples to steer it.





Bringing artificial intelligence to business management

Artificial intelligence (AI) can support managers by effectively delegating management decisions to AI. There are, however, many organizational and technical hurdles that need to be overcome, and we offer a first step on this journey by unpacking the core factors that may hinder or foster effective decision delegation to AI.

Stefan Feuerriegel, Yash Raj Shrestha, Georg von Krogh and Ce Zhang

Zero-shot example



You

Artificial intelligence (AI) can support managers by effectively delegating management decisions to Al. There are, however, many organizational and technical hurdles that need to be overcome, and we offer a first step on this journey by unpacking the core factors that may hinder or foster effective decision delegation to Al.

This is an abstract for a research paper. Write a brief summary of this research paper for a news paper targeted at young audience.

The research paper discusses how artificial intelligence (AI) could help managers make decisions but also highlights the challenges that need to be addressed first. It's like when you play a video game, and you can either make all the decisions yourself or let the computer help you out. The paper is essentially mapping out what needs to be fixed and improved before we can trust AI to make important choices in businesses, much like how game developers tweak the game's AI to make it smarter and more helpful. This study is a guide for taking the first steps towards making that a reality.



2. Few shot prompting

Few-shot prompting can be used as a technique to enable in-context learning where we provide demonstrations in the prompt to steer the model to better performance. The demonstrations serve as conditioning for subsequent examples where we would like the model to generate a response.

Few-shot example



You

Abstract 1: Artificial intelligence (AI) drives innovation across society, economies and science. We argue for the importance of building AI technology according to open-source principles to foster accessibility, collaboration, responsibility and interoperability.

Above is the abstract of a research paper. Summary of this research paper for a news paper targeted at young audience follows:

What was this research about? Some cool stuff to make Al benefit all sections of society. What was this research fun? Because it brings openness into Al development.

Abstract 2: Artificial intelligence (Al) can support managers by effectively delegating management decisions to Al. There are, however, many organizational and technical hurdles that need to be overcome, and we offer a first step on this journey by unpacking the core factors that may hinder or foster effective decision delegation to Al.

This is an abstract for another research paper. Write a brief summary of this research paper for a news paper targeted at young audience similar to above.



6 ChatGPT

What was this research about? It's about teaching AI to help bosses make big decisions at work, like a super smart assistant that knows how to manage stuff really well.

What made this research fun? Because it's like figuring out a puzzle—finding out what makes it hard to let Al take over some boss-level decisions and how we can make that work better.



2. Chain-of-Thought (CoT) Prompting

Prompting can be further improved by instructing the model to reason about the task when responding

- This is very useful for tasks that require reasoning
- You can combine it with few-shot prompting to get better results
- You can also do zero-shot CoT where exemplars are not available

CoT Prompting Example

Standard Prompting

Model Input

Q: Roger has 5 tennis balls. He buys 2 more cans of tennis balls. Each can has 3 tennis balls. How many tennis balls does he have now?

A: The answer is 11.

Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?

Model Output

A: The answer is 27.



Chain-of-Thought Prompting

Model Input

Q: Roger has 5 tennis balls. He buys 2 more cans of tennis balls. Each can has 3 tennis balls. How many tennis balls does he have now?

A: Roger started with 5 balls. 2 cans of 3 tennis balls each is 6 tennis balls. 5 + 6 = 11. The answer is 11.

Q: The cafeteria had 23 apples. If they used 20 to make lunch and bought 6 more, how many apples do they have?

Model Output

A: The cafeteria had 23 apples originally. They used 20 to make lunch. So they had 23 - 20 = 3. They bought 6 more apples, so they have 3 + 6 = 9. The answer is 9.

Zero-Shot CoT

Involves adding "Let's think step by step" to the original prompt.



You

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If we had more fund and have recruited 400 more subjects, what would have been our total subject size?

(5/5) 0



If you recruited 400 more subjects on top of the initial 988, the total subject size would be 1388.







If we had more fund and have recruited 400 more subjects, what would have been our total subject size?

Let's think step by step.

< 6/6

ChatGPT

First, let's calculate the total number of subjects recruited initially:

Total subject size = Initial subject size + Additional subjects

- = 988 subjects + 0 additional subjects (since we haven't recruited additional subjects yet)
- = 988 subjects

Now, if we recruit 400 more subjects:

Total subject size = Initial subject size + Additional subjects

- = 988 subjects + 400 additional subjects
- = 1388 subjects

So, our total subject size would have been 1388 subjects if we recruited 400 more subjects.

Prompt refinement method

Prompt refinement method

PROMPTING PROCESS



PROMPTING ACTIONS

Context Objective Constraints Iteration Dissection

(1/3) Getting Started - Example of a Prompt



You

I work for a newspaper in Europe. My manager wants me two write an article on the impact of large events such as Olympics, Euro football cup or large academic conference on environment. We would like to write an article that draws on trade-offs between the benefits of such gatherings as well as potential detrimental impact on environment. Our audience is general public in Europe. Could you please provide five ideas for us with a short summary for each explaining the rationale why these could be interesting for our readers?



Context Objective Constraints Iteration Dissection

FAST@MPANY

(1/3) Getting Started - Example of a Prompt

Certainly! Here are five ideas for your article on the impact of large events on the environment, along with short summaries explaining their relevance to your audience:

- 1. "The Green Legacy of Mega Events: Balancing Benefits and Environmental Costs"
 Summary: Explore how mega-events like the Olympics, Euro football cup, and academic conferences can leave a lasting environmental legacy. Discuss the trade-offs between the economic, social, and cultural benefits of these gatherings and the potential environmental impact, highlighting initiatives aimed at mitigating negative effects and promoting sustainability.
- 2. "Carbon Footprint of Spectacle: Assessing the Environmental Impact of Large-Scale Events" Summary: Investigate the carbon footprint of hosting mega-events, including transportation emissions, venue construction, and energy consumption. Illustrate the environmental impact of these activities and consider strategies for reducing carbon emissions through green technologies, eco-friendly practices, and carbon offset programs.

(1/3) Getting Started - Example of a Prompt

- 3. "From Stadiums to Conservation: Repurposing Infrastructure for Environmental Conservation" Summary: Examine the potential for repurposing event infrastructure, such as stadiums and conference centers, for environmental conservation efforts post-event. Explore examples of successful adaptive reuse projects and discuss how repurposing can contribute to sustainable development and biodiversity conservation.
- 4. "Local vs. Global: The Environmental Impacts of Hosting Mega-Events in Urban Areas"

 Summary: Compare the environmental impacts of hosting mega-events in urban versus rural areas, considering factors such as air and water pollution, waste management, and urban sprawl. Discuss the challenges and opportunities associated with hosting events in densely populated urban centers and explore strategies for minimizing environmental harm.
- 5. "Engaging the Public: Citizen Participation in Sustainable Event Planning and Management" Summary: Highlight the importance of public engagement and citizen participation in promoting sustainability during event planning and management. Showcase examples of successful community-led initiatives, environmental awareness campaigns, and grassroots movements advocating for sustainable event practices, empowering readers to take action in their own communities.

These ideas aim to engage your audience by providing insightful analysis and practical insights into the environmental impacts of large-scale events, fostering awareness and dialogue around sustainability issues.

(2/3) Refining the Focus - Example of a Prompt



You

The first suggestion could work for us. Lets make it more concrete by taking one specific event. Lets take Olympics 2024. We want to focus on the difficulty to navigate the trade-offs between the benefits of mega events and the potential climate effects. Please provide two suggestions with rationale. Limit your response to 120 words.

- 1. "Legacy of the Paris 2024 Olympics: Navigating Environmental Trade-offs"
 Rationale: By focusing on the Paris 2024 Olympics, readers can connect with a recent and prominent mega-event. We can explore the city's efforts to balance the economic and cultural benefits of hosting the Olympics with the environmental challenges, such as increased carbon emissions from transportation and construction. This approach allows readers to understand the complexities of managing environmental trade-offs in the context of a specific event.
- 2. "Greening the Games: Strategies for Sustainable Olympics in Paris 2024"
 Rationale: This article can delve into the innovative sustainability initiatives implemented for the Paris 2024 Olympics. By showcasing efforts to minimize environmental impact through renewable energy, waste reduction, and eco-friendly infrastructure, readers can gain insight into practical solutions for mitigating climate effects associated with mega-events. Highlighting successful sustainability measures can inspire readers and encourage broader adoption of eco-friendly practices in future event planning and management.

Context

Objective

Constraints

Iteration

Dissection

(3/3) Exploring in Depth - Example of a Prompt



You

Ok, lets focus on the first option (Legacy of the Paris 2024 Olympics). Lets develop an introduction paragraph on this. We could start by saying that it can be great public relation boost for the country while producing too much carbon footprint. Please do so in no more than 150 words.

(3)

ChatGPT

Introduction:

The hosting of the Paris 2024 Olympics promises to be a momentous occasion for France, offering unparalleled opportunities for economic growth, cultural exchange, and global visibility. However, amidst the excitement and anticipation surrounding this prestigious event, lies a pressing concern: the environmental footprint of hosting such a mega-event. While the Olympics can serve as a significant public relations boost for the country, showcasing its ability to organize and host a world-class spectacle, the associated carbon emissions and environmental impacts cannot be overlooked. As the countdown to the Paris 2024 Olympics begins, it becomes increasingly imperative to navigate the delicate balance between reaping the benefits of hosting the games and mitigating the potential climate effects, ensuring a legacy that prioritizes sustainability and environmental stewardship for future generations. lacktriangle

Context

Objective

Constraints

Iteration

Dissection

(3/3) Exploring in Depth - Example of a Prompt

- Develop an abstract of the article
- Develop limitations of current policies
- Build an agenda on the topic for further research
- Discuss how citizens will be affected if we avoid mega events.

Context Objective Constraints Iteration Dissection

In-class exercise II

Let's repeat the task once more with another corpus.

You can continue on the same link as first task.

Task

Imagine you are part of the science communication department at a prominent newspaper. You are assigned to craft **an engaging social media post for X/Twitter** about a recent research article. **Your post should not exceed 280 characters.**

The task should not take more than 6 minutes.

Risks and Challenges

Risks and Challenges







Data Bias and Inequity

- Biased training data may lead to biased outputs
- Reinforce stereotypes and inequalities in society

Security and Privacy

- Exploit to generate harmful or misleading contents
- Personal or corporate data breaches

Dependency and Deterioration

 Long-term reliance for decision-making and content generation lead to the deterioration of skills and judgement.

Discussion

Did you any prompt improvement methods?

A new study sheds light on the impact of psychiatric hospitalization for suicidal patients and uncover what personalized treatment approaches can achieve. Read more: [link] #MentalHealth #SuicidePrevention"



New study finds psychiatric hospitalization associated with 12% decrease in suicide risk within 24 hours of attempt, but not after. Tailored treatments could cut hospitalizations by 13%.

Want to learn more?

1. Prompt Engineering for ChatGPT

Coursera

Link: https://www.coursera.org/learn/prompt-engineering/home/week/1

2. ChatGPT Prompt Engineering for Developers

Deeplearning.Al (collaborated with OpenAl)

Link: https://learn.deeplearning.ai/courses/chatgpt-prompt-eng/lesson/1/introduction

3. Prompt Engineering Guide

Learn Prompting

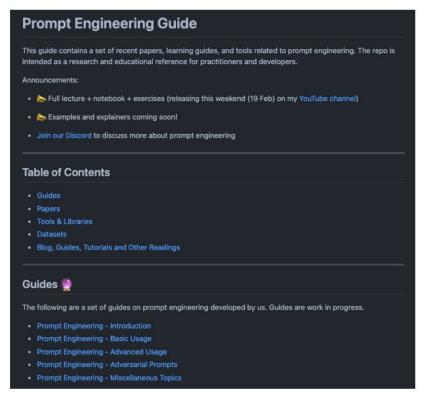
Link: https://learnprompting.org/docs/intro

4. Prompt-Engineering-Guide

DAIR.AI

Github: https://github.com/dair-ai/Prompt-Engineering-Guide/tree/main

Prompt Engineering Guide



https://github.com/dair-ai/Prompt-Engineering-Guide