

Chain-of-Knowledge (For Knowledge Augmentation)

Instructor

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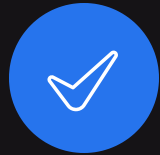
Definition

- Chain-of-Knowledge (CoK) empowers language models to enhance the accuracy of answers by utilizing diverse information sources.
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- It begins by assembling preliminary answers, identifying and weighing various knowledge segments for relevance.

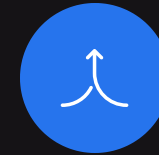
How Chain-of-Knowledge Works



Compares initial answers, refining them targeted information queries to databases such as Wikidata, enhancing answer precision.



Methodically correcting and updating the reasoning steps, CoK incrementally improves the responses.



Combine all the corrected reasons to arrive at the final answer

Chain-of-Knowledge: Example

Question

What year was the Argentine actor who directed El Tio Disparte born?

Chain-of-Thought & Self-consistency

Rationales: First, the Argentine actor who directed EL Tio Disparte is Fernando Birri.
Second, Fernando Birri was born in 1925.



Retrieval-Based Methods
(Verify -and Edit

Verifying Questions: Who directed EL Tio Disparte?
When was Fernando Birri born?
Retrieved & Edit once: Palito Ortega directed El Tio Disparte, Fernando Birri was born in 1925.



Error Propagation

Chain-of-Knowledge with
Dynamic Knowledge Adapting

Identified domains: factual (Wikidata, Wikipedia)
Rationale 1: First, the Argentine actor who directed El Tio Disparte is Fernando Birri.

Retrieve (Wikidata) 1: SELECT ?answer WHERE { wd:El Tio Disparte wdt:director ?answer . } -> Palito Ortega

Retrieve (Wikipedia) 1: Who directed El Tio Disparte? -> El Tio Disparte is directed by Palito Ortega.

Corrected rationale 1: the Argentine actor who directed El Tio Disparte is Palito Ortega.

Rationale 2: Second, Palito Ortega was born in 1941. Retrieve (Wikidata) 2: SELECT ? answer WHERE { wd: Palito Ortega wdt: date of birth? answer . } -> 8 March 1941

Retrieve (Wikipedia) 2: When was Palito Ortega born? -> Palito Ortega was born in 8 March 1941.

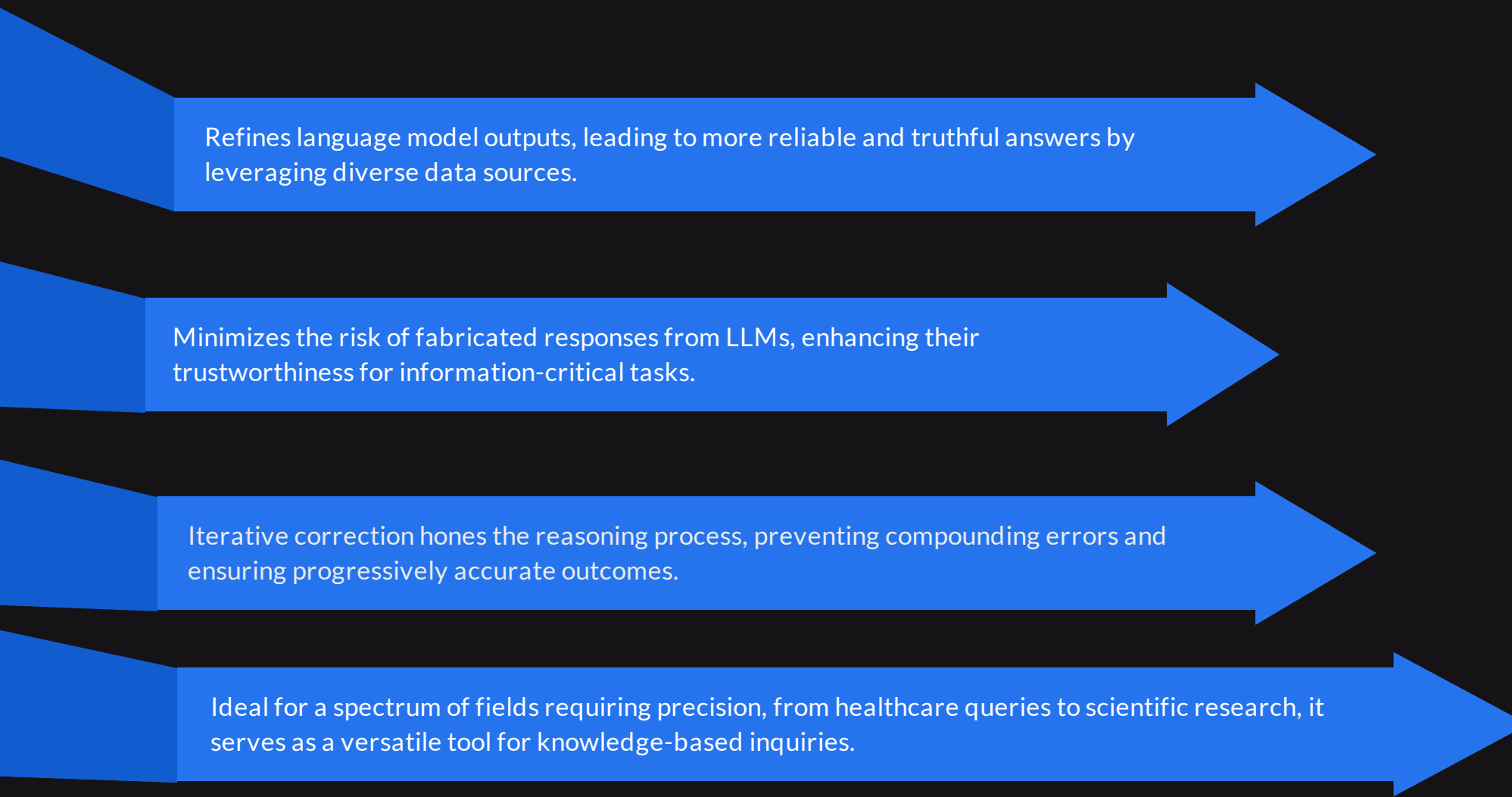
Corrected rationale 2: Palito Ortega was born in 8 March 1941.

Corrected rationales: First, the Argentine actor who directed El Tio Disparte is Palito Ortega. Second, Palito Ortega was born on 8 March 1941.

The answer is 1941.



Chain of Knowledge: Practical Use-case



Refines language model outputs, leading to more reliable and truthful answers by leveraging diverse data sources.

Minimizes the risk of fabricated responses from LLMs, enhancing their trustworthiness for information-critical tasks.

Iterative correction hones the reasoning process, preventing compounding errors and ensuring progressively accurate outcomes.

Ideal for a spectrum of fields requiring precision, from healthcare queries to scientific research, it serves as a versatile tool for knowledge-based inquiries.

Thank You
