EduQuery

The RAG-Based Chatbot for Active Learning

"Turning Passive Study Material into Interactive Quizzes”

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EduQuery

Solution Overview

⚠️ The Problem:

- Passive Learning & Retention: Students often read notes repeatedly (passive learning), which studies show leads to extremely poor information retention.
- The Hallucination Risk: Existing general chatbots can answer study questions but are prone to fabricating answers when not grounded in the specific course material.

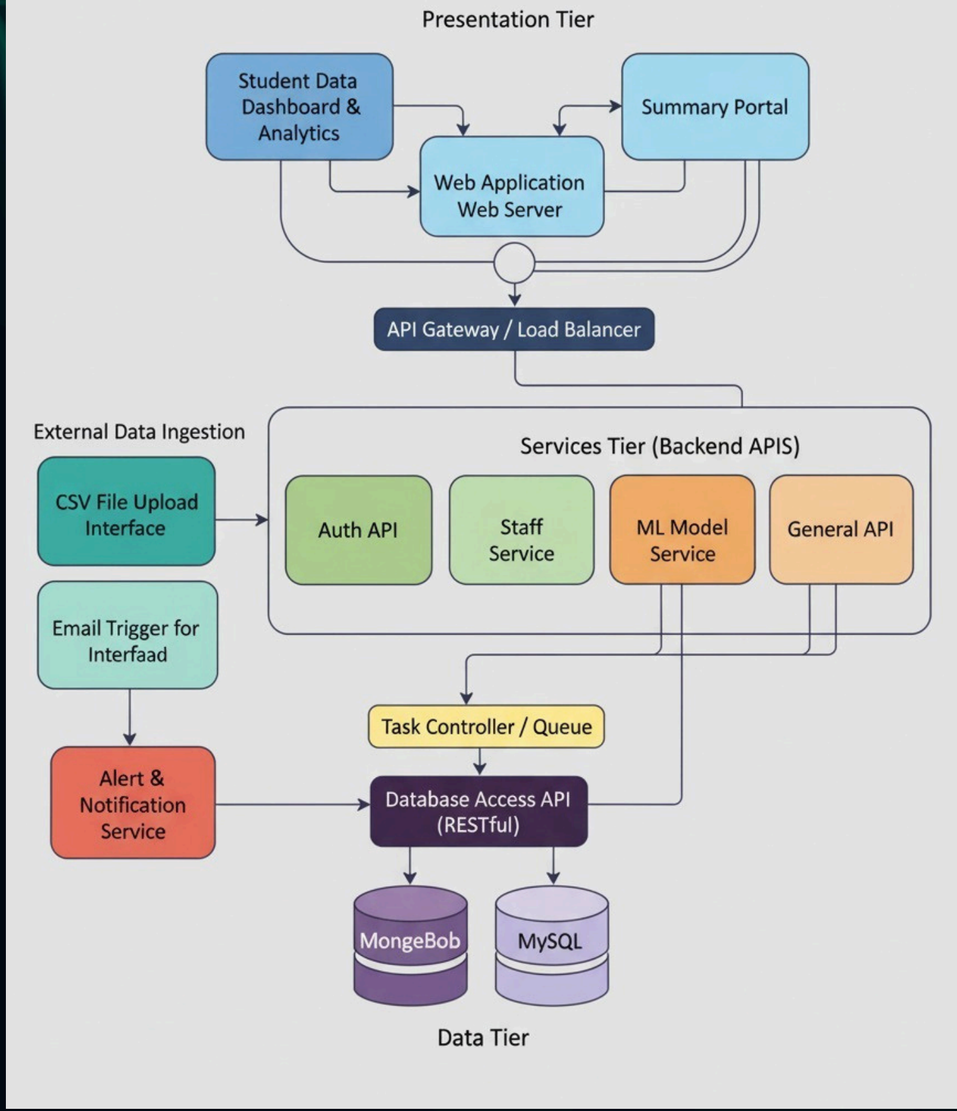
Our Solution:

- **EduQuery is an AI study partner powered by RAG that transforms uploaded course material into an interactive quiz generator. It doesn't just answer questions—it asks the student questions, promoting Active Recall.**
- **Question Generation Focus: Our core feature is the ability to generate specific, targeted questions directly from the retrieved context, forcing the student to recall the information.**

Special Attributes:

- Active Recall Enforcement : Adaptive Test Generation
- 100% Contextual Grounding : Zero Hallucination Guarantee
- Immediate, Corrective Feedback :Tutor-Grade Response
- Dynamic Source Citing : Instant Verification & Trust

System Architecture



TECHNICAL APPROACH

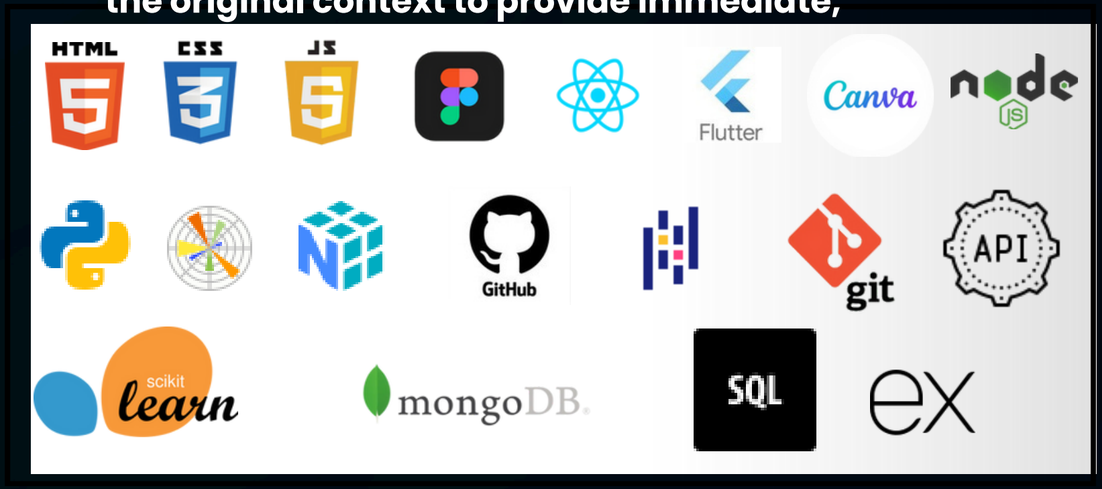
Methodology:

1. Ingestion: Prepare the Data
Action: Uploaded content is chunked and vectorized.

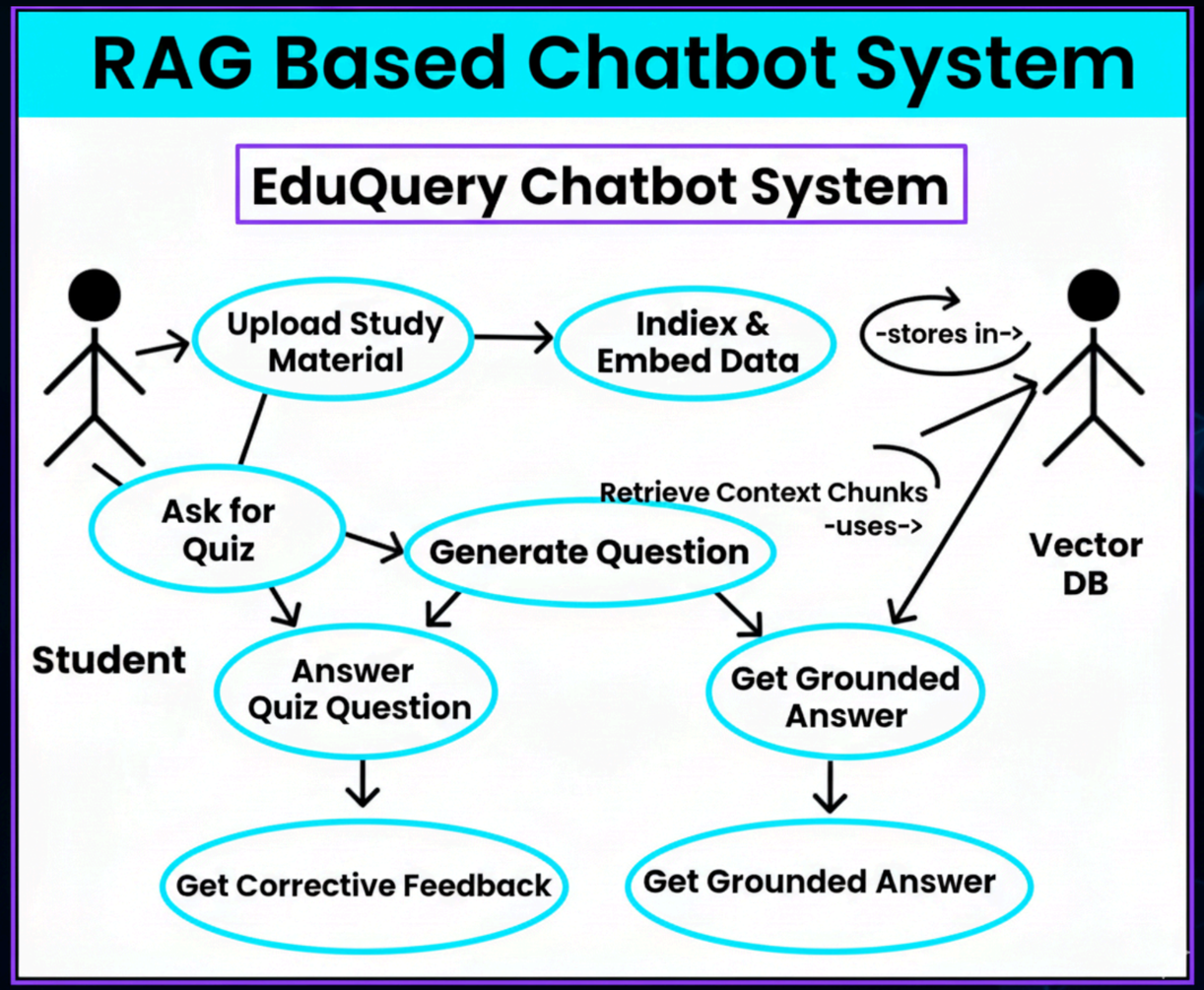
2. Retrieval: Target the Context
Action: User request ("Quiz me on X") retrieves all relevant text chunks from the vector store.

3. Prompting: Generate the Quiz
Action: The LLM is given a role-specific prompt: "Act as a Tutor".

4. Output: Close the Feedback Loop
Action: Deliver the question (with source citation), then use the original context to provide immediate,



Use Case Diagram



FEASIBILITY AND VIABILITY

Strategy & Market Fit:

Feasibility:

- Technically Achievable: Built with modern, open-source RAG tools, relying on established LLM APIs for core generation.
- Balanced Approach: Focus on a single, powerful before scaling to complex features like spaced repetition.

Viability:

- Scalable by Content: Easily scales from a single student's PDF to a university's entire lecture library, making it a viable national educational platform.
- Multilingual Support: As RAG pipelines and modern LLMs inherently support multiple languages, the solution is inclusive and broadly applicable.

Scalability:

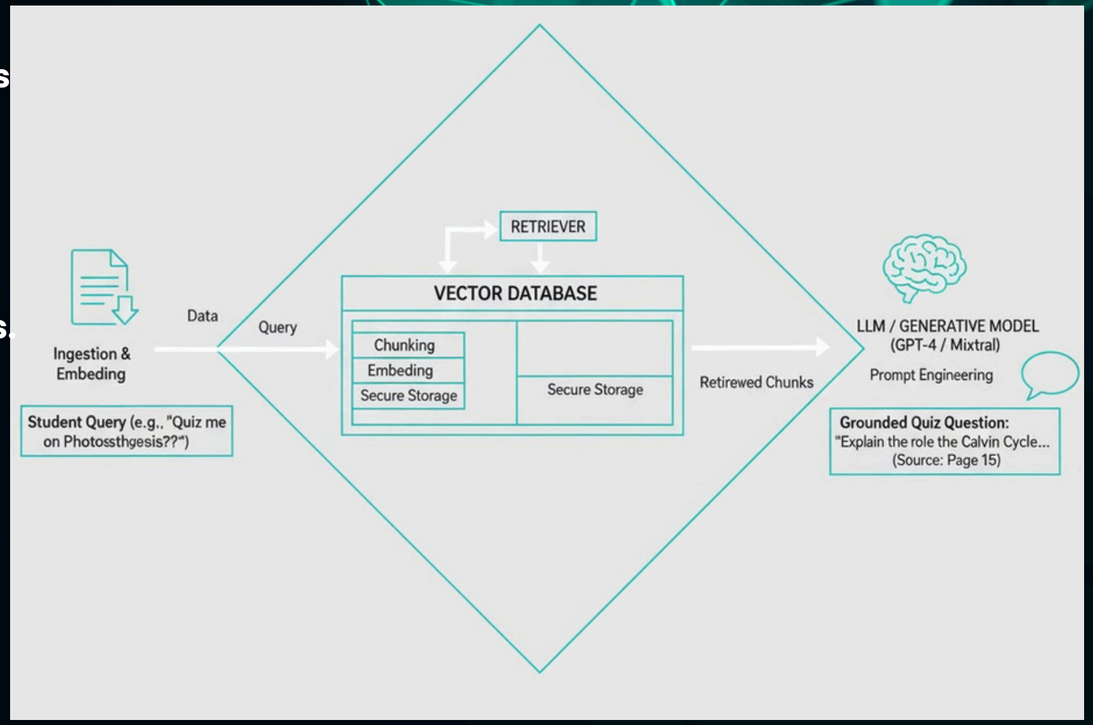
- The architecture is built on resource-efficient, resource-proven technologies.
- Modular RAG design allows easy updates to document parsers, embedding models, and vector stores without breaking the core chat logic.

Security&Compliance:

- Content Confidentiality: Student-uploaded documents are treated as confidential. Content is secured in private vector stores and is never shared with the public internet or used to train external LLMs.

Revenue Model:

- Content Confidentiality: Student-uploaded documents are treated confidential. Content is secured in private vector stores and is never shared with the public internet or used to train external LLMs.
- Supports scaling from individual users (freemium model) to pilot programs for thousands of students with institution-based licenses.



IMPACT AND BENEFITS

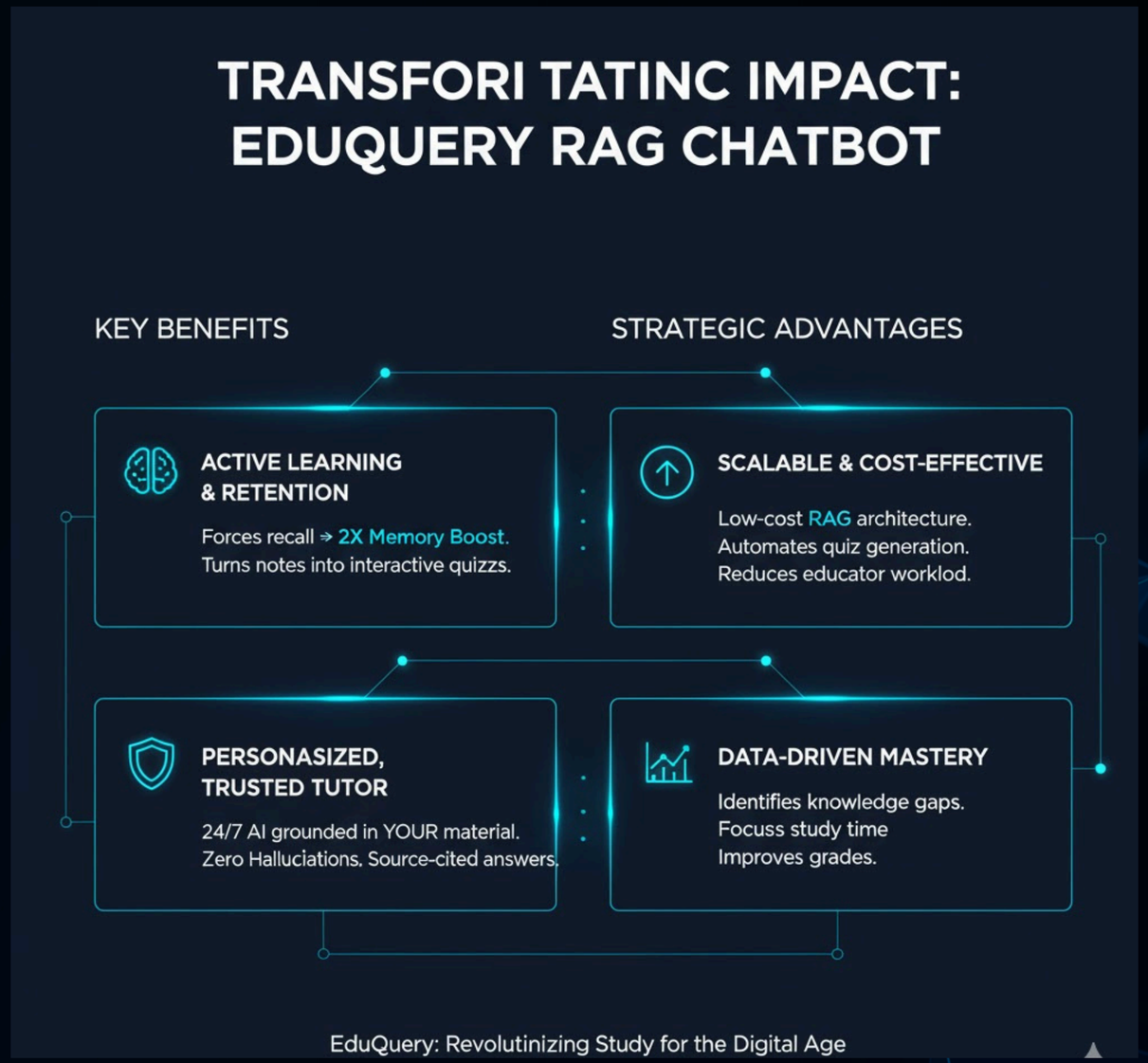
1. 2X Learning Retention (Active Recall)
The system systematically forces Active Recall—the most effective study technique—by generating comprehension questions. We move students past the passive reading stage, significantly increasing long-term information retention and reducing study time waste.

2. Zero Hallucination Guarantee
Our RAG pipeline ensures that every single question and piece of feedback is 100% grounded and traceable back to the student's uploaded source document. This builds academic trust and eliminates the risk of incorrect, AI-fabricated answers.

3. Personalized 24/7 Socratic Tutor
EduQuery functions as a tireless, non-judgmental tutor. It uses the original context to provide immediate, specific corrective feedback that guides the student and promotes deeper understanding, rather than just giving a simple "right" or "wrong."

4. Targeted Knowledge Gap Detection
The student can quiz themselves on micro-topics (e.g., "just the last three paragraphs on genetics"). This allows them to instantly self-diagnose and isolate their weak points, making their study sessions dramatically more efficient and focused.

5. Low-Cost Educational Scalability
The resource-efficient RAG architecture, utilizing open-source or efficient LLM components, provides a high-quality AI tutoring alternative at a fraction of the cost of commercial analytics platforms, making it viable for widespread deployment across public education systems.



RESEARCH AND REFERENCES

References & Research:

- "Retrieval-Augmented Generation for Knowledge-Intensive NLP Tasks" by Lewis et al., (2020, Google AI).

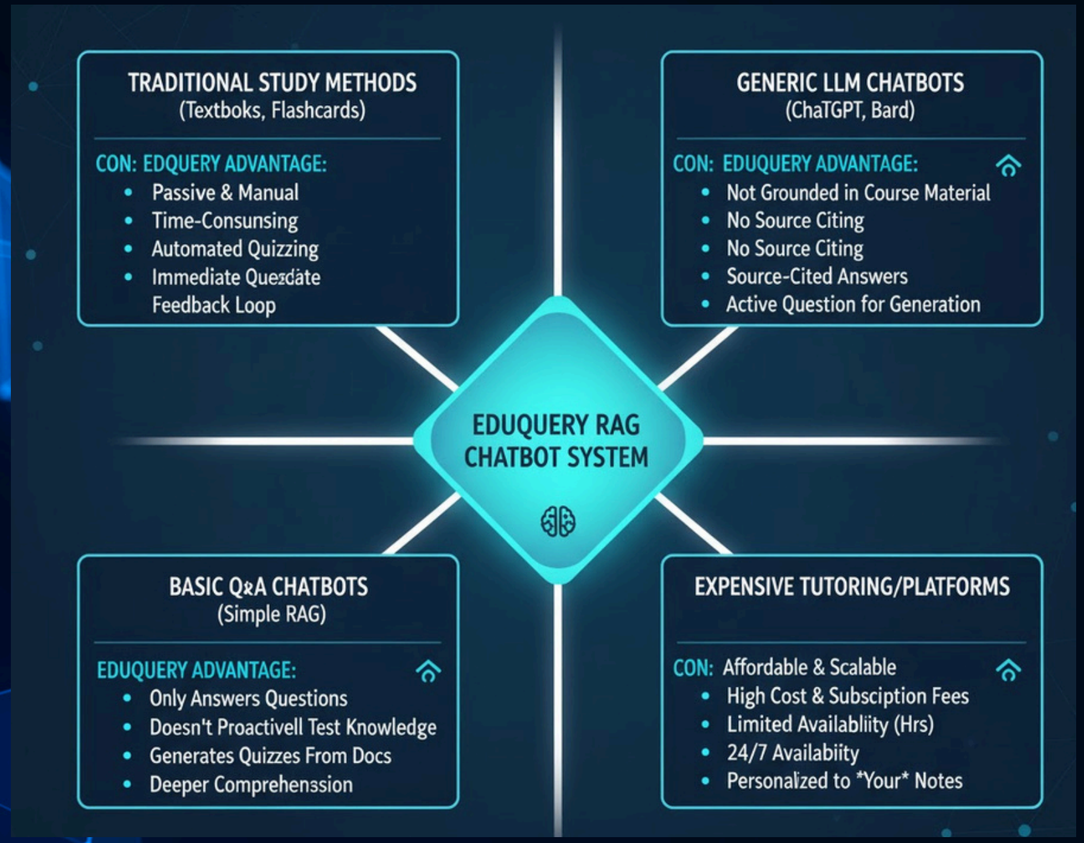
- Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology" by Dunlosky et al., (2013).

- Various LangChain Documentation & Tutorials:

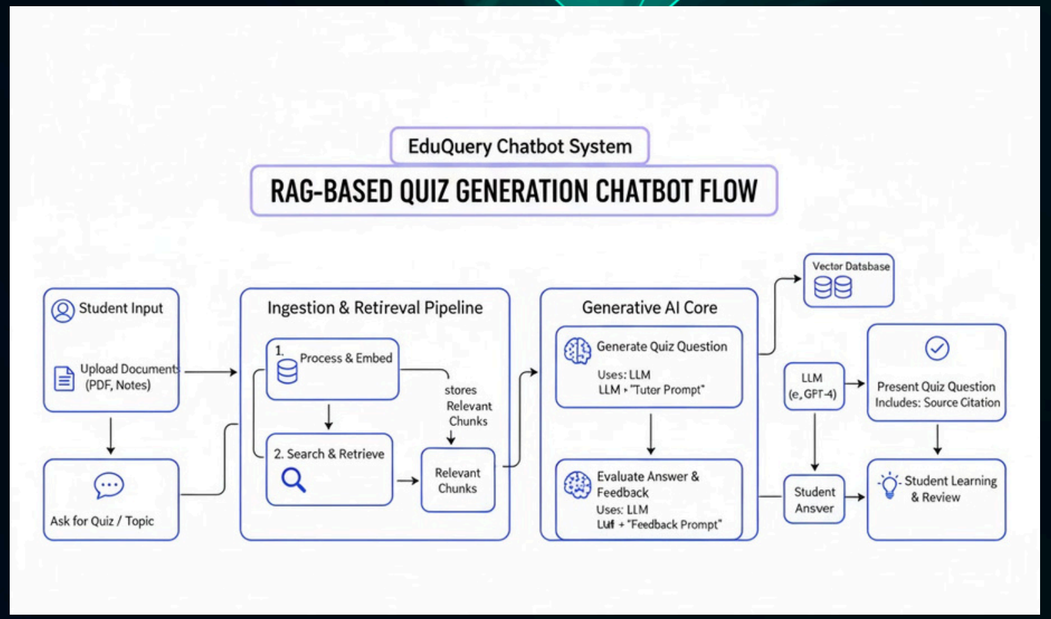
  Reference: https://python.langchain.com/docs/get_started/introduction

- ChromaDB Documentation:

  Reference: https://platform.openai.com/docs/overview



Flow Diagram:



THANK YOU!

FOR YOUR ATTENTION