DevTown

FINAL PROJECT REPORT

AI-Powered Study Bot with Persistent Memory

Student Information :

- ✓ Full name : Khadija Ait Hajjou
- ✓ Bootcamp : Generative AI Chatbot – Build Your First AI Chatbot
- ✓ Duration : 3 Days Intensive Training
- ✓ Project name : Study_Bot
- ✓ Submission date : February 22, 2026

Project Overview :

- ✓ Core Technology : FastAPI, LangChain, and Groq LLM
- ✓ Database : MongoDB Atlas (for Chat History Persistence)

1. Project Introduction :

The goal of this project was to develop a functional AI Study Bot capable of assisting students with academic queries. Built using FastAPI and LangChain, the bot leverages the Groq Llama-3 model to provide fast and accurate responses. The application is designed to be scalable and secure, using environment variables to protect sensitive API keys.

2. Technical Architecture :

- ✓ **Backend :** Developed with Python and FastAPI for high-performance API management
- ✓ **AI Engine :** Powered by Groq's Large Language Model (LLM) for natural language processing
- ✓ **Database :** MongoDB Atlas is used for storing chat history and maintaining session persistence

3. Memory & Persistence :

- ✓ Every user interaction is stored in a database collection.
- ✓ The bot retrieves the previous conversation history based on a unique session_id.
- ✓ This allows the AI to maintain context, remember the user's name, and answer follow-up questions accurately.

4. Skills Acquired :

During this intensive 3-day Bootcamp, I gained hands-on experience in the following areas:

- ✓ Backend Development : Building RESTful APIs using the FastAPI framework.
- ✓ AI Integration : Connecting and prompting Large Language Models (LLM) via the Groq API.
- ✓ Database Management : Implementing cloud storage and session persistence with MongoDB Atlas.
- ✓ DevOps and Deployment : Managing version control with github and deploying live applications on Render.

5. Conclusion :

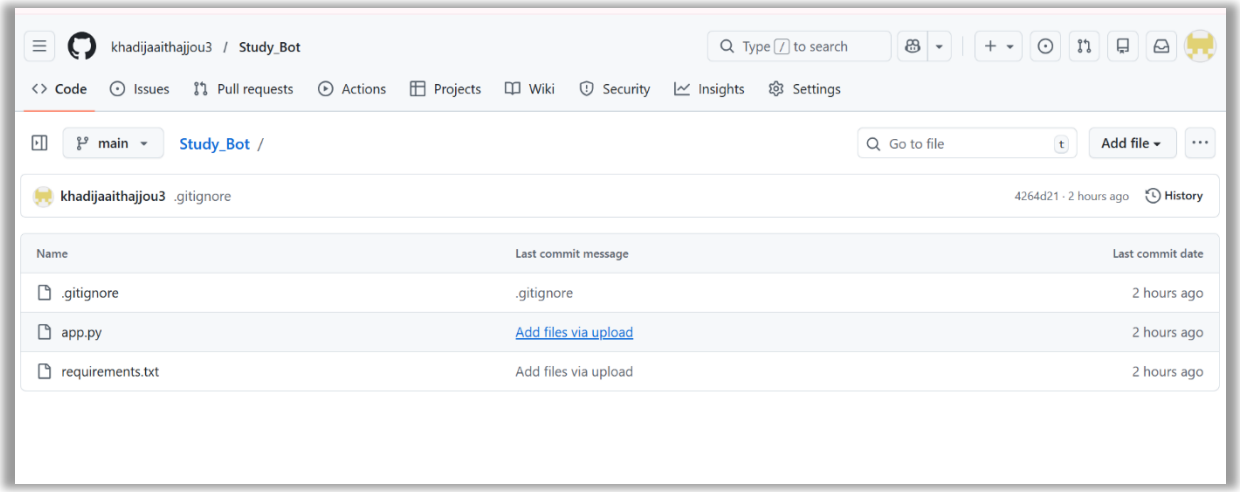
The Study_Bot project shows how to connect an AI with a database like MongoDB Atlas. Using FastAPI and Groq, I built a chatbot that can remember past messages to help students better. This project proves that I can create, protect, and launch a complete AI application from start to finish.

Note on Deployment: To prioritize data security and follow best practices regarding personal information, I have chosen to host the application locally for this demonstration. All features, including the FastAPI server, Groq LLM integration, and MongoDB Atlas persistence, are fully functional and tested as shown in the project screenshots.

6. Project screenshots :

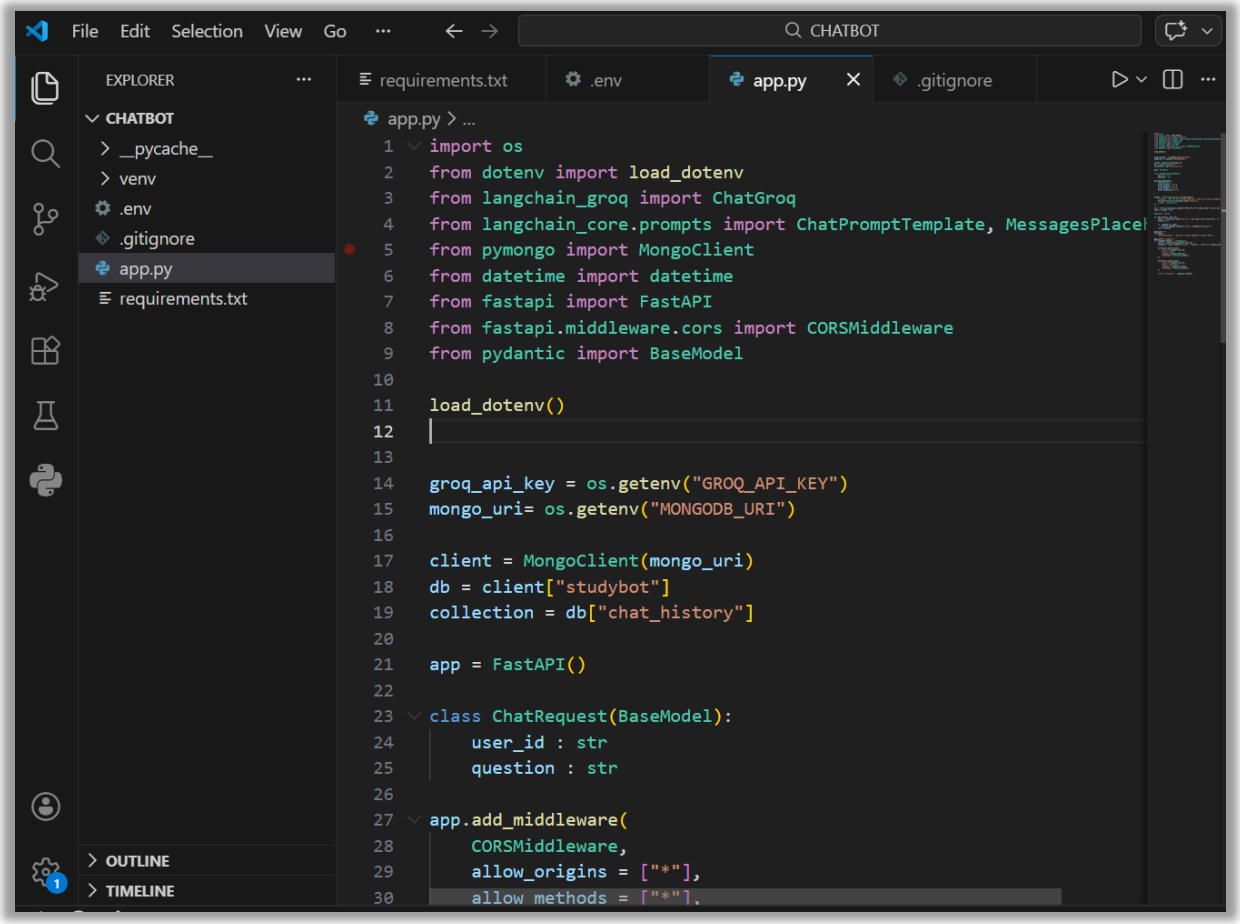
1. GitHub Repository :

This screenshot shows my GitHub repository named Study_Bot. It contains all the necessary project files, including the source code, requirements, and configuration files.



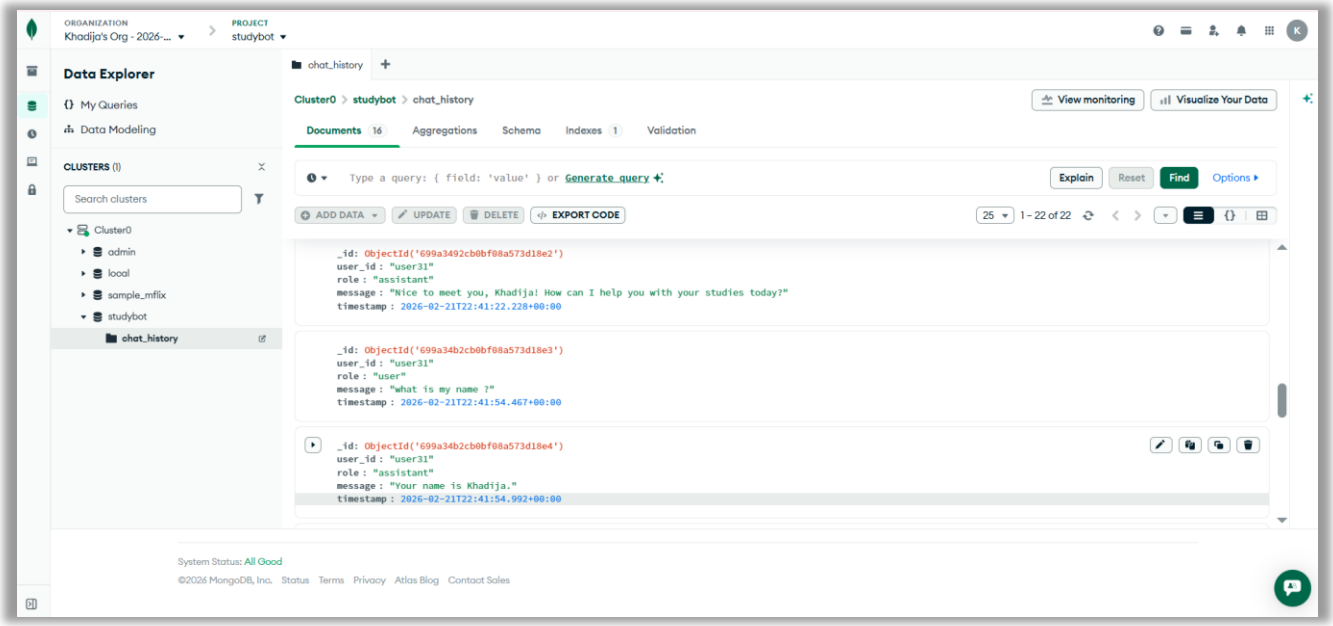
2. Backend Implementation (VS Code) :

This image displays the Python code in VS Code. It highlights the integration of FastAPI with the Groq LLM and the connection setup for the MongoDB database.



3. Database (MongoDB Atlas) :

This view from MongoDB Atlas proves that the chatbot saves messages. The data shows that the bot correctly remembers the user's name ("Khadija"), confirming that the persistent memory is working.



4. Local Server Execution (Uvicorn) :

This screenshot shows the FastAPI server running locally using Uvicorn. The 'Application startup complete' message indicates that the backend is ready to handle requests.

```
(venv) PS C:\Users\HP\Downloads\CHATBOT> uvicorn main:
app --reload
INFO:     Will watch for changes in these directories:
 ['C:\\Users\\HP\\Downloads\\CHATBOT']
INFO:     Uvicorn running on http://127.0.0.1:8000 (Pr
ess CTRL+C to quit)
INFO:     Started reloader process [22428] using StatR
eload
```

5. Chatbot Interaction :

This is a live test of the Study Bot. I first told the bot my name, and in the next question, it correctly answered 'your name is Khadija'.This

proves the AI successfully retrieves my session history from MongoDB to maintain context.