20241003

Thread of Thought Unraveling Chaotic Contexts

Prompt engineering

- System 2 Attention (S2A) Prompting
 - 解決Transformer-based LLM中的軟注意力機制容易合併不相關上下文訊息的問題
 - 重新生成輸入的上下文,過濾掉不相關的資訊
- Thread of Thought (ThoT) Prompting
 - 将大段的上下文分解成可管理的部分,逐步分析並總結每個片段,再將 訊息精煉以生成最終回答
 - 適合在處理過於繁雜或沒有明確結構的文本

• LLMs struggle in chaotic contexts, leading to information omission.

Aspect	Chaotic Context	Long Context
Definition	Overloaded with complex, often unrelated information.	Primarily characterized by the length of text.
Challenges	Difficulty lies in the complexity and disorganization of information. Identifying relevant information is hard due to the clutter of similar, unrelated elements.	Challenge is managing and processing the extended amount of information, but the data might still be orderly or sequential.
Key Characteristic	Non-sequential, mixed, and complex information structure.	Sequential and more orderly information structure, despite being extensive.
LLM's Struggle	Hard to navigate due to the lack of order and presence of distractions.	Struggle with processing due to volume, but navigation is simpler due to sequential order.

• Inspired by human cognitive processes, ThoT methodically segments and analyzes extended contexts, selecting relevant information.

CoT v.s. ThoT

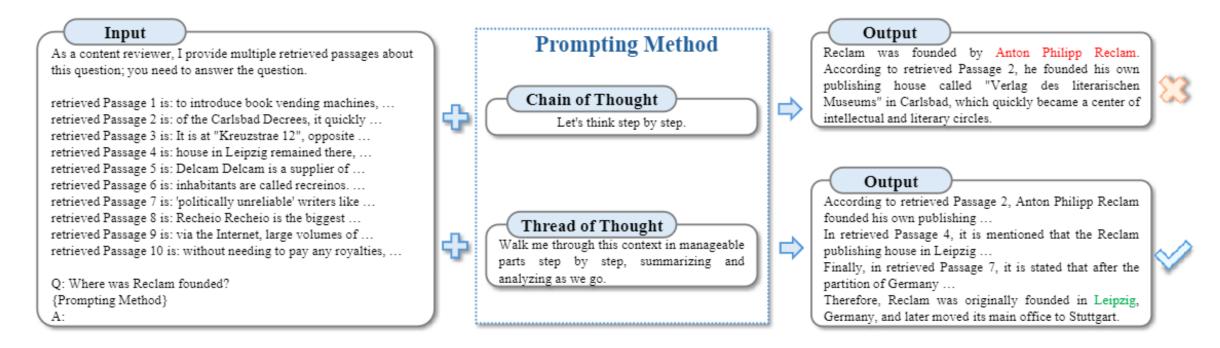


Figure 1: Thread of Thought prompting enables large language models to tackle chaotic context problems. In the output depicted, green text denotes the correct answer, while red text indicates the erroneous prediction.

CoT v.s. ThoT

Aspect	Chain of Thought (CoT)	Thread of Thought (ThoT)
Primary Goal	To improve reasoning by generating intermediate steps.	To handle chaotic contexts by segmenting and analyzing extended contexts.
Approach	Linear reasoning, following a logical sequence of steps.	Systematic segmentation and analysis of context, selecting relevant information.
Complexity Handling	Effective in structured contexts, but may struggle with complex, disorganized information.	Specifically designed to tackle complex, chaotic contexts with disorganized or unrelated information.
Integration	Can be integrated into existing LLMs, enhancing reasoning ability.	Versatile module, seamlessly integrating with various LLMs and prompting techniques.
Use Cases	Suited for problems where a step-by- step reasoning process can lead to a solution.	Ideal for scenarios with mixed, non- sequential, or complex information structures.

Input As a content reviewer. I provide multiple retrieved passages about this question; you need to answer the question. retrieved Passage 1 is: to introduce book vending machines. ... retrieved Passage 2 is: of the Carlsbad Decrees, it quickly ... retrieved Passage 3 is: It is at "Kreuzstrae 12", opposite ... retrieved Passage 4 is: house in Leipzig remained there, ... retrieved Passage 5 is: Delcam Delcam is a supplier of ... retrieved Passage 6 is: inhabitants are called recreinos. ... retrieved Passage 7 is: 'politically unreliable' writers like ... retrieved Passage 8 is: Recheio Recheio is the biggest ... retrieved Passage 9 is: via the Internet, large volumes of ... retrieved Passage 10 is: without needing to pay any royalties, ... O: Where was Reclam founded? Walk me through this context in manageable parts step by step, summarizing and analyzing as we go. First Output According to retrieved Passage 2, Anton Philipp Reclam founded his own publishing ... In retrieved Passage 4, it is mentioned that the Reclam publishing house in Leipzig ... Finally, in retrieved Passage 7, it is stated that after the partition of Germany ... Therefore, Reclam was originally founded in Leipzig, Germany, and later moved its main office to Stuttgart. Second Output Reclam was originally founded Therefore, the answer: in Leipzig

First Step: Initiating the Reasoning "Walk me through this context in manageable parts step by step, summarizing and analyzing as we go"

Second Step: Refining the Conclusion "Therefore, the answer:"

Figure 2: Thread of Thought for zero-shot reasoning.

As a content reviewer, I provide multiple retrieved passages about this question; you need to answer the question. retrieved Passage 1 is: claims that ever since her father's death she has been ... retrieved Passage 2 is: ... Andi Eigenmann is his daughter with actress Jaclyn Jose... retrieved Passage 3 is: several tokens (e.g., a lock of hair, some black beads ... retrieved Passage 4 is: 2017, he took part in the German TV series " Let's Dance... retrieved Passage 5 is: engaged. When Jorja Fox decided to leave the show, ... retrieved Passage 6 is: as well as in the 420 discipline in 2007 and 2008. ... retrieved Passage 7 is: to be to transfix a man with a harpoon. Grissom ... retrieved Passage 8 is: Rivera on June 1, 2009. The next year, Rivera ... retrieved Passage 9 is: the relationship, saying that it was in her best interest. ... retrieved Passage 10 is: Sidle and Grissom were interested in each other ... Q: Who is Mark Gil married to? Walk me through this context in manageable parts step by step, summarizing and analyzing as we go.

Output

The question is about Mark Gil and who he is married to. Mark Gil is mentioned in retrieved Passage 2 and retrieved Passage 8.

In retrieved Passage 2, it is mentioned that Mark Gil was married to Maricar Jacinto in 1996 and they had one child named Stephanie. However, this passage does not provide any information about Mark Gil's current marital status or who he is currently married to.

In retrieved Passage 8, it is not mentioned who Mark Gil is married to. Instead, this passage provides information about his previous marriages and divorces. It states that he was previously married to a woman named Elisabeth Rivera in 2009, but they divorced in 2011. It also mentions that he later married Kim Perks in 2012 and they had a daughter in 2014. This passage does not provide any information on Mark Gil's current marital status or who he is currently married to.

Therefore, based on the provided information, it is not possible to determine who Mark Gil is currently married to.

Figure 7: Error Analysis.

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