

인공지능 모델 활용 실습

ChatGPT Prompt Engineering



Prompt Engineering



- 다양한 응용 프로그램 및 연구에 거대언어모델(LLM)을 효율적으로 이용하기 위해 프롬프트를 개발하고 최적화하는 것
 - 질의 응답과 같은 일반적인 작업뿐만 아니라 계산 및 추론 등의 복잡한 작업까지 LLM의 역량을 향상시킴
 - 단순히 프롬프트를 잘 설계하여 입력하는 것 뿐만 아니라 도메인 지식 및 외부 도구와 LLM을 상호 작용시키는 기술을 포함

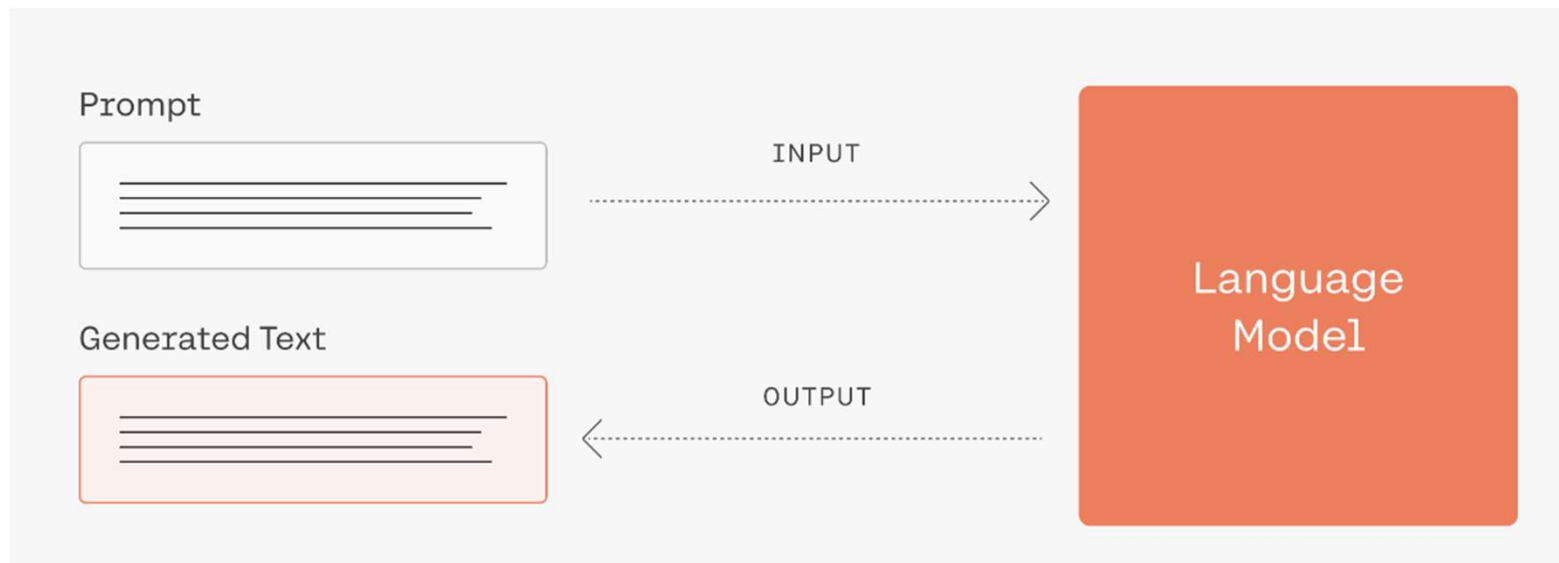


그림 출처 : Cohere - <https://docs.cohere.com/docs/prompt-engineering>

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▶ OpenAI Playground

<https://platform.openai.com/playground>

- Temperature : 생성된 문장의 창의성과 사실성을 조절하는 변수
- Top_p or Top_k : 출력 문장의 단어 다양성과 길이를 조절하는 변수

Playground

Load a preset... Save View code Share ...

Write a tagline for an ice cream shop.

Mode: Complete Legal

Model: text-davinci-003

Temperature: 0.7

Maximum length: 256

Stop sequences: Enter sequence and press Tab

Top P: 1

Frequency penalty: 0

Presence penalty: 0

Looking for ChatGPT? [Try it now](#)

Submit

Complete 변경

text-davinci-003 변경

0.7 변경

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▶ 프롬프트 구성요소

- Instruction : 모델이 수행하기를 원하는 특정 작업 또는 지침
- Context : 더 나은 응답을 할 수 있도록 모델에게 주는 외부 정보 또는 컨텍스트
- Input Data : 응답을 받고자 하는 입력 또는 질문
- Output Indicator : 출력의 유형 또는 형식

The sea is vast

The sea is vast and powerful. It covers more than two-thirds of the Earth's surface and is home to an incredible variety of plants and animals. Its endless beauty and mystery have inspired creativity and exploration throughout the centuries.

<Instruction을 주지 않았을 경우>

Complete the sentence:
The sea is
deep.

Translate the Text below to Korean:
Text : "Hello!"

안녕하세요!

<Instruction을 주었을 경우>

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▶ 프롬프트 구성요소

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

Question: Where did the drone attack happened recently?

Answer: Yemen.

<Context를 주지 않은 경우 – 잘못된 정보를 대답>

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: Russian governors in charge of regions close to Ukraine are reporting further cross-border drone attacks by Ukrainian forces. A drone crashed in the town of Kurchatov in Kursk oblast, Gov. Roman Starovoit wrote on Telegram, causing partial damage to an apartment building. No one was injured, he said. Three drones were also intercepted Thursday over the neighboring Voronezh region, according to Gov. Aleksandr Gusev, who reported no injuries and no damage. CCTV videos posted on local unofficial Telegram channels showed what appeared to be one of the explosions happening at just before 11 p.m. local time. A loud bang can be heard followed by the sound of alarms.

Question: Where did the drone attack happed?

Answer: Kurchatov, Kursk oblast and Voronezh region.

<Context를 준 경우 – 최근의 사실을 대답>

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▶ 프롬프트 구성요소

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

Question: Where did the drone attack happened recently?

Answer: Yemen.

<Context를 주지 않은 경우>

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: Russian governors in charge of regions close to Ukraine are reporting further cross-border drone attacks by Ukrainian forces. A drone crashed in the town of Kurchatov in Kursk oblast, Gov. Roman Starovoit wrote on Telegram, causing partial damage to an apartment building. No one was injured, he said. Three drones were also intercepted Thursday over the neighboring Voronezh region, according to Gov. Aleksandr Gusev, who reported no injuries and no damage. CCTV videos posted on local unofficial Telegram channels showed what appeared to be one of the explosions happening at just before 11 p.m. local time. A loud bang can be heard followed by the sound of alarms.

Question: Where were the airplanes going?

Answer: Unsure about answer.

<Context를 준 경우 – 확실치 않은 대답은 하지 않음>

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▶ 프롬프트 구성요소

<Output Indicator를
주지 않은 경우>

Extract the years in the following text.

Input: "When it launched its first rocket into space in 1963, the country was no match for the ambitions of the US and the former Soviet Union, which were way ahead in the space race. Now, India is the world's most populous nation and its fifth largest economy. It boasts a burgeoning young population and is home to a growing hub of innovation and technology. And India's space ambitions have been playing catch up under Modi. For the leader, who swept to power in 2014 on a ticket of nationalism and future greatness, India's space program is a symbol of the country's rising prominence on the global stage. In 2014, India became the first Asian nation to reach Mars, when it put the Mangalyaan probe into orbit around the Red Planet, for \$74 million – less than the \$100 million Hollywood spent making space thriller "Gravity." Three years later, India launched a record 104 satellites in one mission. In 2019, Modi announced in a rare televised address that India had shot down one of its own satellites, in what it claimed was an anti-satellite test, making it one of only four countries to do so."

1963, 2014, 2017, 2019

<Output Indicator를 준 경우>

Extract the years in the following text.

Desired format:

Year: <comma_separated_list_of_years>

Input: "When it launched its first rocket into space in 1963, the country was no match for the ambitions of the US and the former Soviet Union, which were way ahead in the space race. Now, India is the world's most populous nation and its fifth largest economy. It boasts a burgeoning young population and is home to a growing hub of innovation and technology. And India's space ambitions have been playing catch up under Modi. For the leader, who swept to power in 2014 on a ticket of nationalism and future greatness, India's space program is a symbol of the country's rising prominence on the global stage. In 2014, India became the first Asian nation to reach Mars, when it put the Mangalyaan probe into orbit around the Red Planet, for \$74 million – less than the \$100 million Hollywood spent making space thriller "Gravity." Three years later, India launched a record 104 satellites in one mission. In 2019, Modi announced in a rare televised address that India had shot down one of its own satellites, in what it claimed was an anti-satellite test, making it one of only four countries to do so."

Year: 1963, 2014, 2017, 2019

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▶ 프롬프팅 기법

- Zero-shot Prompting
- Few-shot Prompting
- Chain-of-Thought Prompting
- Self-Consistency
- Generate Knowledge Prompting
- Tree of Thoughts
- Retrieval Augmented Generation
- Automator Prompt Engineer
- Active-Prompt
- Directional Stimulus Prompting
- ReAct

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▶ 프롬프팅 기법

- Few-shot Prompting : 예제를 주어 모델의 응답을 조절하는 기법

<예제를 주지 않은 경우>

Fix the input sentence in Good English output format

Poor English input: I'd be more than happy to work with you in another project.

Good English output: I would be delighted to collaborate with you on another project.

<예제를 준 경우>

Poor English input: I eated the purple berries.

Good English output: I ate the purple berries.

Poor English input: Thank you for picking me as your designer. I'd appreciate it.

Good English output: Thank you for choosing me as your designer. I appreciate it.

Poor English input: The mentioned changes have done. or I did the alteration that you requested. or I changed things you wanted and did the modifications.

Good English output: The requested changes have been made. or I made the alteration that you requested. or I changed things you wanted and made the modifications.

Poor English input: I'd be more than happy to work with you in another project.

Good English output: I would be more than happy to work with you on another project.

예제 출처 : Brown, Tom, et al. "Language models are few-shot learners." Advances in neural information processing systems 33 (2020): 1877-1901.

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▶ 프롬프팅 기법

- Chain-of-Thought(CoT) : 중간 추론 단계를 주어 복잡한 추론을 가능하게 하는 기법

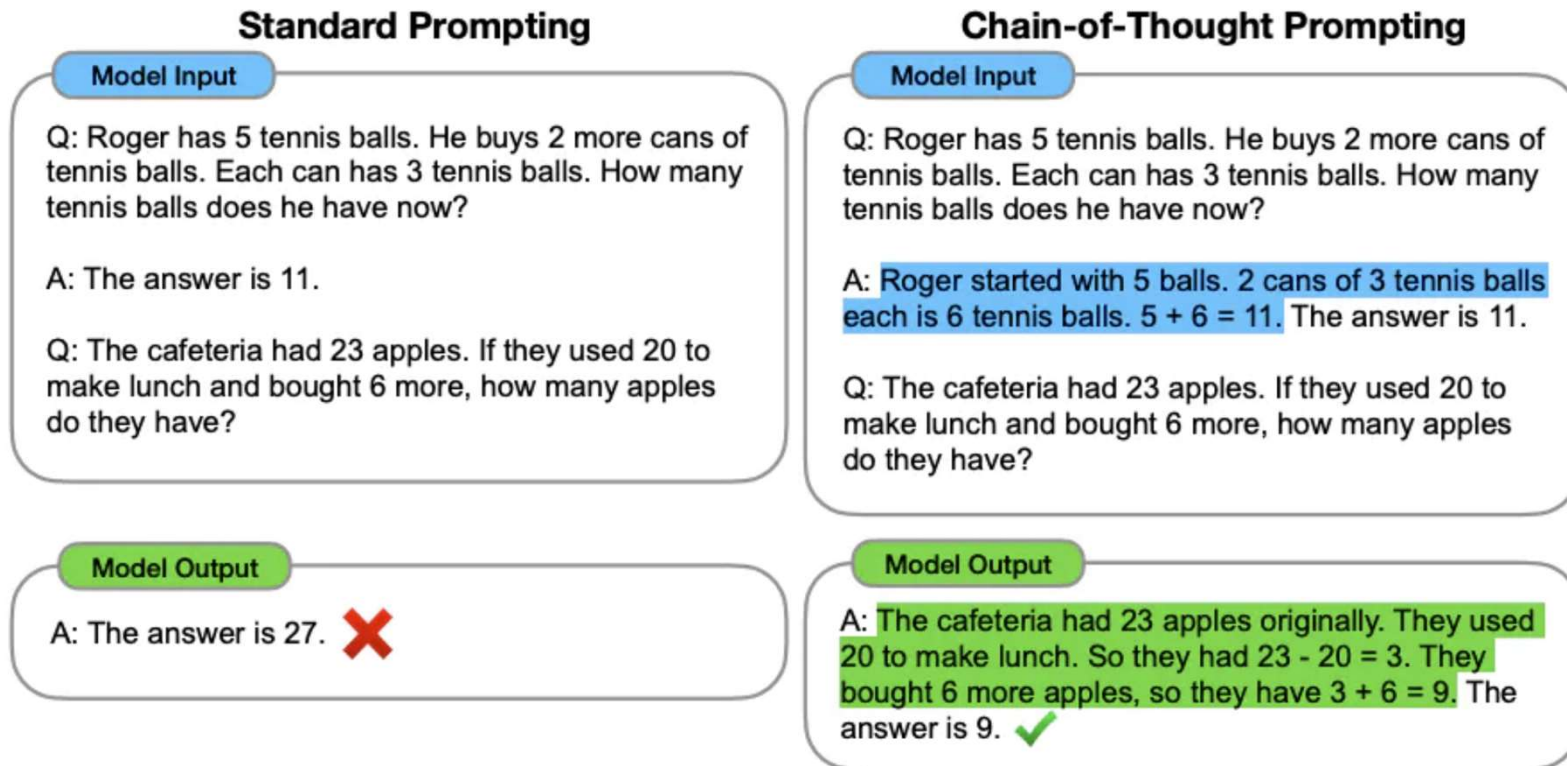


그림 출처 : Wei, Jason, et al. "Chain-of-thought prompting elicits reasoning in large language models." Advances in Neural Information Processing Systems 35 (2022)

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▶ 프롬프팅 기법 (CoT)

<정답만 예제로 준 경우>

The odd numbers in this group add up to an even number: 4, 8, 9, 15, 12, 2, 1.

A: The answer is False.

The odd numbers in this group add up to an even number: 17, 10, 19, 4, 8, 12, 24.

A: The answer is True.

The odd numbers in this group add up to an even number: 16, 11, 14, 4, 8, 13, 24.

A: The answer is True.

The odd numbers in this group add up to an even number: 17, 9, 10, 12, 13, 4, 2.

A: The answer is False.

The odd numbers in this group add up to an even number: 15, 32, 5, 13, 82, 7, 1.

A: The answer is True.

<중단 추론 단계로 같이
예제로 준 경우>

The odd numbers in this group add up to an even number: 4, 8, 9, 15, 12, 2, 1.

A: Adding all the odd numbers (9, 15, 1) gives 25. The answer is False.

The odd numbers in this group add up to an even number: 15, 32, 5, 13, 82, 7, 1.

A: Adding all the odd numbers (15, 5, 13, 7, 1) gives 41. The answer is False.

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▶ 프롬프팅 기법

- Zero-shot CoT: "Let's think step by step"을 넣어 CoT를 수행하게 하는 기법

(a) Few-shot

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: A juggler can juggle 16 balls. Half of the balls are golf balls, and half of the golf balls are blue. How many blue golf balls are there?
A:

(Output) The answer is 8. ✗

(b) Few-shot-CoT

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: A juggler can juggle 16 balls. Half of the balls are golf balls, and half of the golf balls are blue. How many blue golf balls are there?
A:

(Output) The juggler can juggle 16 balls. Half of the balls are golf balls. So there are $16 / 2 = 8$ golf balls. Half of the golf balls are blue. So there are $8 / 2 = 4$ blue golf balls. The answer is 4. ✓

(c) Zero-shot

Q: A juggler can juggle 16 balls. Half of the balls are golf balls, and half of the golf balls are blue. How many blue golf balls are there?
A: The answer (arabic numerals) is

(Output) 8 ✗

(d) Zero-shot-CoT (Ours)

Q: A juggler can juggle 16 balls. Half of the balls are golf balls, and half of the golf balls are blue. How many blue golf balls are there?
A: **Let's think step by step.**

(Output) There are 16 balls in total. Half of the balls are golf balls. That means that there are 8 golf balls. Half of the golf balls are blue. That means that there are 4 blue golf balls. ✓

그림 출처 : Kojima, Takeshi, et al. "Large language models are zero-shot reasoners." Advances in neural information processing systems 35 (2022)