

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
 - 將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

Thread of Thought (ThoT)

- 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.

Thread of Thought (ThoT)

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

CoT v.s. ThoT

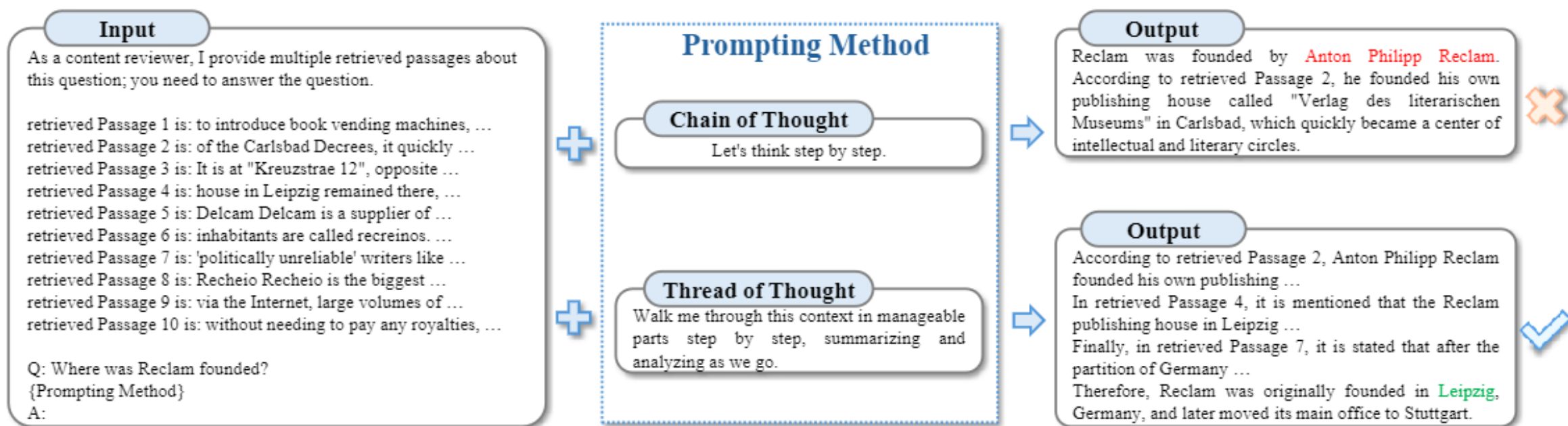
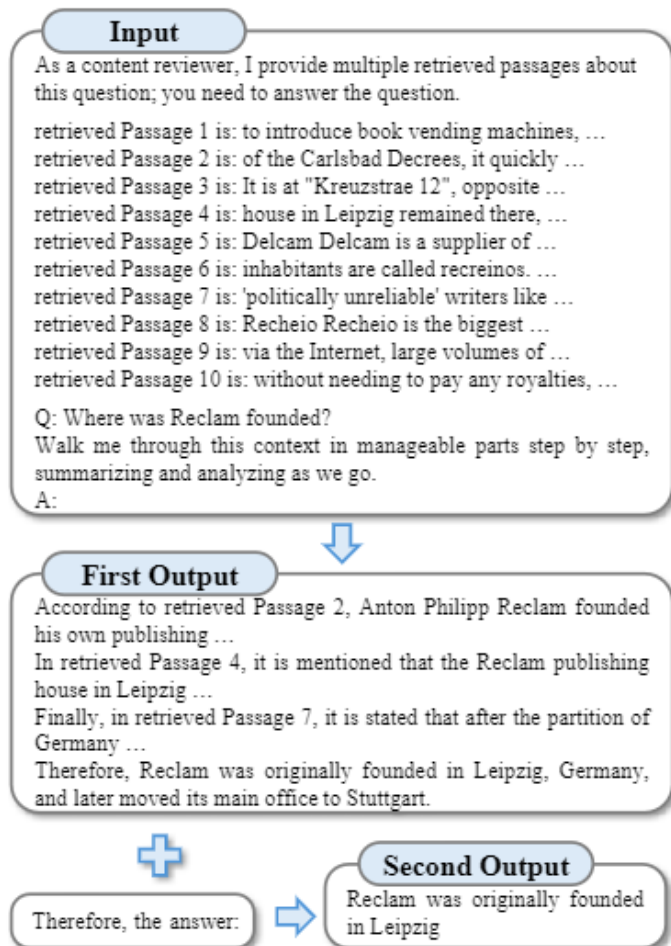


Figure 1: Thread of Thought prompting enables large language models to tackle chaotic context problems. In the output depicted, green text denotes the correct answer, while red text indicates the erroneous prediction.

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.

Thread of Thought (ThoT)



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.

Thread of Thought (ThoT)

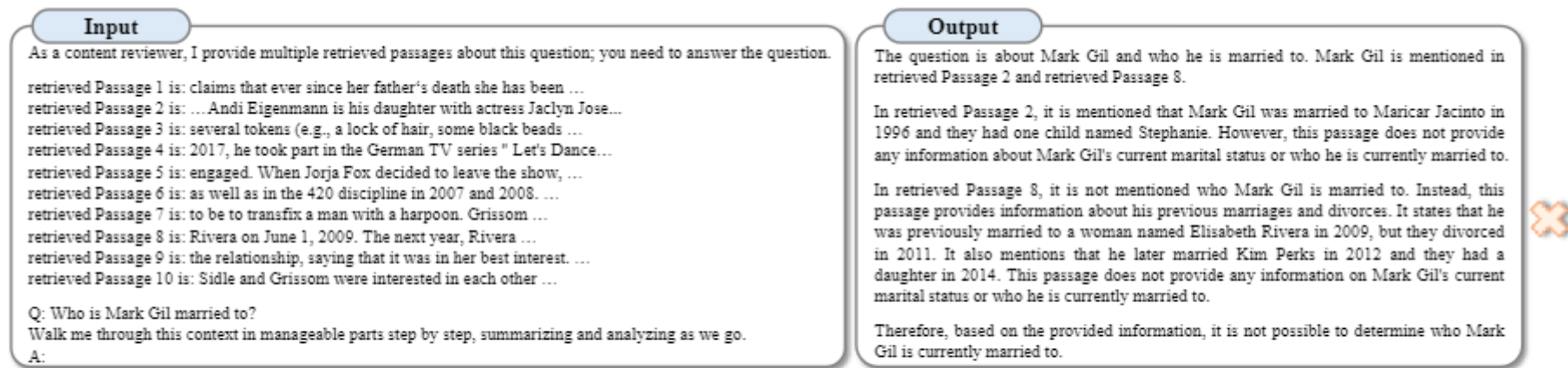


Figure 7: Error Analysis.

擅長提取顯式訊息

但在需要理解細微關係的隱式推理方面會碰到困難