AI Study Bot

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1. Project Overview

AI Study Bot is an intelligent chatbot developed using FastAPI, MongoDB Atlas, LangChain, and Groq LLM. The system is designed to help learners understand and retain knowledge through structured explanations, quizzes, flashcards, and practice questions. The bot maintains conversational memory by storing previous interactions in MongoDB, allowing it to provide context-aware responses.

2. Technology Stack

1. Backend Framework: FastAPI
2. Database: MongoDB Atlas (Cloud)
3. LLM Integration: Groq API (openai/gpt-oss-20b model)
4. Prompt Engineering: LangChain
5. Data Validation: Pydantic
6. Deployment Platform: Render

3.Memory Implementation Explanation

The chatbot stores every user message and assistant response in MongoDB Atlas with the following fields: user_id, role (user/assistant), message, and timestamp. When a new request is received:

1. The system retrieves all previous chats for the given user_id.
2. These messages are sorted chronologically using timestamps.
3. The conversation history is passed to the LLM using LangChain.
4. The model generates a context-aware response.
5. Both the user query and assistant response are stored back in MongoDB. This implementation enables conversational memory, allowing the bot to remember previous questions and provide personalized, contextual responses.

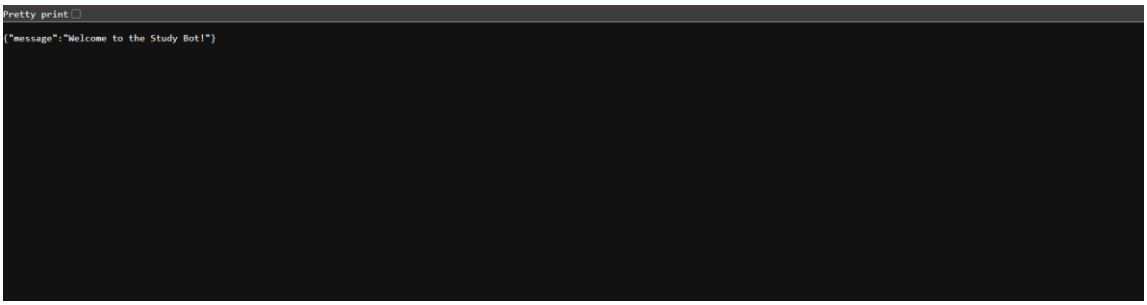
4. API Endpoints

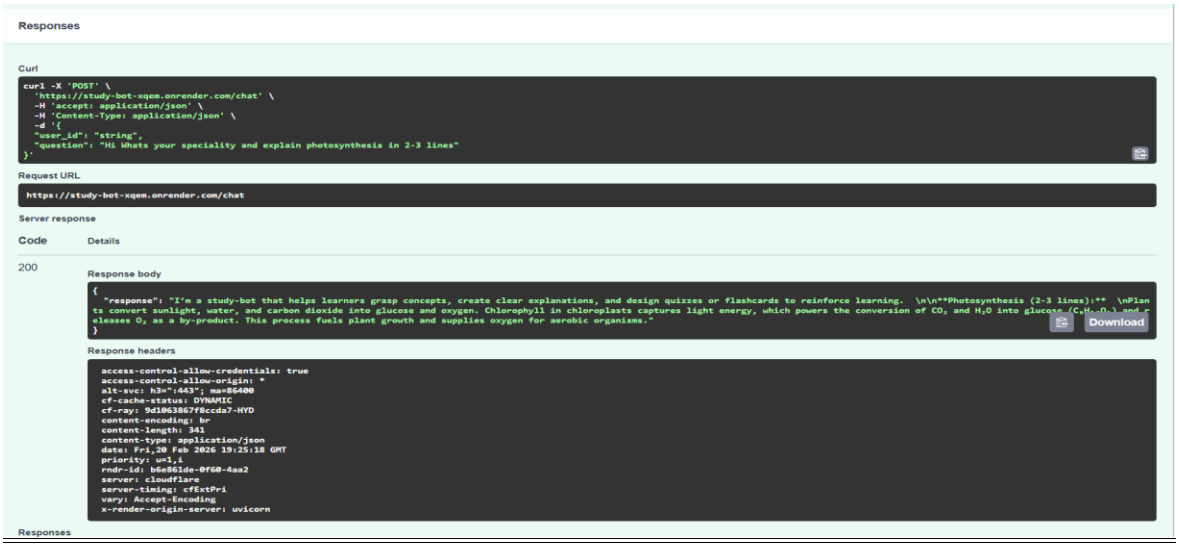
Method	Endpoint	Description
GET	/	Returns welcome message
POST	/chat	Accepts user_id and question, returns AI response

5. Deployment Details

Hosted API Link: https://study-bot-xqem.onrender.com/ GitHub Repository: https://github.com/Master-Rizen/Study-Bot

6. Screenshots





7. Future Improvements

• Implement user authentication and session management. • Add frontend interface for better user interaction. • Improve prompt optimization for more accurate responses. • Add analytics dashboard for tracking user learning progress.