

ReAct Prompting

Instructor

Bhaskarjit Sarmah

Vice President, Blackrock



Definition

- ReAct Prompting is a method that combines thinking and action, boosting language models' problem-solving abilities.

How Does it Work

- **Integrated Reasoning:** It blends internal reasoning and actionable steps, improving task execution.
- **Strategic Interaction:** Plans and adapts actions, including engaging with external information sources like websites.
- **Human-Like Reasoning:** Aims for a natural problem-solving approach by preventing guesswork and encouraging logical progression.

ReAct Prompting: Example

(1) Hotspot QA

Questions: Aside from the Apple Remote, what other device can control the program Apple Remote was originally designed to interact with?

(1 a) Standard

Answer: ipod



(1 b) CoT (Reason only)

Thought: Let's think step by step. Apple Remote was, originally designed to interact with Apple TV. Apple TV can be controlled by iPhone, iPad, and iPod Touch.

Answer: iPhone, iPad, iPod Touch.



(1 c) Act-only

Act 1: Search (Apple Remote)
Obs 1: The Apple Remote is a remote control

Act 2: Search (Front Row)
Obs 2: Could not find (Front Row).
Similar:

Act 3: Search (Front Row (software))
Obs 3: Front Row is a discontinued media center software....

Act 4: Finish (Yes)



(1 d) ReAct (Reason +Act)

Thought 1: I need to search Apple Remote and find the program it was originally designed to interact with.

Act 1: Search (Apple Remote)

Obs 1: The Apple Remote is a remote control introduced in October 2005 by Apple.... originally designed to control the Front Row media center program....

Thought 2: Apple Remote was originally designed to control the Front Row media center program. I need to search Front Row next and find what other device can control it.

Act 2: Search (Front Row)

Obs 2: Could not find (Front Row). Similar: ('Front Row seat to Earth', 'Front RowMotorsports', 'Front Row (Software'.))

Thought 3: Front Row is not found. I need to search Front Row (Software).

Act 3: Search (Front Row (Software))

Obs 3: Front Row is a discontinued media center software.....

Thought 4: Front Row (Software) is controlled by an Apple Remote or the keyboard function keys. So the answer is Keyboard function keys.

Act 4: Finish (Keyboard function Keys).



ReAct Promoting: Example with Human-in-the-loop

Alfworld

You're in the middle of a room. Looking quickly around you, you see a armchair 1, a cabinet 4, a drawer 5, ..., a drawer 1, a dresser1, a garbage can 1, a safe 1, a shelf 12,, a sidetable 1, and a sofa 1.
Your task is to : put two keychain in safe.

ReAct

.....
Obs 16: You open the drawer 4. The drawer 4 is open. In it, you see a keychain 3, and a watch 2.
Act 17: Think [Now I find the first keychain (3). Next, I need to take it. I can find the second keychain (2) later in drawer 4.]
Act 18: Take keychain3 from drawer 4
Obs 18: You pick up the keychain 3 from the drawer 4.
.....
Act 22: Put keychain 3 in/on the safe 1.
Obs 22: You put the keychain 3 in/on the safe 1.
Act 23: Think [Now I put the first keychain in safe. Next, I need to find the second keychain. I can directly go to drawer 4.]
Act 24: Go to drawer 4
Obs 24: The drawer 4 is open. In it, you see a watch 2.
Act 25: Think [Now I find the second keychain (2). Next , I need to take it.]
Act 26: Take keychain 2 from drawer 4
Obs 26: Nothing happens.



(1 d) ReAct (Human Thought Edit)

.....
Obs 16: You open the drawer 4. The drawer 4 is open. In it, you see a keychain 3, and a watch 2.
Act 17: Think [Now I find the first keychain (3). Next, I need to take it.
Act 18: Take keychain 3 from drawer 4
Obs 18: You pick up the keychain 3 from the drawer 4.
.....
Act 22: Put keychain 3 in/on safe 1
Obs 22: You put the keychain 3 in/on the safe 1.
Act 23: Think [Now I put the first keychain in the safe. Next, I need to find the second keychain, which is more likely to appear in the dresser (1), garbage can (1), safe (1), side table (1), sofa (1), and shelf (1-12).]
Act 24: Go to dresser 1
Obs 24: On the dresser 1, you see a box 1, a credit card 1, a keychain 2, a keychain 1, and a laptop 1...
Act 25: Think [Now I find the second keychain (2). Next, I need to take it.]
Act 26: Take keychain 2 from dresser 1
Act 27: Think [Now I take the second keychain (2). Next, I need to put it in/on safe 1.]
Act 28: Go to safe 1
obs 28: The safe 1 is open. In it, you see a keychain 3, a statue 2, and a watch 3.
Act 29: Put keychain 2 in/on safe 1
Obs 29: You put the keychain 2 in/on the safe 1.



Pros: ReAct Prompting

Merges thought with action for dynamic and responsive planning.

Its transparent process in decision-making builds user confidence.

Harness external data, like Wikipedia, to enhance decisions.

Cons: ReAct Prompting

Can be challenged by complex tasks with numerous options due to cognitive load limitations.

May enter loops, reiterating thoughts and actions without progress.

Finds navigating tasks with a wide array of possible actions challenging.

Thank You
