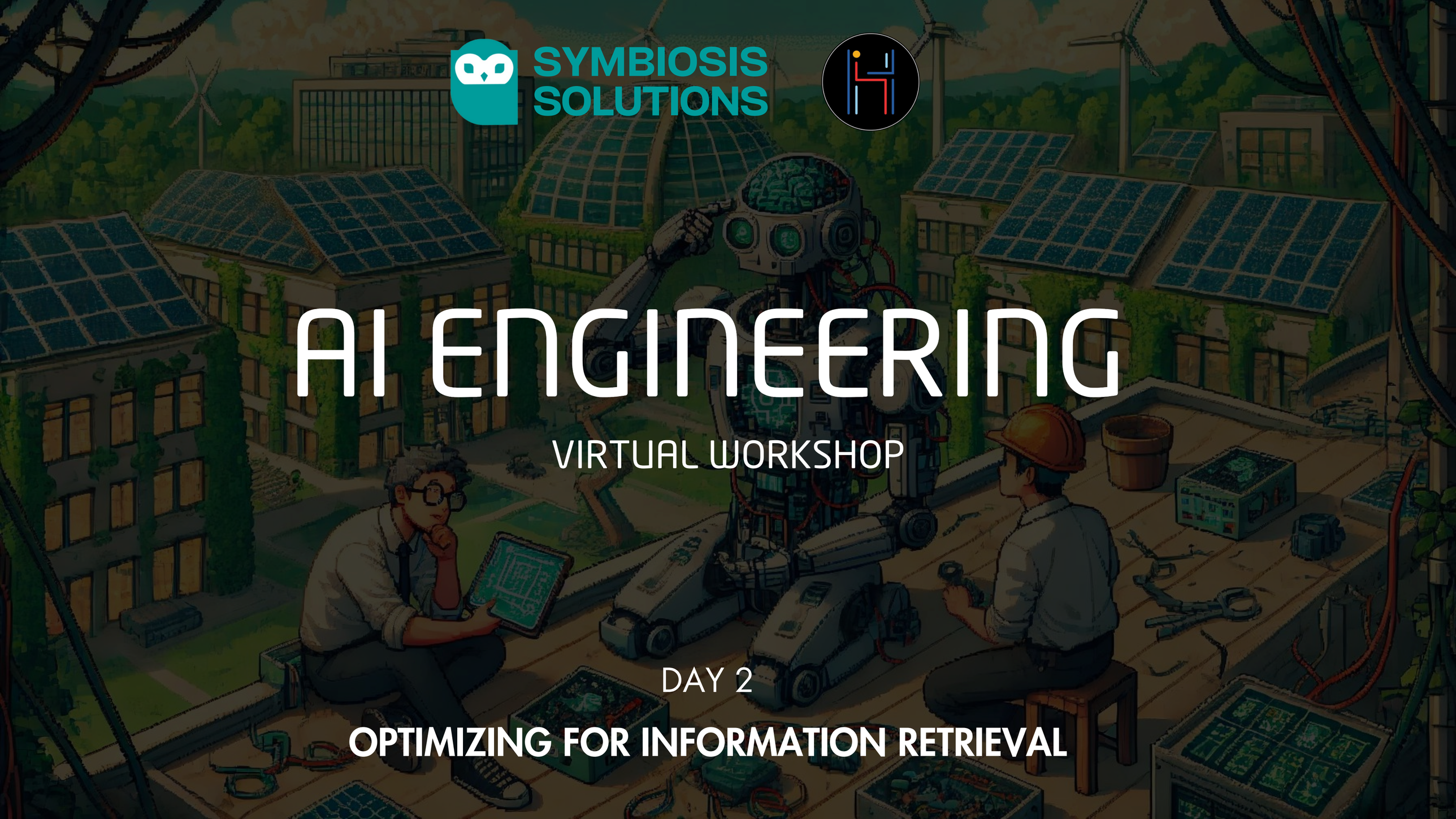


AI ENGINEERING

VIRTUAL WORKSHOP

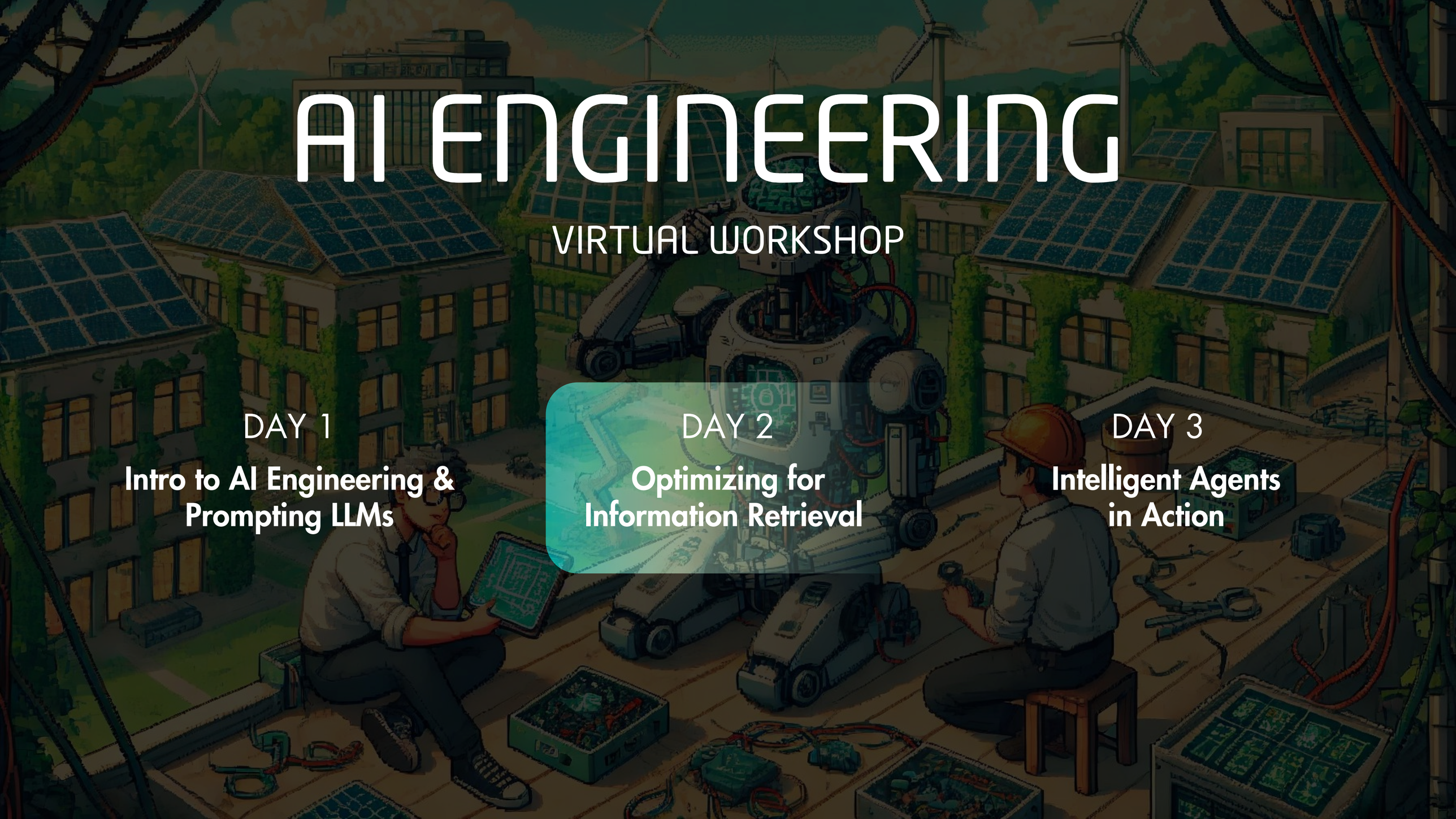
DAY 2

OPTIMIZING FOR INFORMATION RETRIEVAL

FLASH RECAP

menti.com

6566 9721

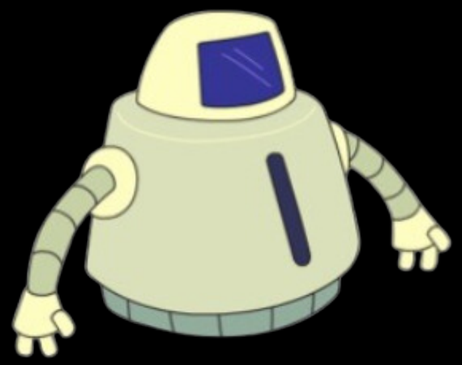

AI ENGINEERING
VIRTUAL WORKSHOP
DAY 1
Intro to AI Engineering & Prompting LLMs
DAY 2
Optimizing for Information Retrieval
DAY 3
Intelligent Agents in Action

AGENDAS

OPTIMIZING FOR INFORMATION RETRIEVAL

1. Why IR Matters
2. Evaluating RAG
3. RAG Techniques

EUREKA!



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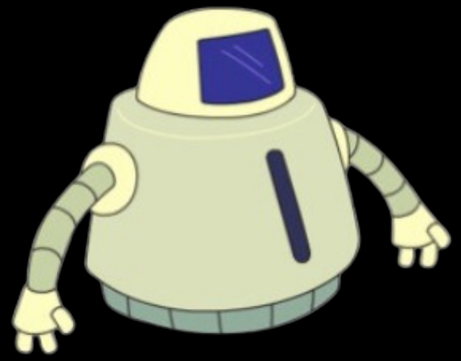
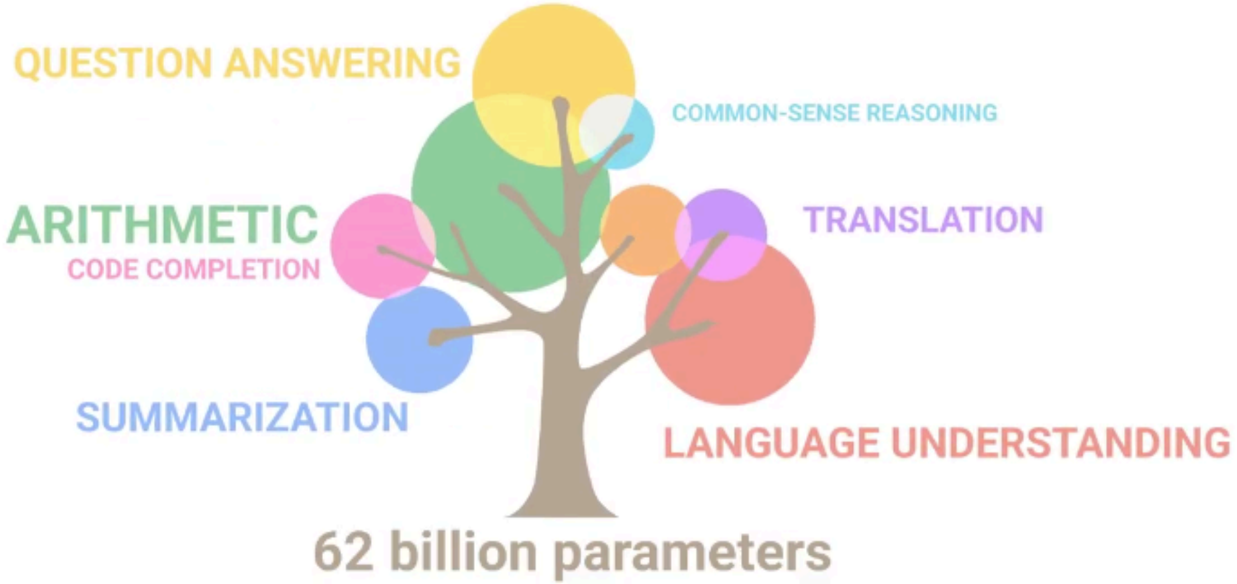


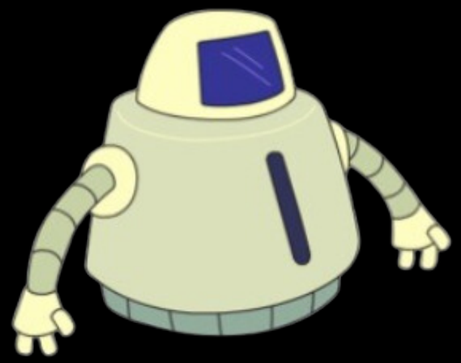
LLMs

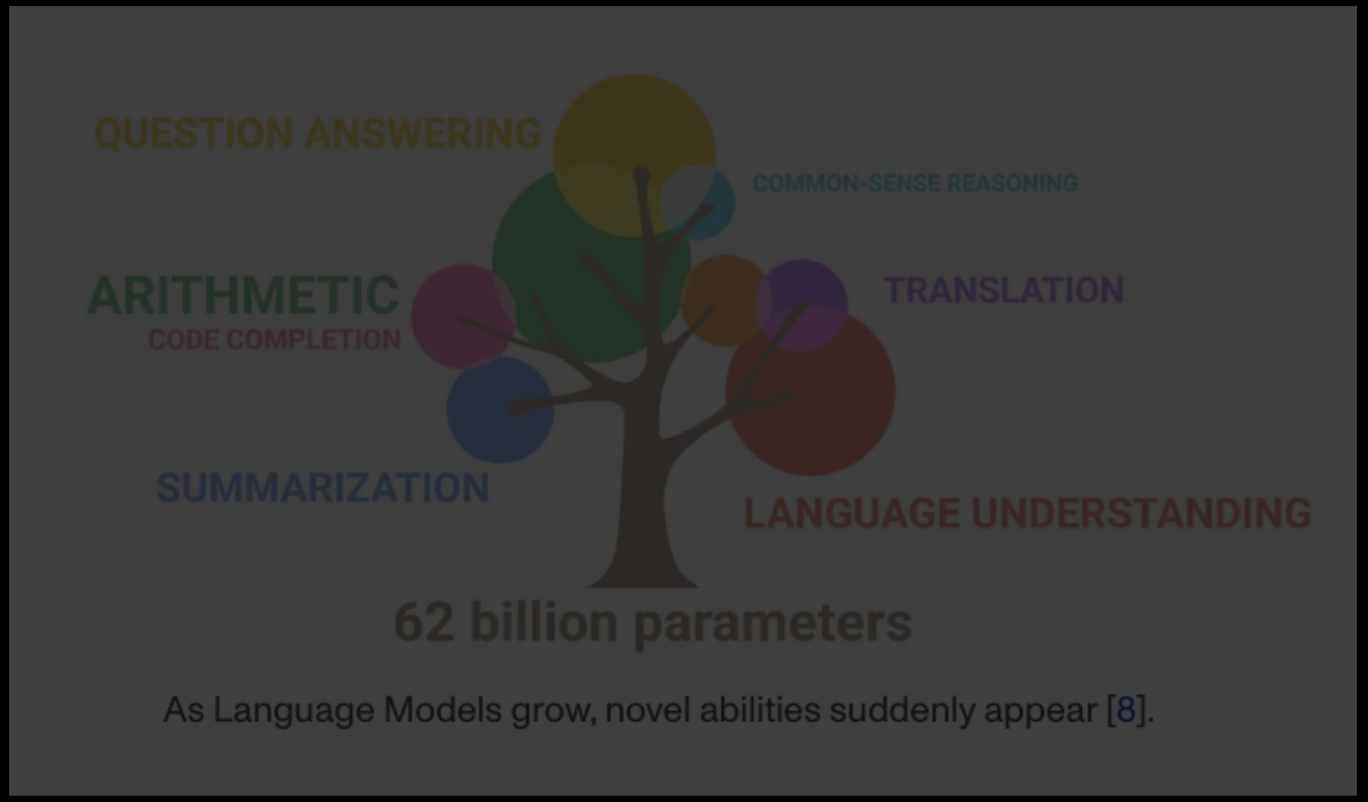


As Language Models grow, novel abilities suddenly appear [8].

BUT...

What are it's LIMITATIONS?





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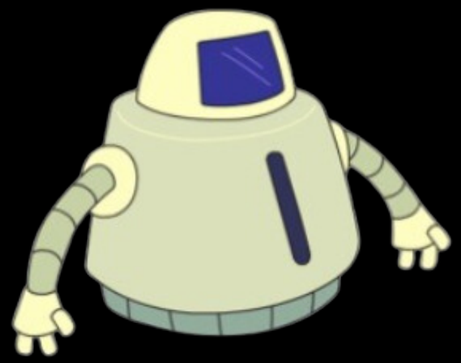

Key Limitations of LLMs

1. Hallucinations and Misinformation
2. Contextual Understanding
3. Bias and Ethical Concerns

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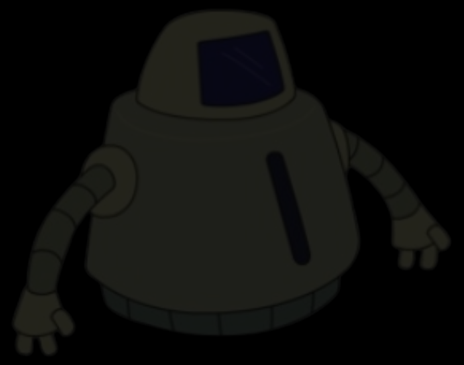
BUT... What are it's LIMITATIONS?



Key Limitations of LLMs

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SOLUTION???

INFORMATION RETRIEVAL

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refers to
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relevant information from
large datasets.

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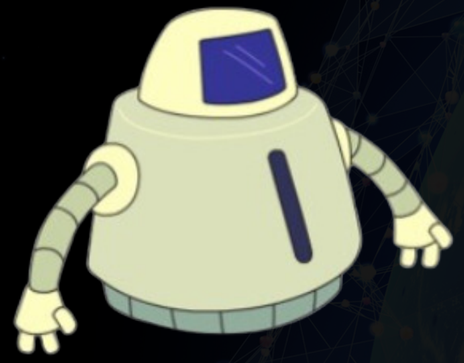

Benefits?

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Key Limitations of LLMs
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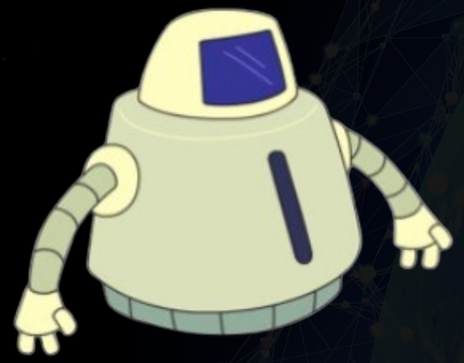
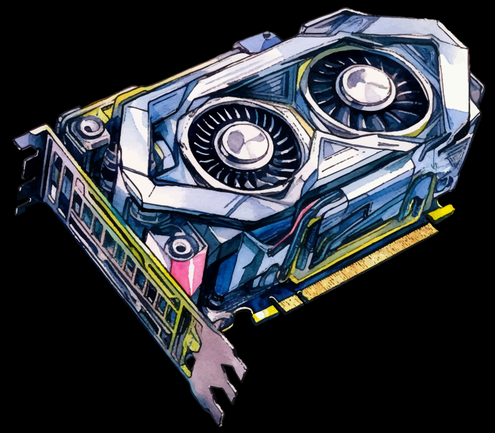
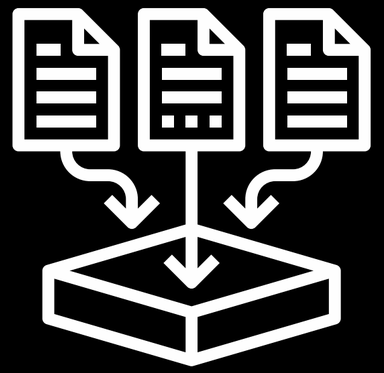


Benefits?

2 Paradigms of Inserting Knowledge into LLMs

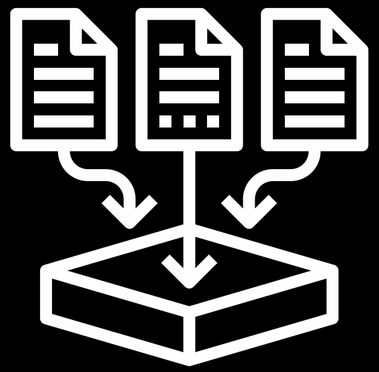


Fine-Tuning

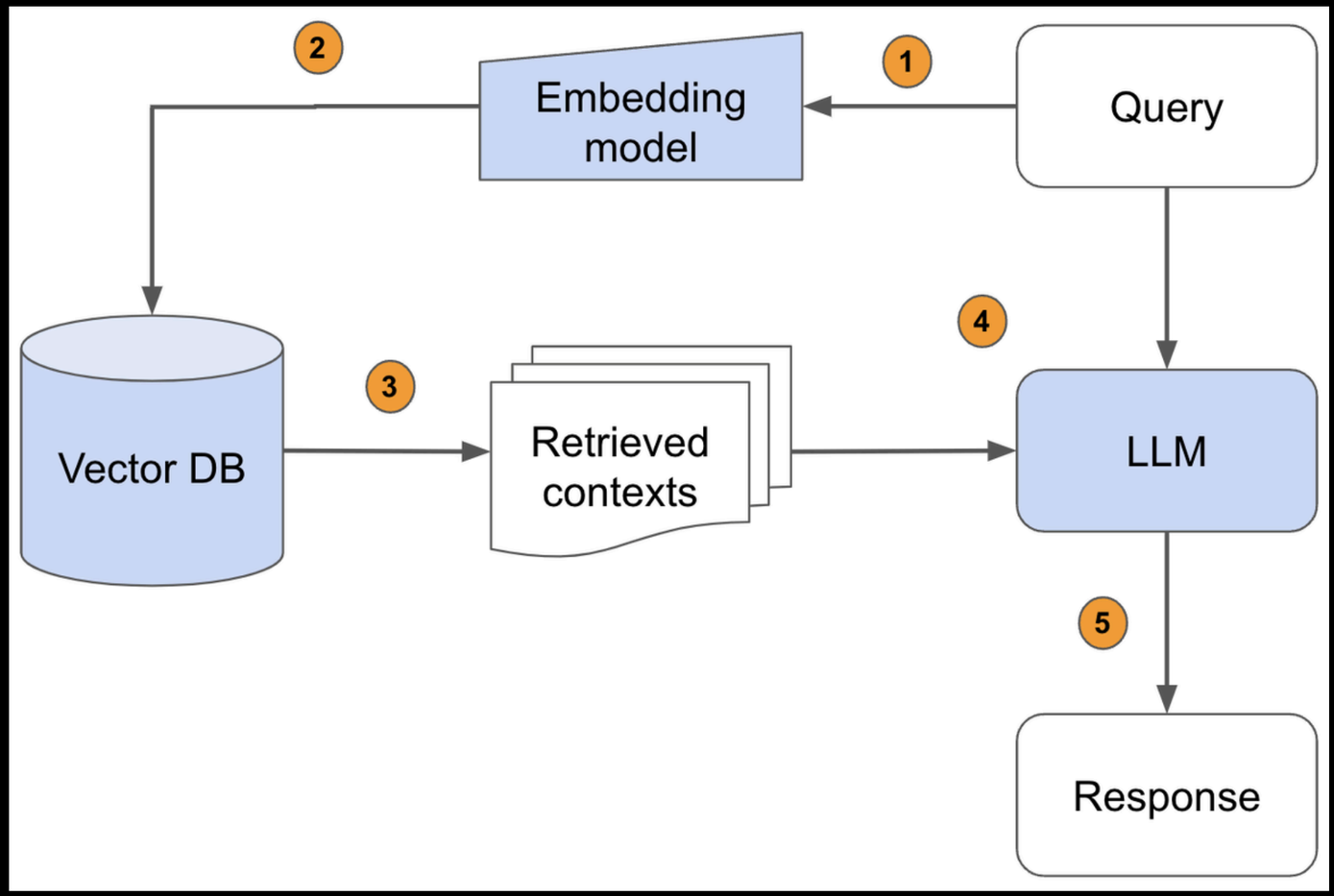


Retrieval Augmentation Generation (RAG)

https://www.anyscale.com/blog/a-comprehensive-guide-for-building-rag-based-llm-applications-part-1



Retrieval Augmentation Generation



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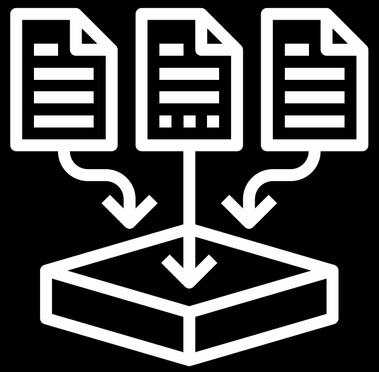
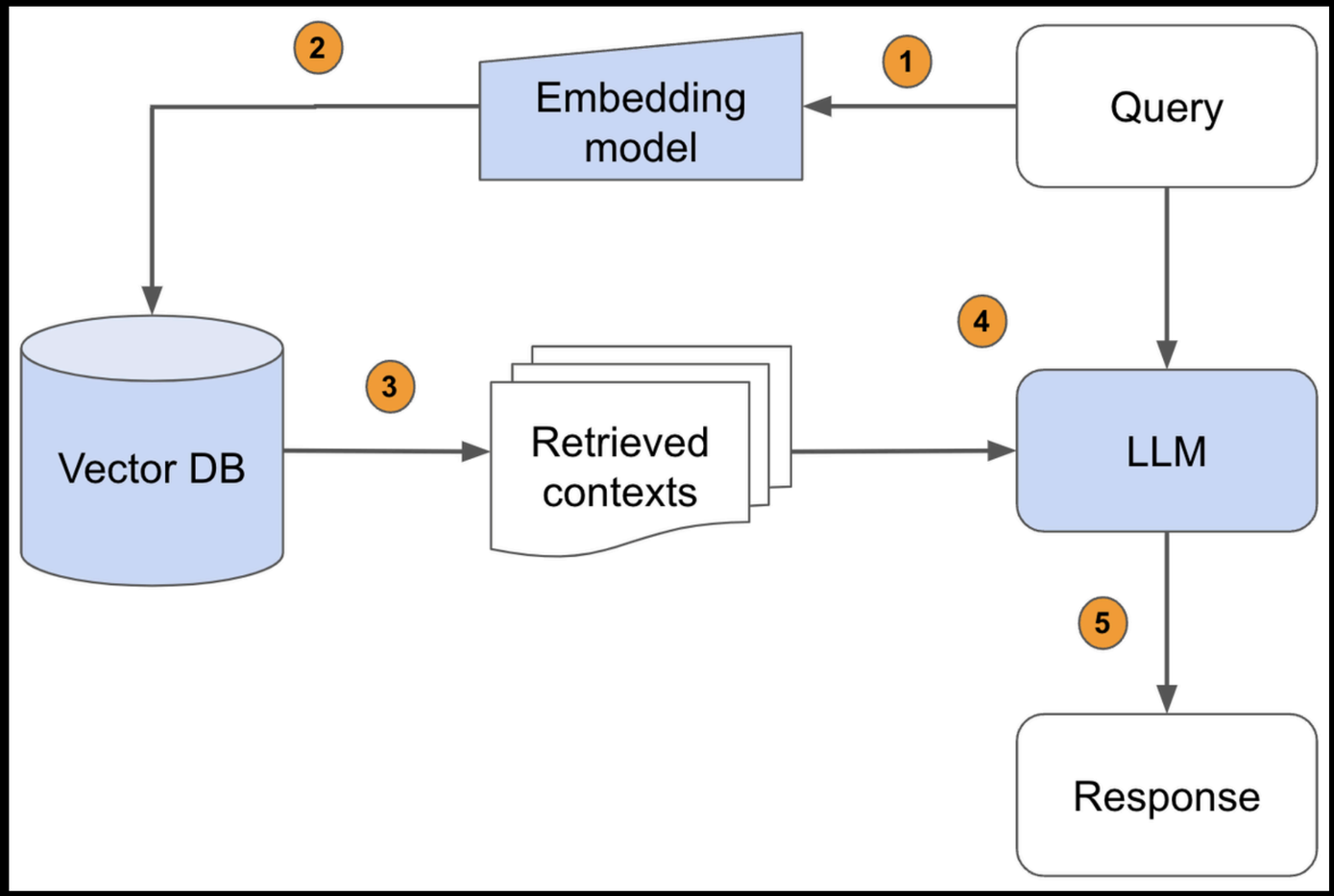
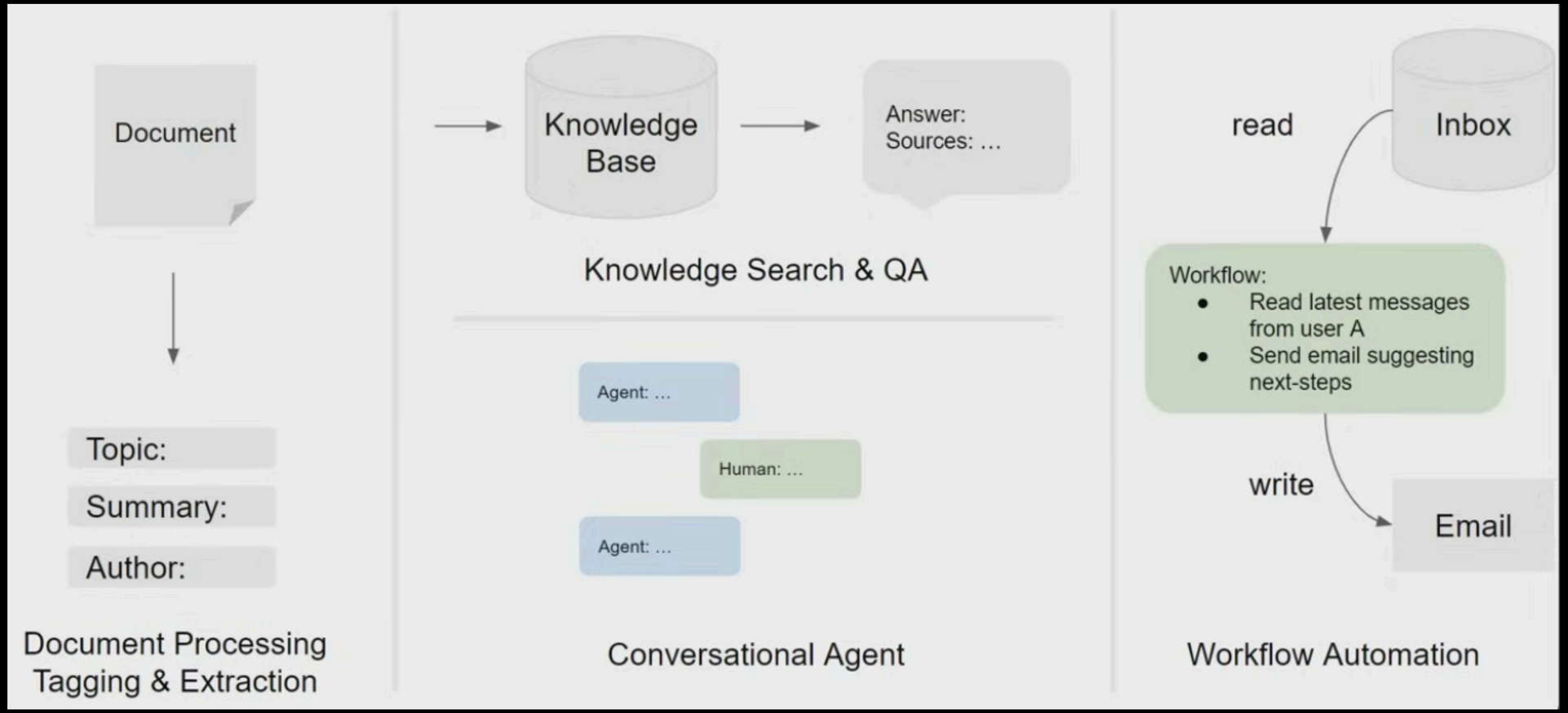
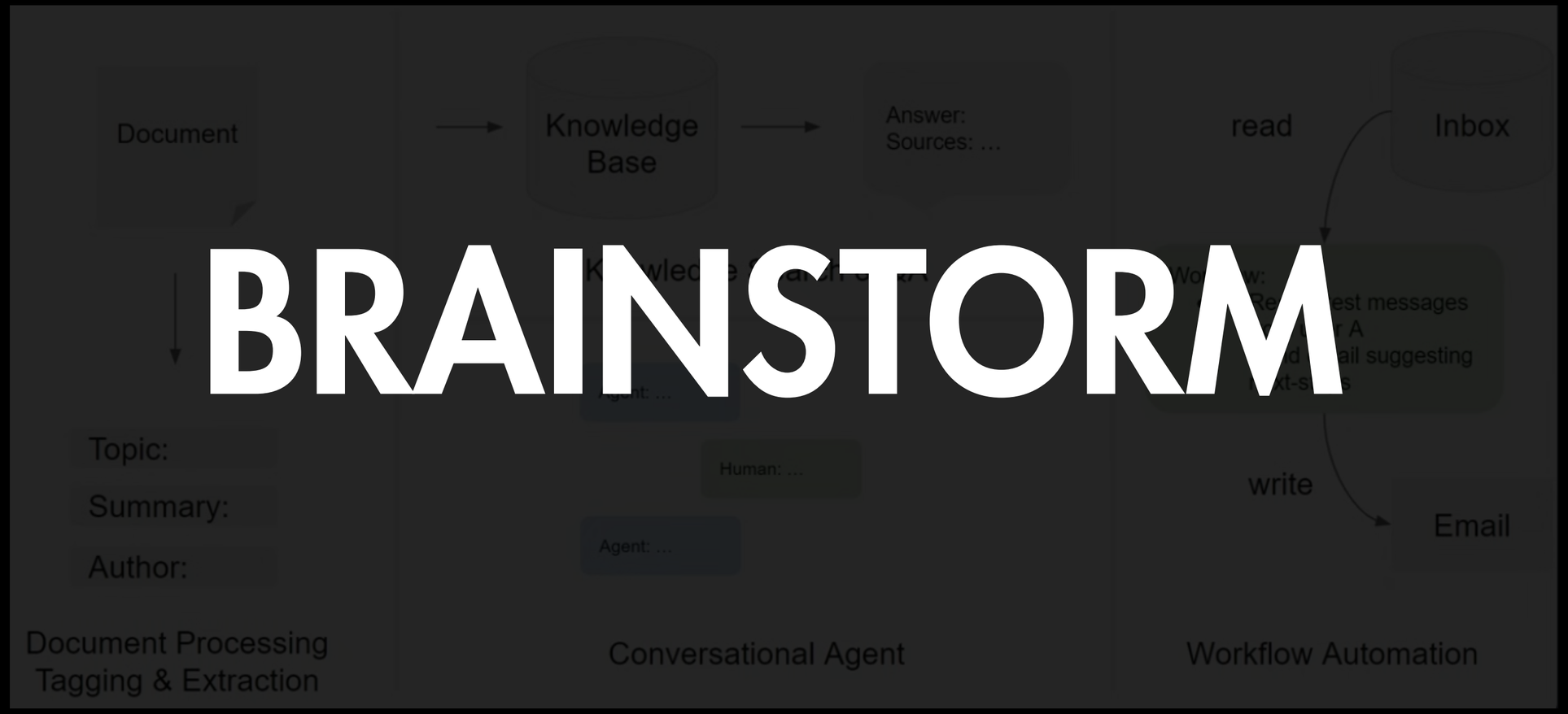


Retrieval Augmentation Generation



Source: https://www.youtube.com/watch?v=TRjq7t2Ms5I&ab_channel=AIEngineer




Document
Knowledge Base
Answer:
Sources: …
read
Inbox
Topic:
Summary:
Author:
Human: …
Agent: …
write
Email
Document Processing
Tagging & Extraction
Conversational Agent
Workflow Automation

BRAINSTORM

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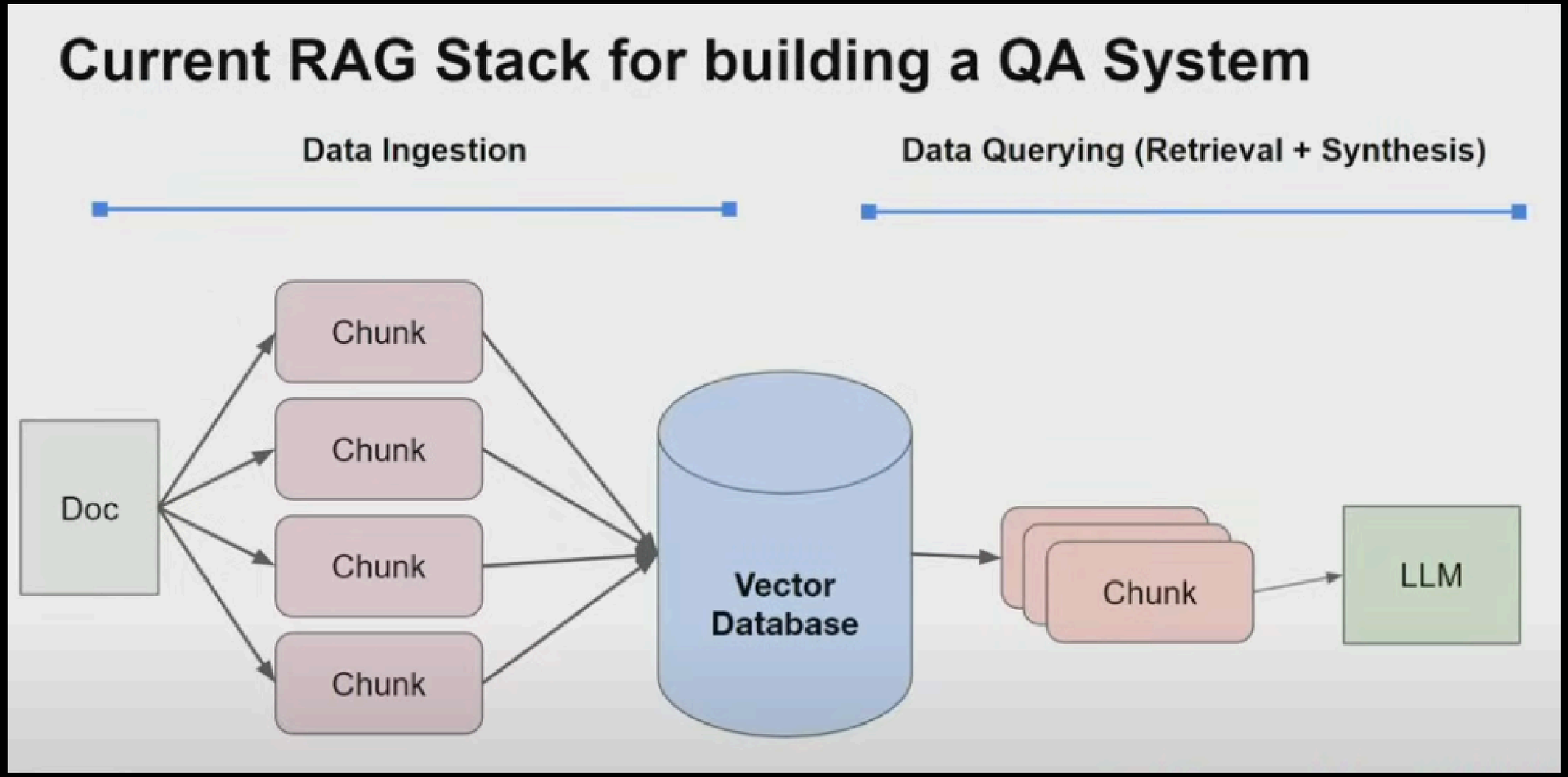

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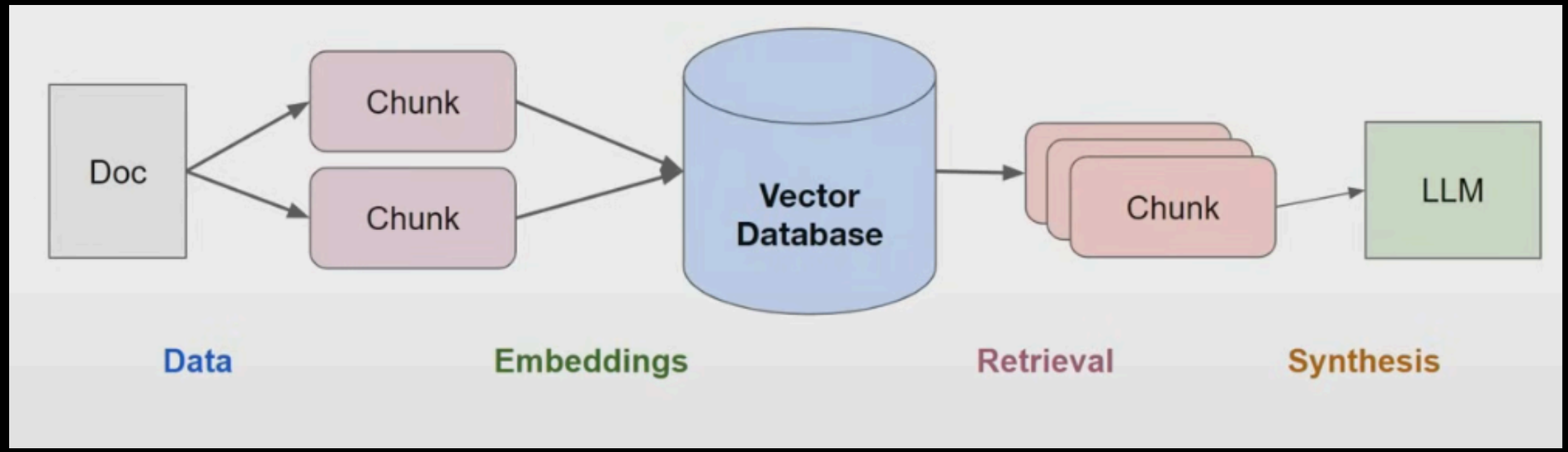
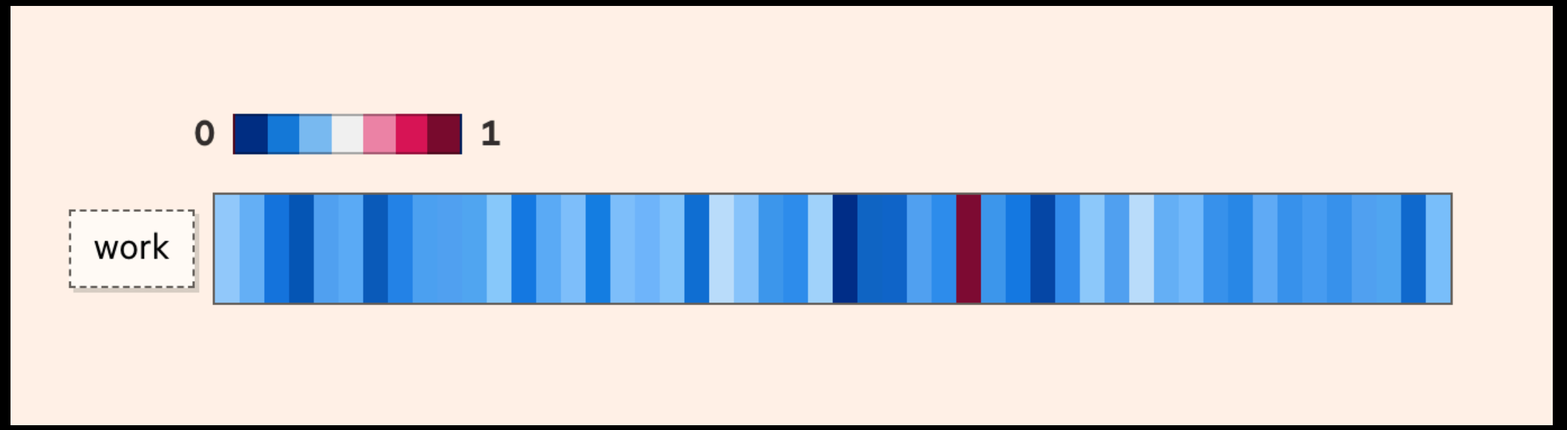
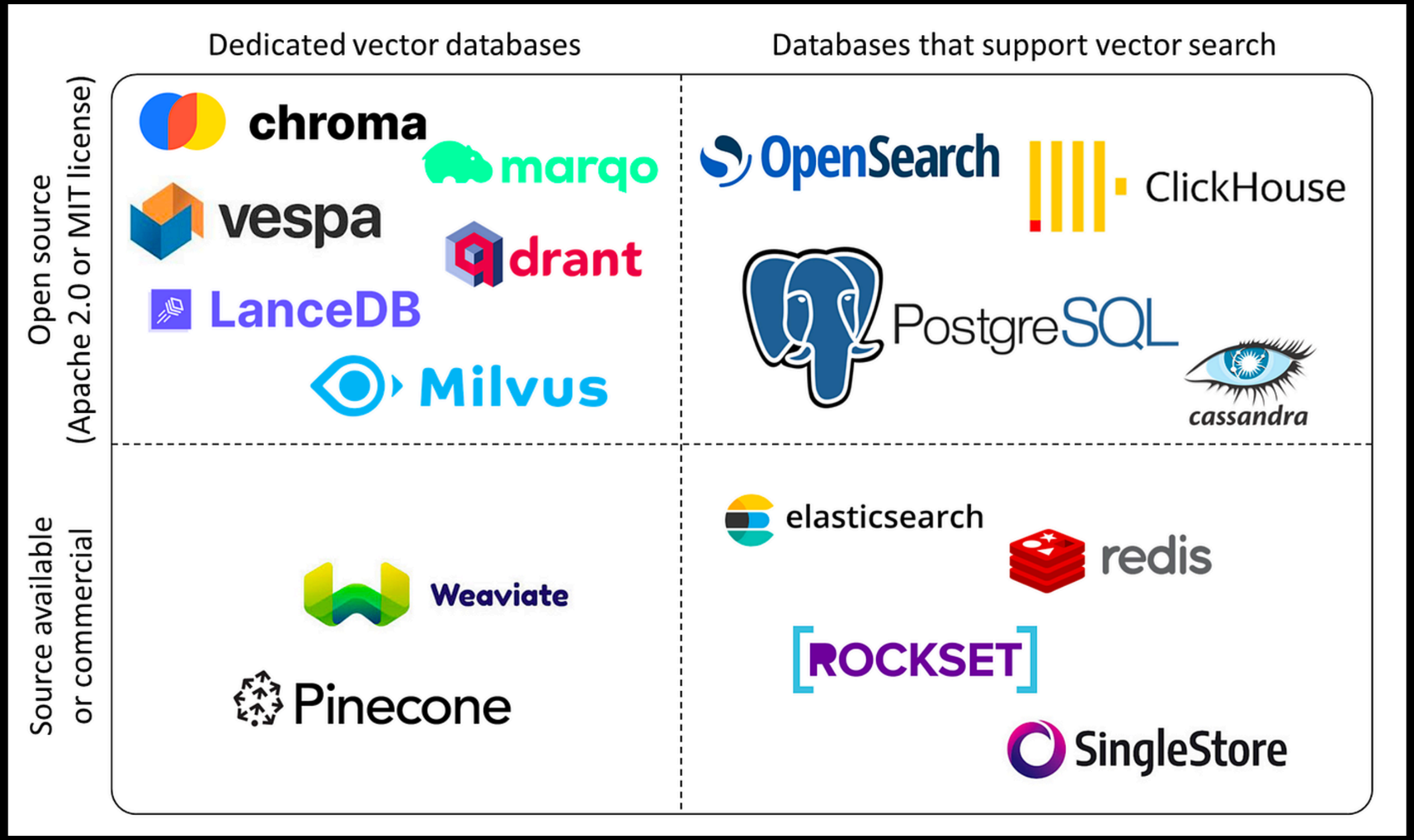


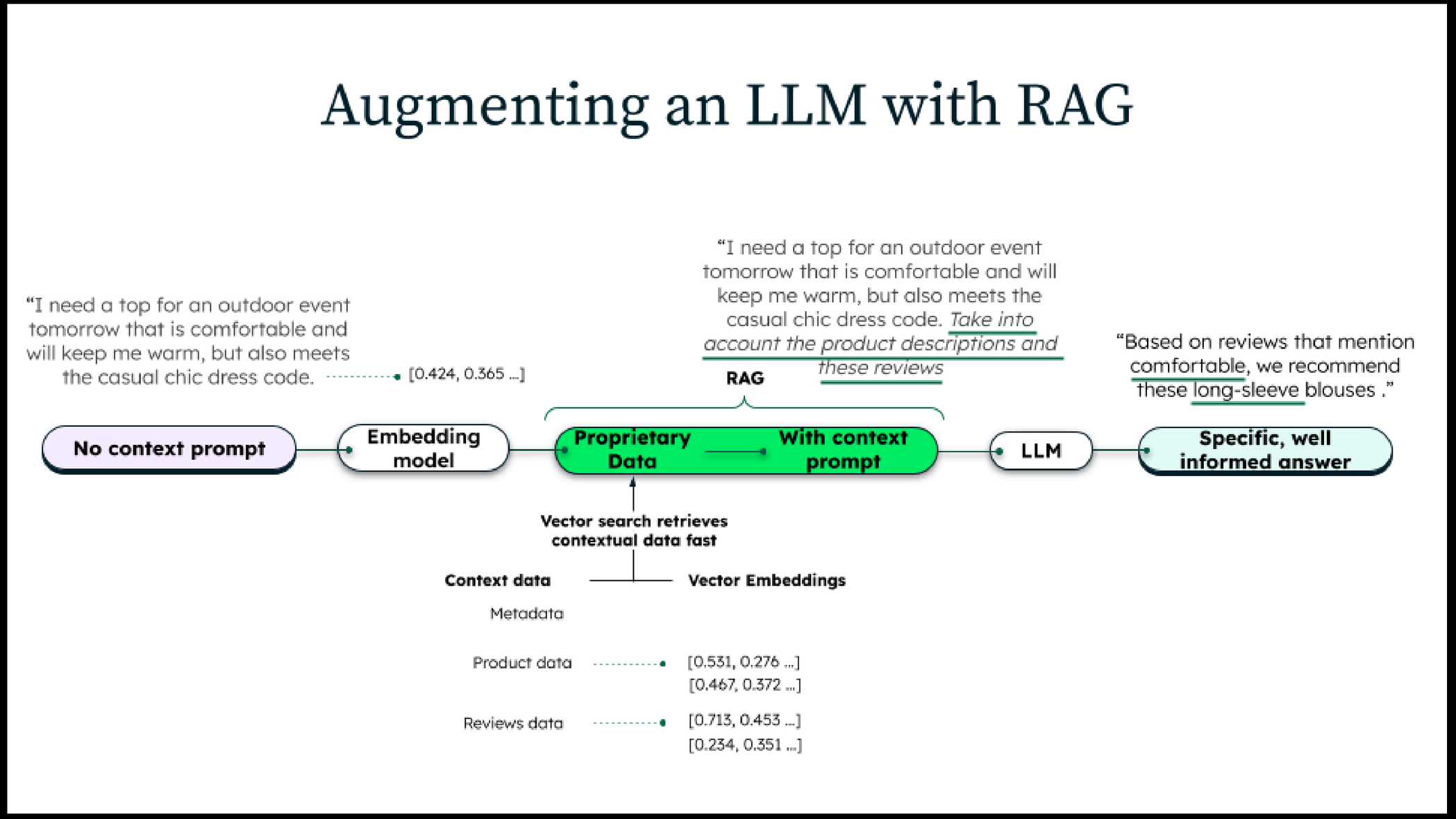
https://ig.ft.com/generative-ai/



https://www.datacamp.com/blog/the-top-5-vector-databases



https://www.mongodb.com/resources/basics/artificial-intelligence/retrieval-augmented-generation



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Challenges with Naive RAG (Response Quality)

- Bad Retrieval
  - **Low Precision:** Not all chunks in retrieved set are relevant
    - Hallucination + Lost in the Middle Problems
  - **Low Recall:** Now all relevant chunks are retrieved.
    - Lacks enough context for LLM to synthesize an answer
  - **Outdated information:** The data is redundant or out of date.
- Bad Response Generation
  - **Hallucination:** Model makes up an answer that isn't in the context.
  - **Irrelevance:** Model makes up an answer that doesn't answer the question.
  - **Toxicity/Bias:** Model makes up an answer that's harmful/offensive.

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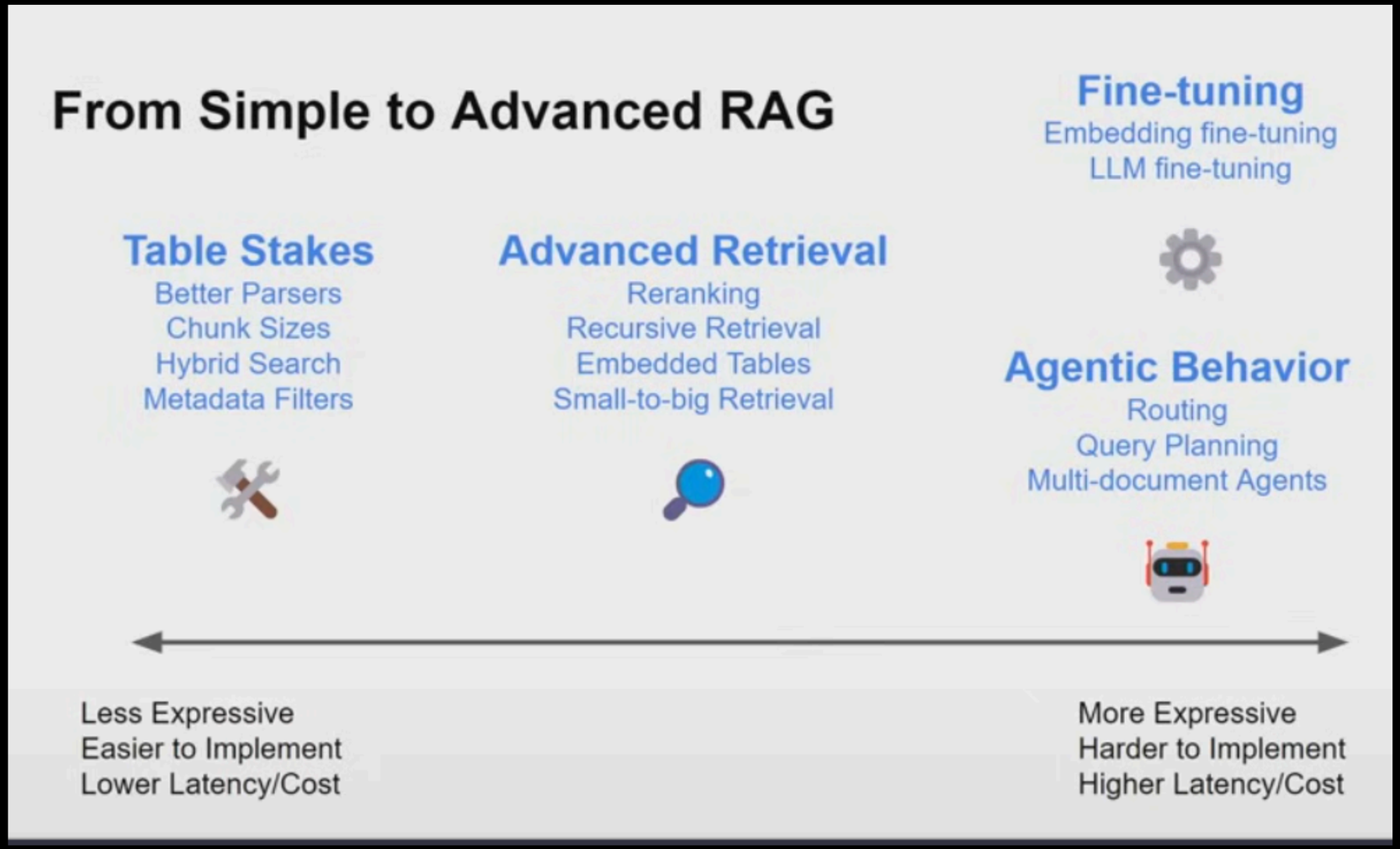

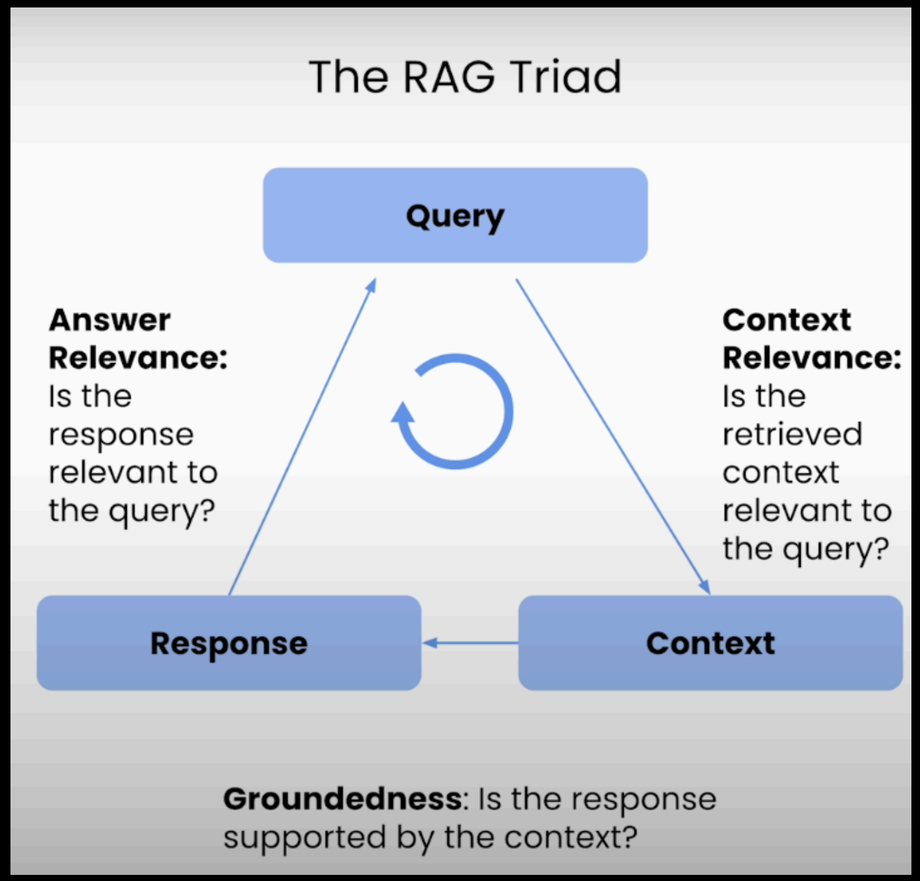
The RAG Triad
Query
Answer Relevance: Is the response relevant to the query?
Context Relevance: Is the retrieved context relevant to the query?
Response
Context
Groundedness: Is the response supported by the context?