A Comprehensive Taxonomy of Prompt Engineering Techniques for Large Language Models

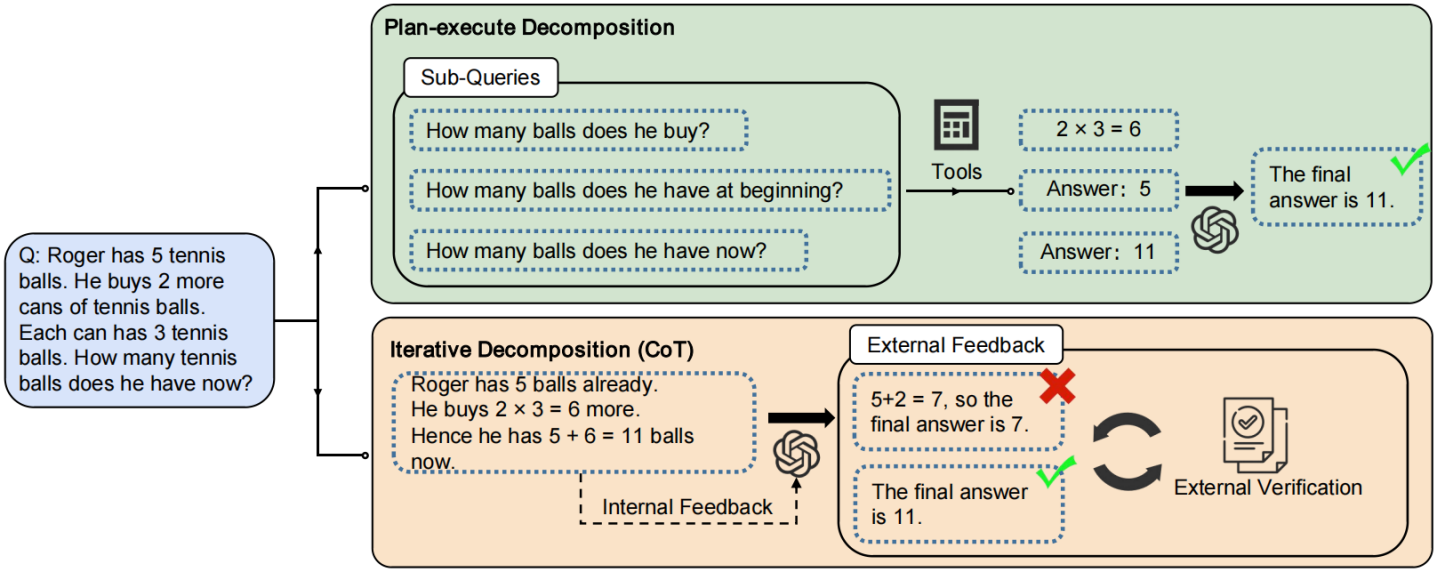
Yaoyang LIU, Zhen ZHENG, Feng ZHANG, Jincheng FENG, Yiyang FU, Jidong ZHAI,
Bingsheng HE, Xiao ZHANG, Xiaoyong DU

Frontiers of Computer Science, DOI: 10.1007/s11704-025-50058-z

Problems & Ideas

- Problems of prompt engineering approaches:
  - Existing prompt engineering techniques have introduced numerous methods to enhance LLM performance, yet these techniques still lack systematic categorization and a unified framework.
  - There is still a lack of a systematic summary of prompt engineering techniques tailored to specific application scenarios.

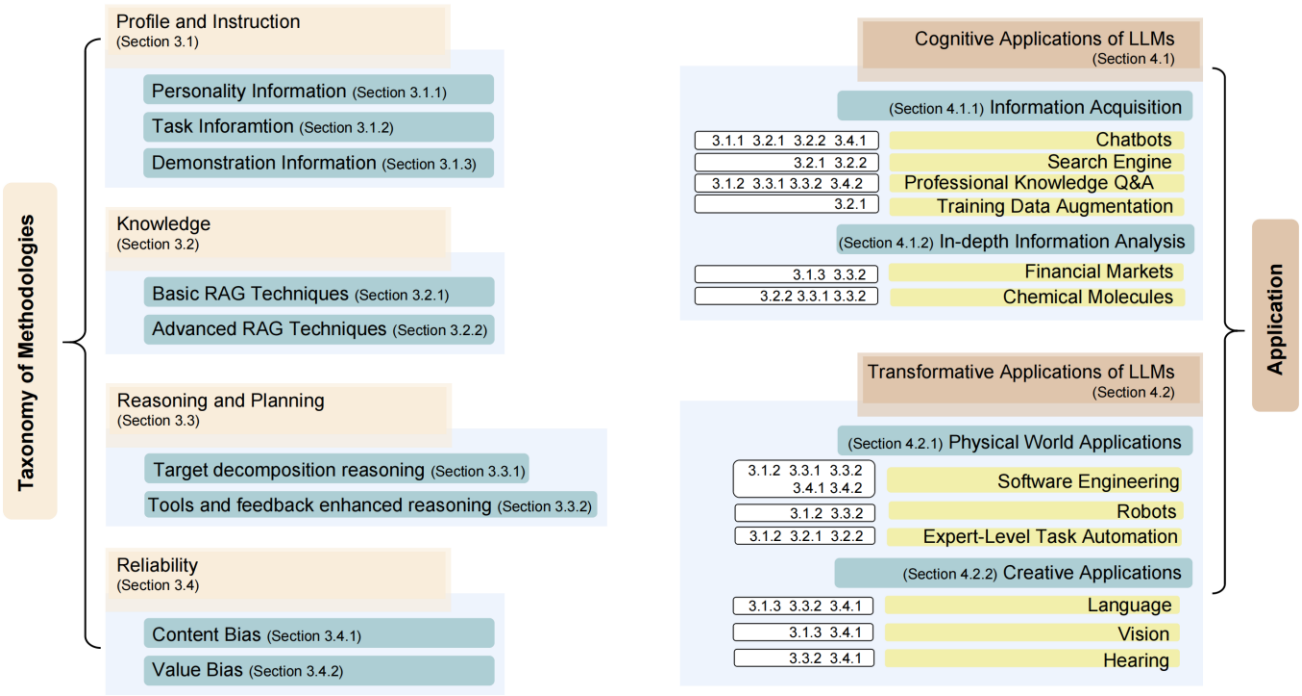
- Ideas: Based on the principles of human problem-solving, prompt engineering is divided into four aspects: basic task information, knowledge augmentation, reasoning, and reliability. This taxonomy encompasses core techniques from basic prompt to advanced reasoning , providing a clear and unified framework.



An example of using prompt engineering techniques to improve question answer performance. By using various prompt engineering techniques, improving prompts enhances the problem-solving ability of LLMs.

Main Contributions

- Contributions:
  - We present a comprehensive taxonomy of prompt engineering across four aspects: **profile and instruction**, **knowledge**, **reasoning and planning**, and **reliability**. This taxonomy provides a foundational framework encompassing essential building blocks and methodological abstractions crucial for prompt engineering;
  - This paper presents a comprehensive range of practical applications and case studies that effectively demonstrate the effectiveness of the proposed taxonomy.
  - This paper identifies several promising future research directions, such as prompt attack defense, multi-hop RAG, and domain-specific prompt engineering frameworks.



The taxonomy tree of prompt engineering methodologies. The application tree on the right reveals the relationship between the practical application of LLMs and our categorized prompt engineering techniques.