Analytics Vidhya

Retrievers

Instructor

Dipanjan Sarkar

Head of Community & Principal AI Scientist at Analytics Vidhya

Google Developer Expert - ML & Cloud Champion Innovator

Published Author

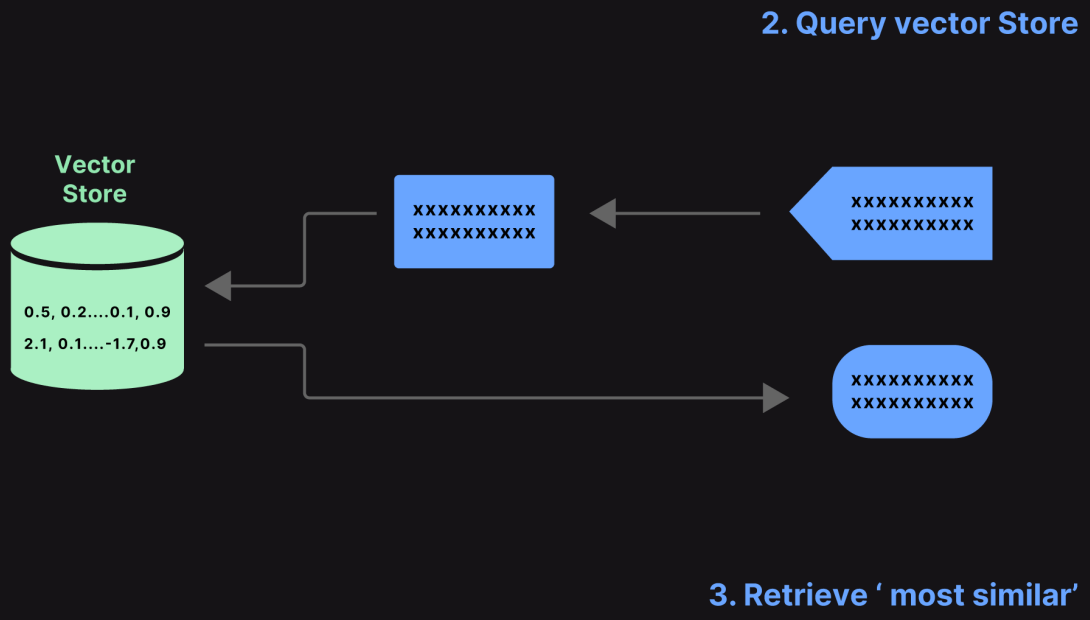
Outline

- Retrievers in LangChain
- Popular Retrieval Strategies
- Similarity or Ranking based Retrieval
- Similarity with Threshold Retrieval
- Multi-Query Retrieval
- Self-Query Retrieval

Outline

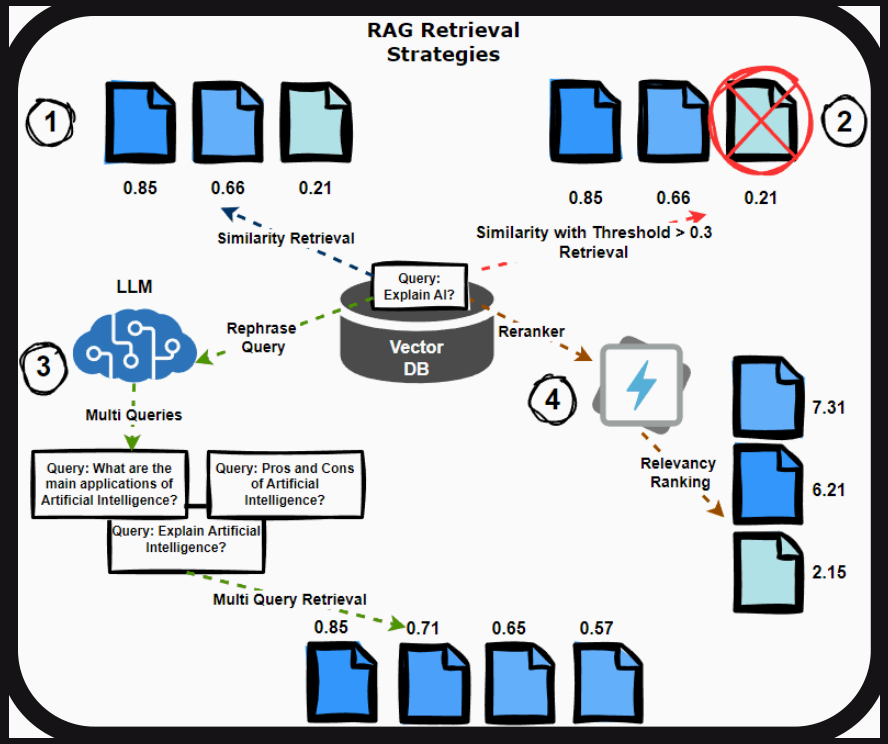
- Reranker Retrieval
- Ensemble Retrieval
- Hybrid Search Retrieval
- Contextual Compression Retrieval
- Parent Document Chunk Retrieval

Retrievers in LangChain



- LangChain supports API wrappers for all popular vector databases.
- "It also allows us to create retrievers using vector databases as a foundation."
- Retrievers use a retrieval strategy to retrieve similar documents for user queries

Popular Retrieval Strategies



- Similarity or ranking based
- Similarity with threshold
- Multi-query Retriever
- Reranker Retriever
- Ensemble Retriever

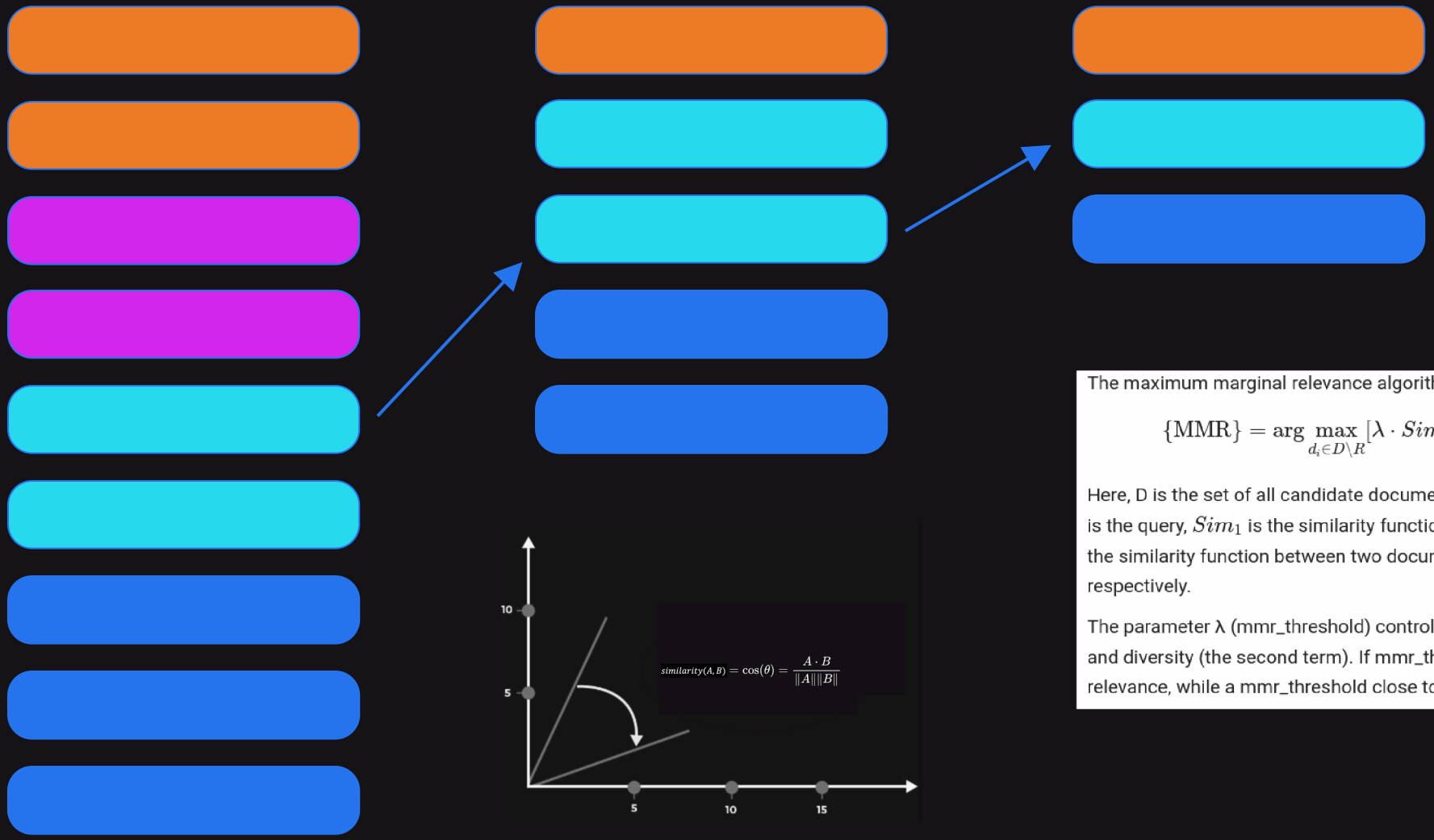
Analytics Vidhya

Similarity or Ranking based Retrieval

All docs

fetch_k most similar docs

k most diverse



The maximum marginal relevance algorithm is as follows:

$$\{\text{MMR}\} = \arg \max_{d_i \in D \setminus R} [\lambda \cdot Sim_1(d_i, q) - (1 - \lambda) \cdot \max_{d_j \in R} Sim_2(d_i, d_j)]$$

Here, D is the set of all candidate documents, R is the set of already selected documents, q is the query, Sim_1 is the similarity function between a document and the query, and Sim_2 is the similarity function between two documents. d_i and d_j are documents in D and R respectively.

The parameter λ (mmr_threshold) controls the trade-off between relevance (the first term) and diversity (the second term). If mmr_threshold is close to 1, more emphasis is put on relevance, while a mmr_threshold close to 0 puts more emphasis on diversity.

Analytics Vidhya

Similarity with Threshold Retrieval

All docs

fetch_k most similar docs

Threshold>0.3

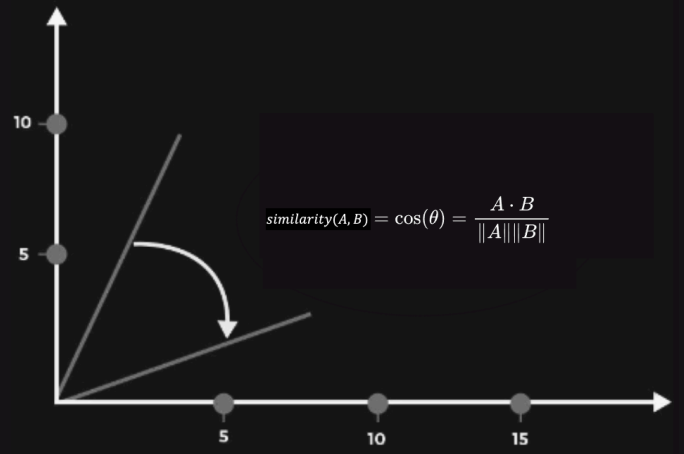
0.76 ✓

0.63 ✓

0.44 ✓

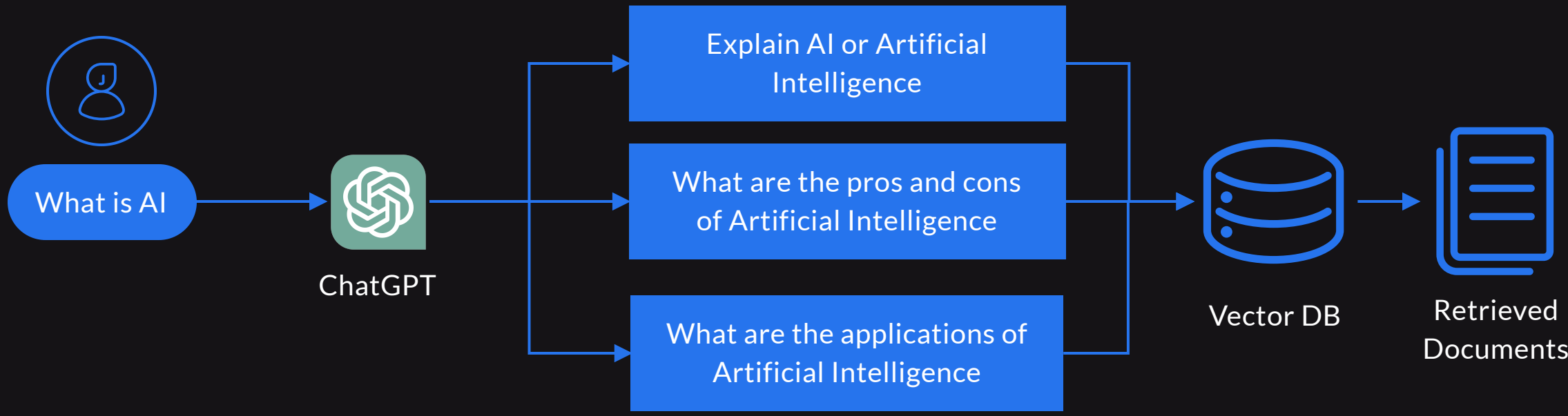
0.21 ✗

0.19 ✗

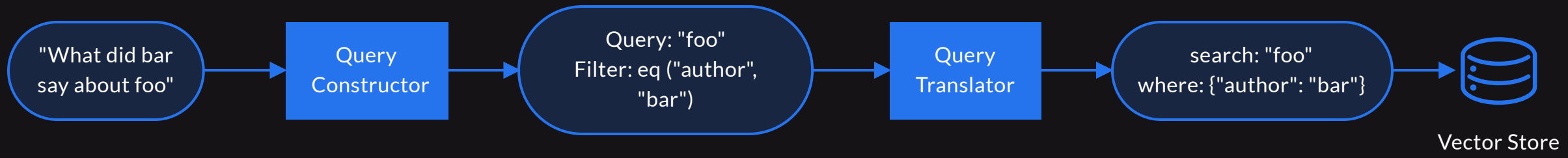


Analytics Vidhya

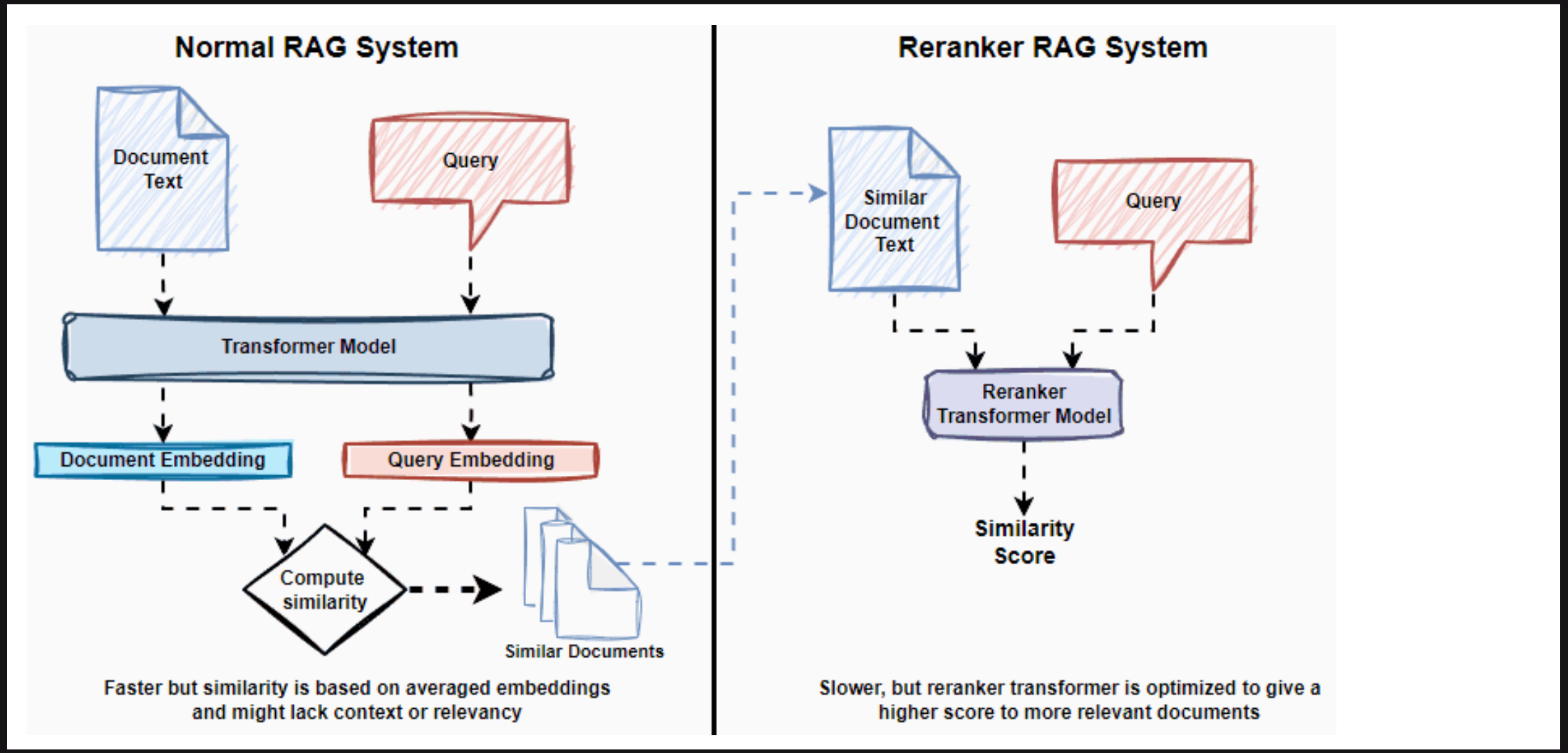
Multi-Query Retrieval



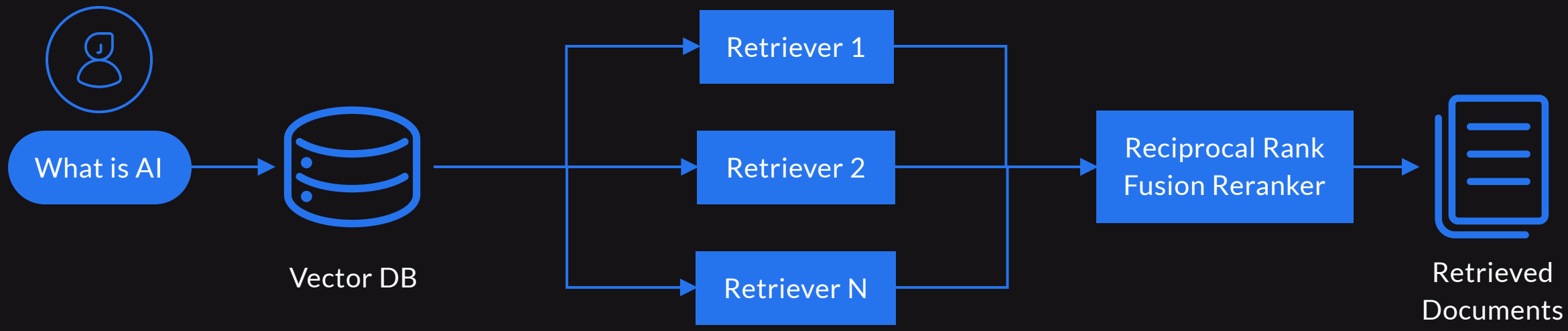
Self-Query Retrieval



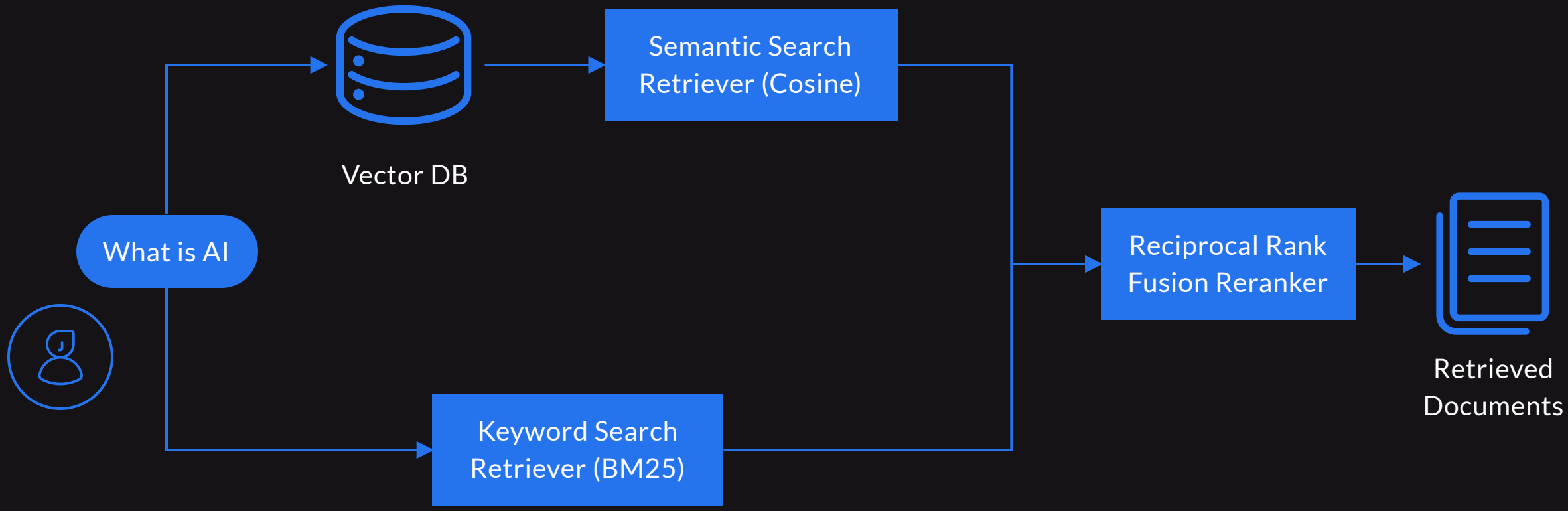
Reranker Retrieval



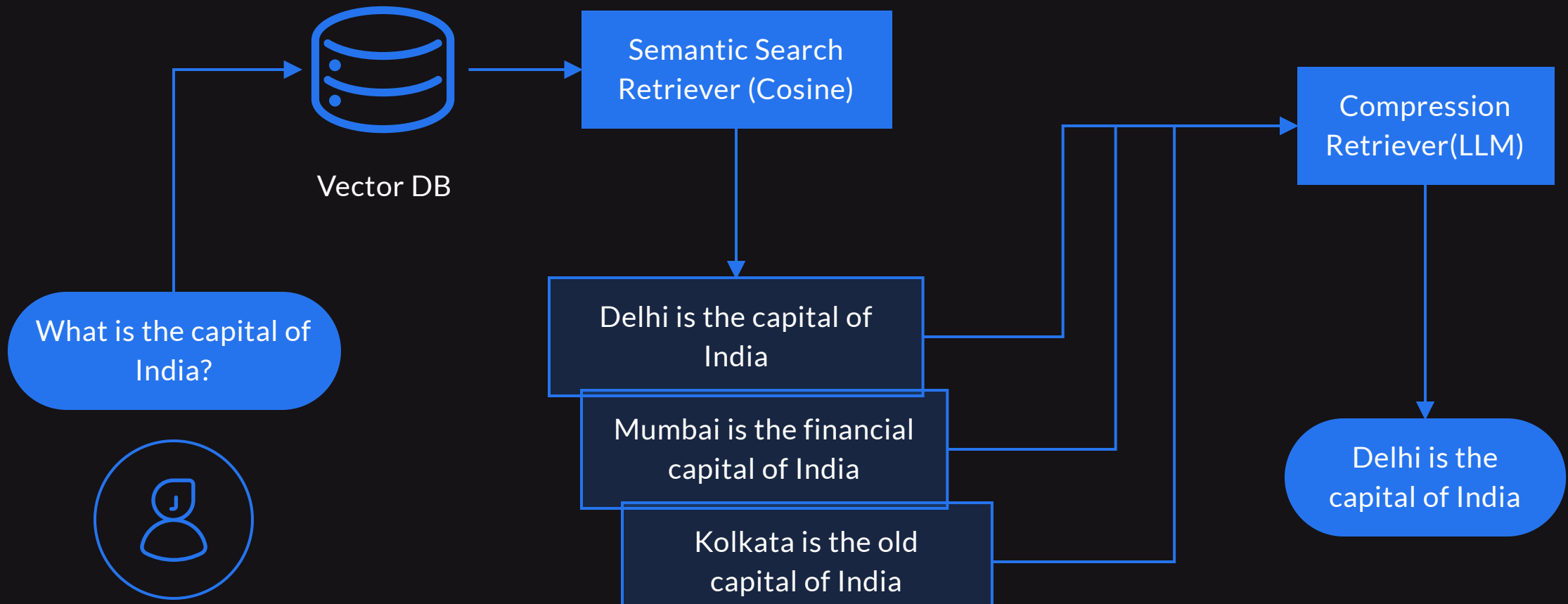
Ensemble Retrieval



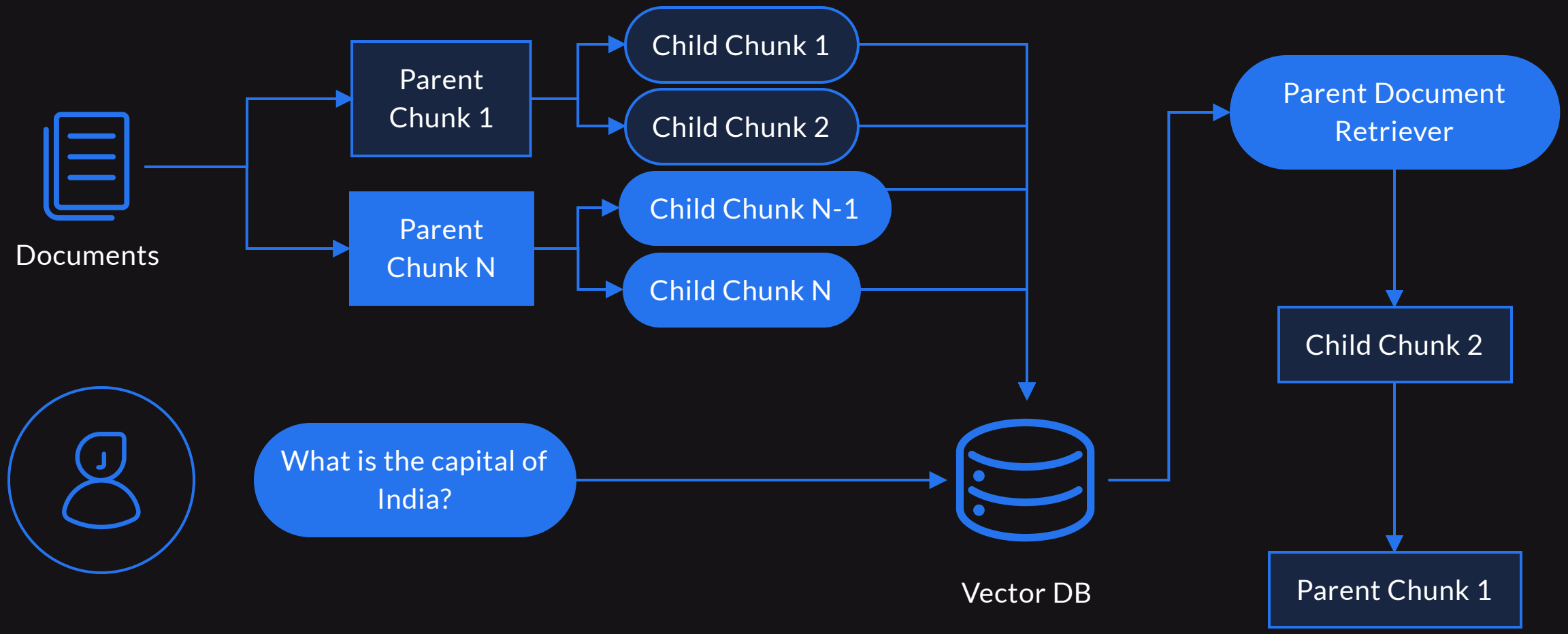
Hybrid Search Retrieval



Contextual Compression Retrieval



Parent Document Chunk Retrieval



Thank You

Analytics Vidhya