6 Different RAG Techniques

PART 2

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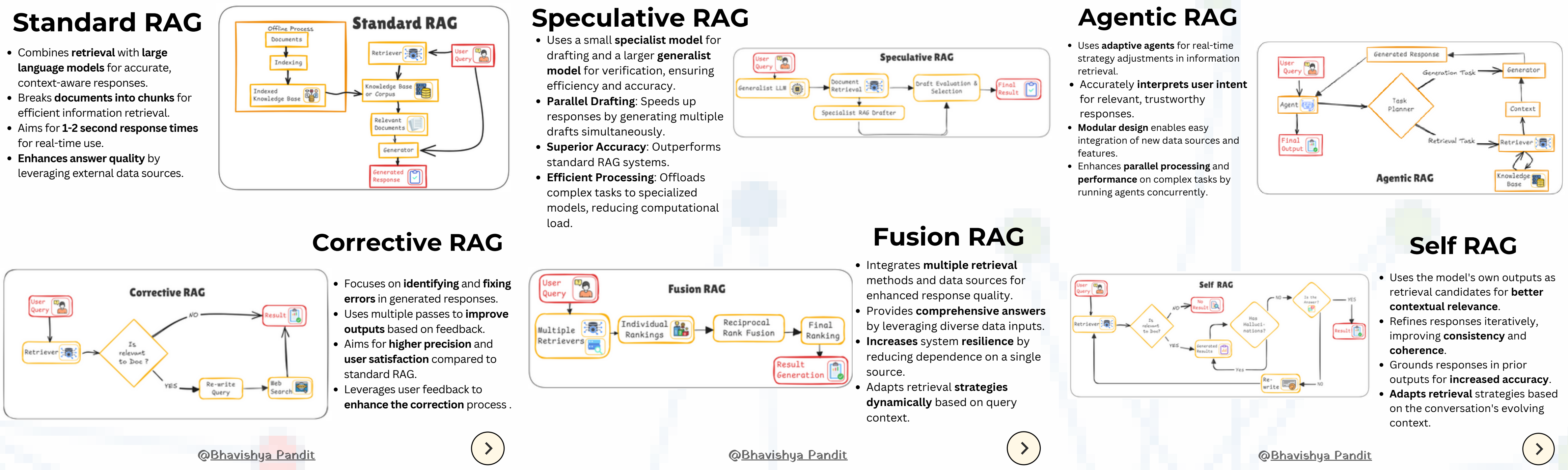

Part 1

In Part 1, we delved into 6 RAG techniques. Now, in Part 2, we expand on that foundation by introducing 6 more innovative RAG techniques.

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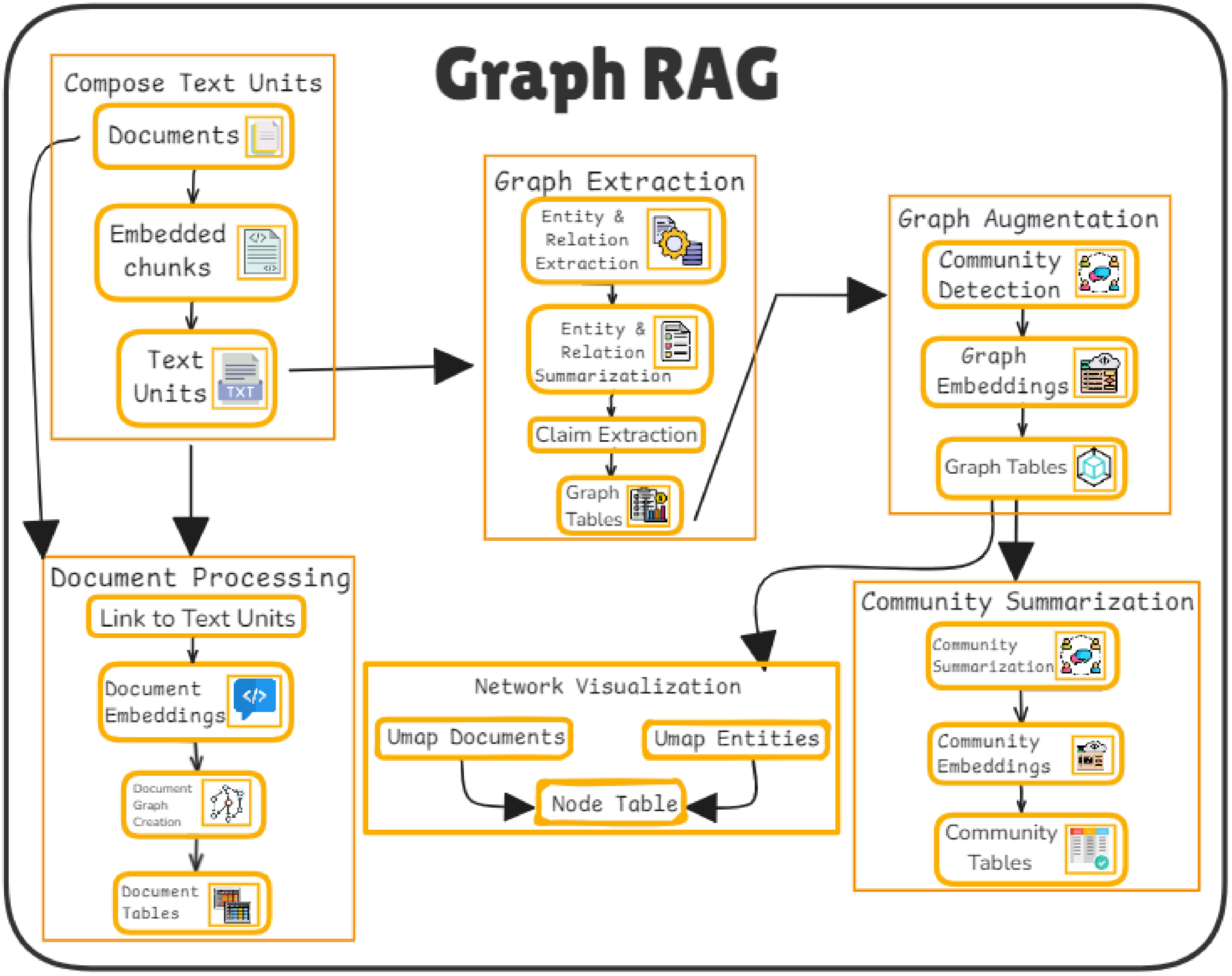
Graph RAG



- Graph RAG constructs a **knowledge graph** on-the-fly, linking relevant entities during retrieval.
- It leverages **node relationships** to decide when and how much external knowledge to retrieve.
- **Confidence scores** from the graph guide expansion, avoiding irrelevant additions.
- This approach **improves efficiency** and **response accuracy** by keeping the knowledge graph compact and relevant.

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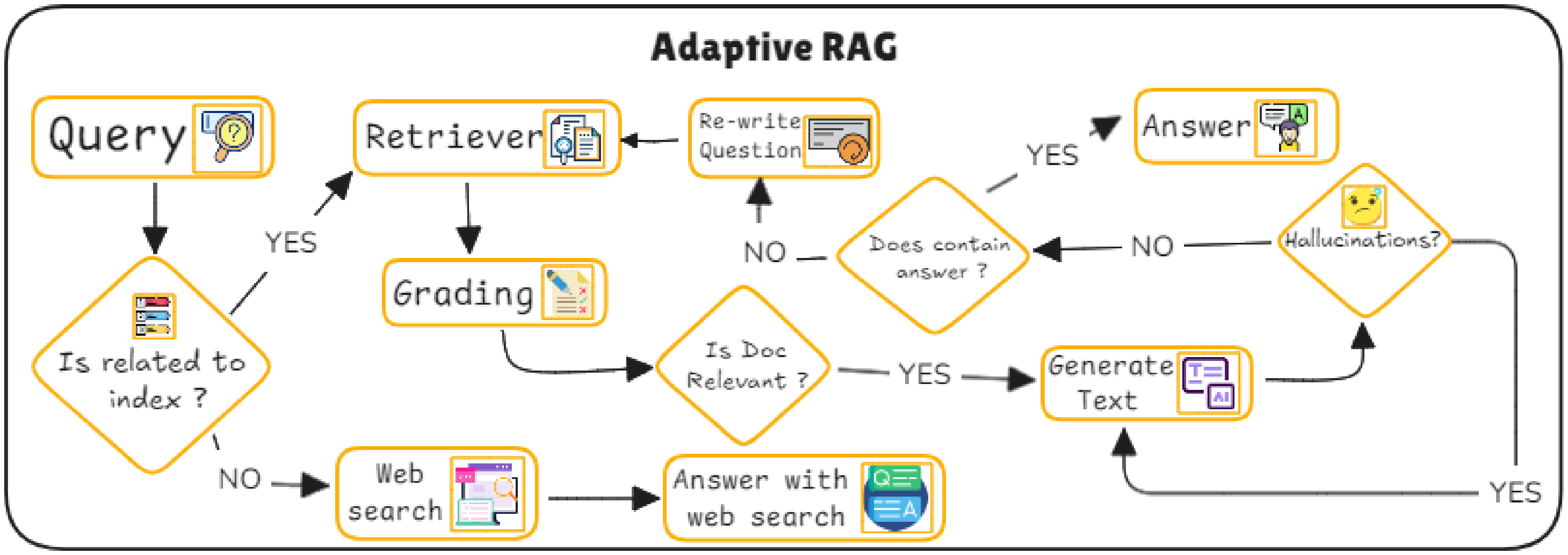
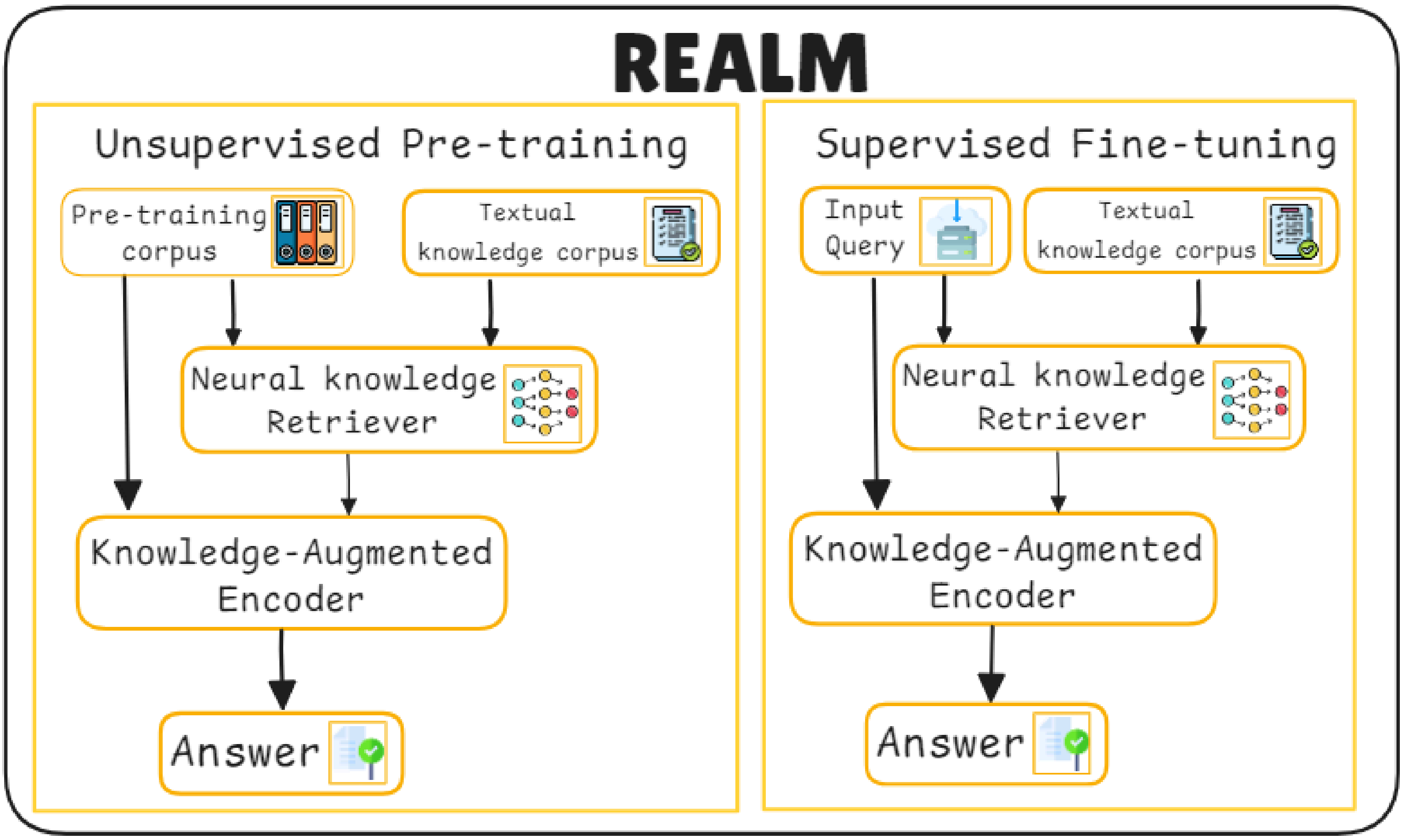
Adaptive RAG



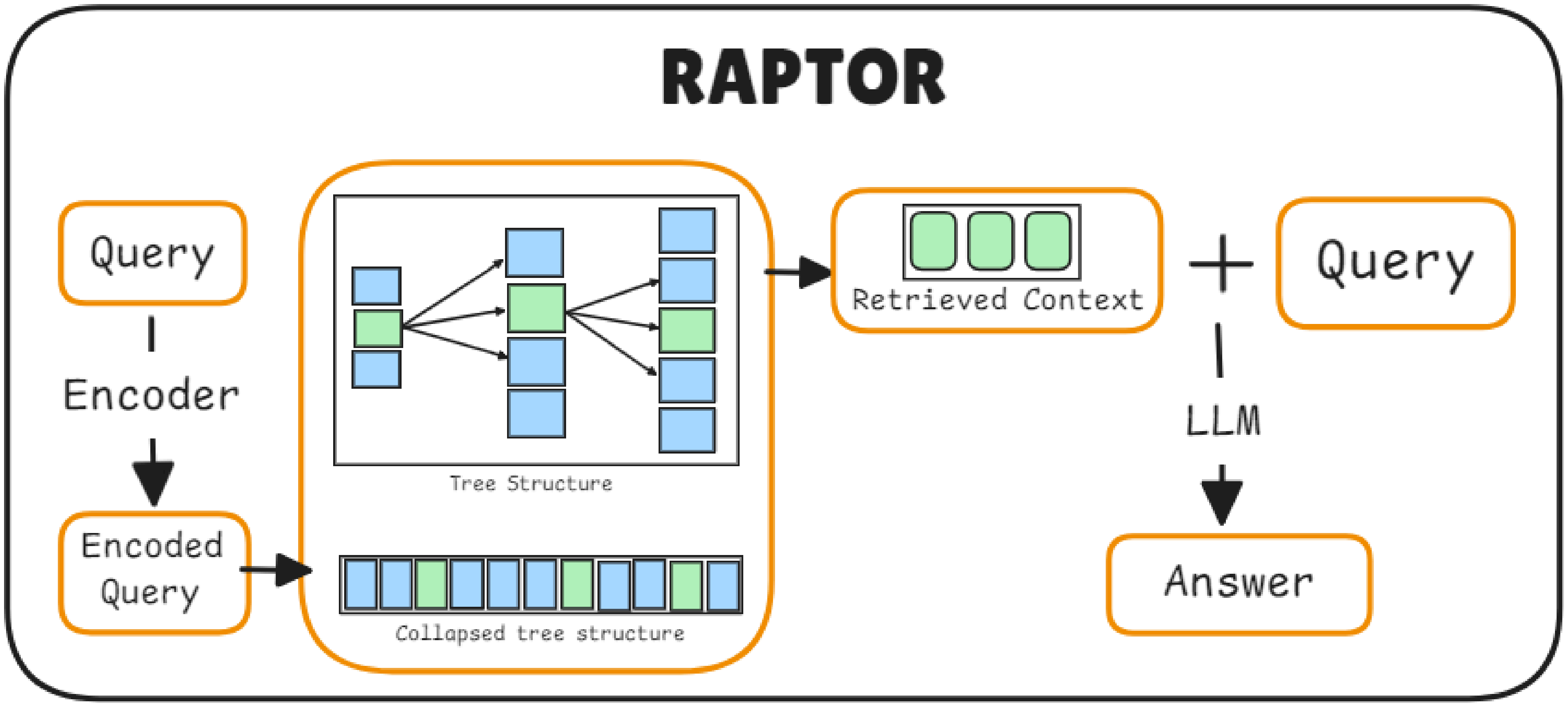
- It **dynamically** decides when to retrieve external knowledge, balancing internal and external knowledge.
- It uses **confidence scores** from the language model's internal states to assess retrieval necessity.
- An honesty probe helps the model **avoid hallucinations** by aligning its output with its actual knowledge.
- It **reduces unnecessary retrievals**, improving both efficiency and response accuracy.

REALM: Retrieval augmented language model pre-training



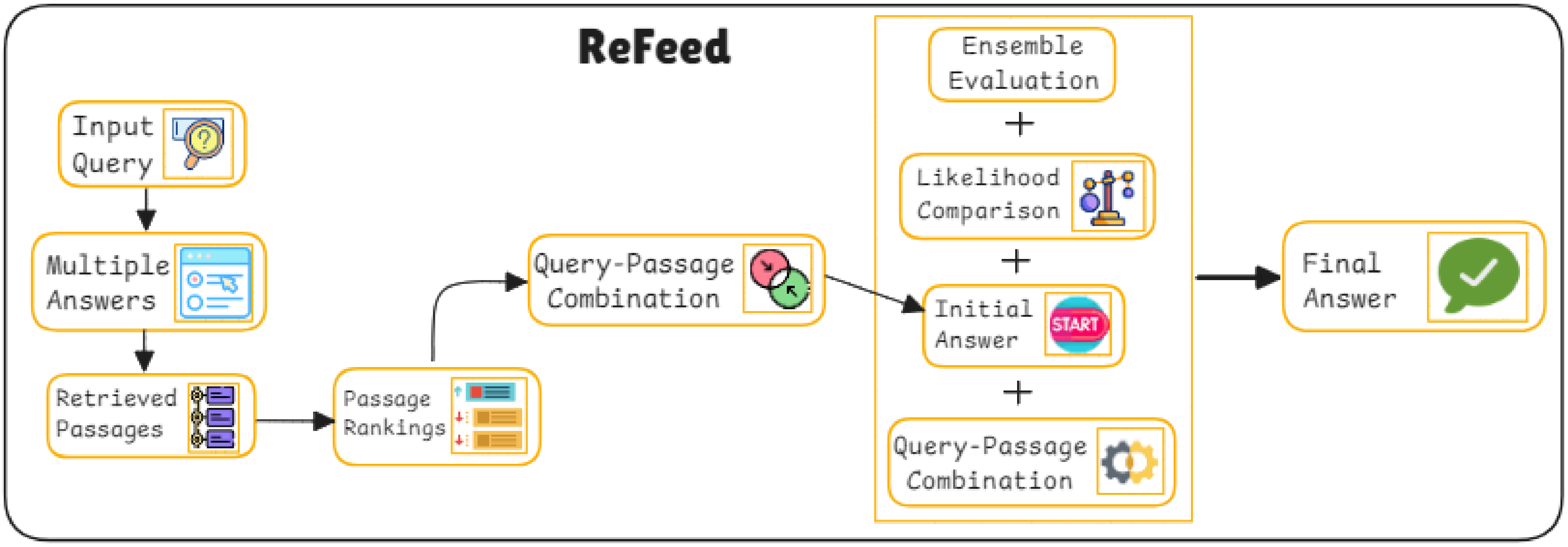
- REALM retrieves relevant documents from large corpora like Wikipedia to **enhance model predictions**.
- The retriever is trained with masked language modeling, optimizing retrieval to **improve** prediction **accuracy**.
- It uses **Maximum Inner Product Search** to efficiently find relevant documents from millions of candidates during training.
- REALM outperforms previous models in **Open-domain Question Answering** by integrating external knowledge.

RAPTOR: Recursive Abstractive Processing for Tree-Organized Retrieval



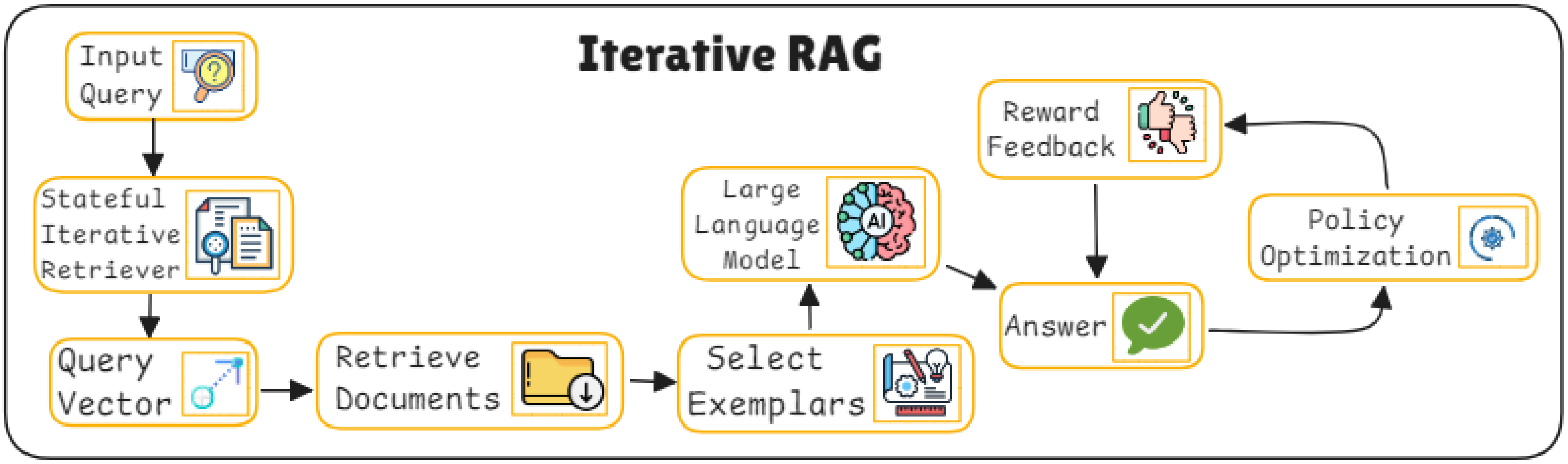
- RAPTOR builds a **hierarchical tree** by **clustering** and **summarizing text recursively**.
- It enables retrieval at **different abstraction levels**, combining **broad themes** with specific details.
- RAPTOR **outperforms traditional methods** in complex question-answering tasks.
- Offers tree traversal and collapsed tree methods for **efficient information retrieval**.

REFEED: Retrieval Feedback



- REFEED refines model outputs using **retrieval feedback without fine-tuning**.
- Initial answers are improved by retrieving relevant documents and adjusting the response based on the new information.
- Generates **multiple answers** to improve retrieval accuracy.
- Combines pre- and post-retrieval outputs using a **ranking system to enhance answer reliability**.

Iterative RAG



- Unlike traditional retrieval, iterative RAG performs **multiple retrieval steps**, refining its search based on feedback from previously selected documents.
- Retrieval decisions follow a **Markov decision process**.
- **Reinforcement learning** improves retrieval performance.
- The iterative retriever **maintains an internal state**, allowing it to adjust future retrieval steps based on the accumulated knowledge from previous iterations.

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