Dollie uvettah ‘s STUDY BOT PROJECT REPORT

GitHub Repository

https://github.com/chibi1245/study_chatbot.git

Render

https://study-chatbot-1.onrender.com

Api link

http://127.0.0.1:8000/

The Project Overview

This project is a Study Bot built using the following FastAPI, LangChain, Groq LLM, and MongoDBATLAS and deployed using render. The chatbot answers study-related questions and maintains conversation memory for each user by storing chats in MongoDB. This will allows multiple users to interact with the chatbot while still storing their individual conversation history using a unique user_id without losing the memory.

- FastAPI – for backend API framework

- LangChain – LLM framework

- Groq which I used (openai/gpt-oss-20b) – for the Language model

- MongoDB Atlas – Database for storing chat memory

- Uvicorn – ASGI server

2. Description of Memory Implementation

The memory is implemented using MongoDB. Each message in a conversation is stored in a database with the following fields: user_id, role, message, and the timestamp.

Storing Messages

After the response has been generated, both the user question and assistant response are stored in the MongoDB database with a timestamp. This is done to create permanent memory.

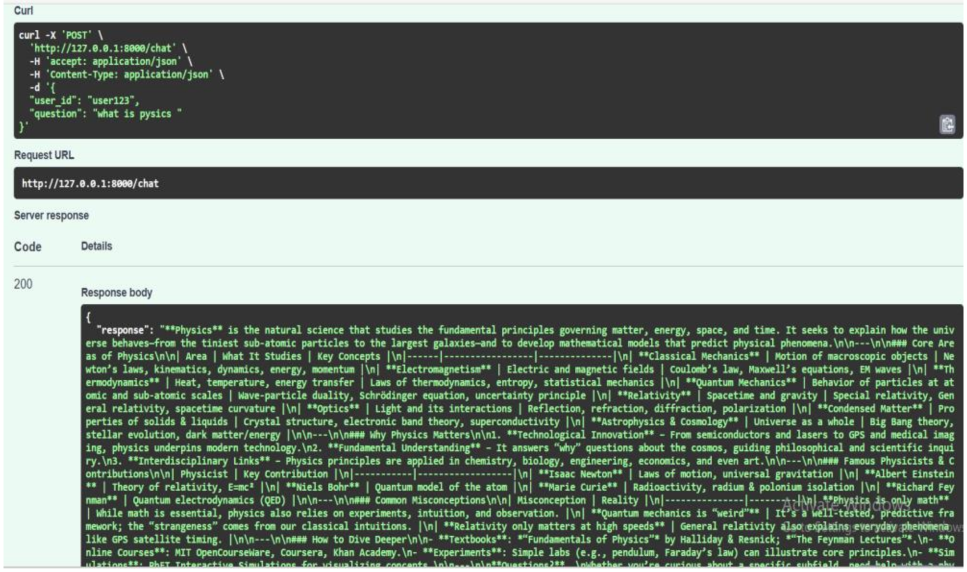
Retrieving Chat History

Before a new response is generated, the system retrieves all previous messages for that user in chronological order. The chat history is then passed to the language model.

Sending History to the Model

The chat history and current question are sent to the LLM using LangChain. This allows the chatbot to generate context-driven response

Sample pics for the api



Curl

```
curl -X 'POST' \
  'http://127.0.0.1:8000/chat' \
  -H 'accept: application/json' \
  -H 'Content-Type: application/json' \
  -d '{
  "user_id": "user123",
  "question": "what is pysics "
}'
```

Request URL

```
http://127.0.0.1:8000/chat
```

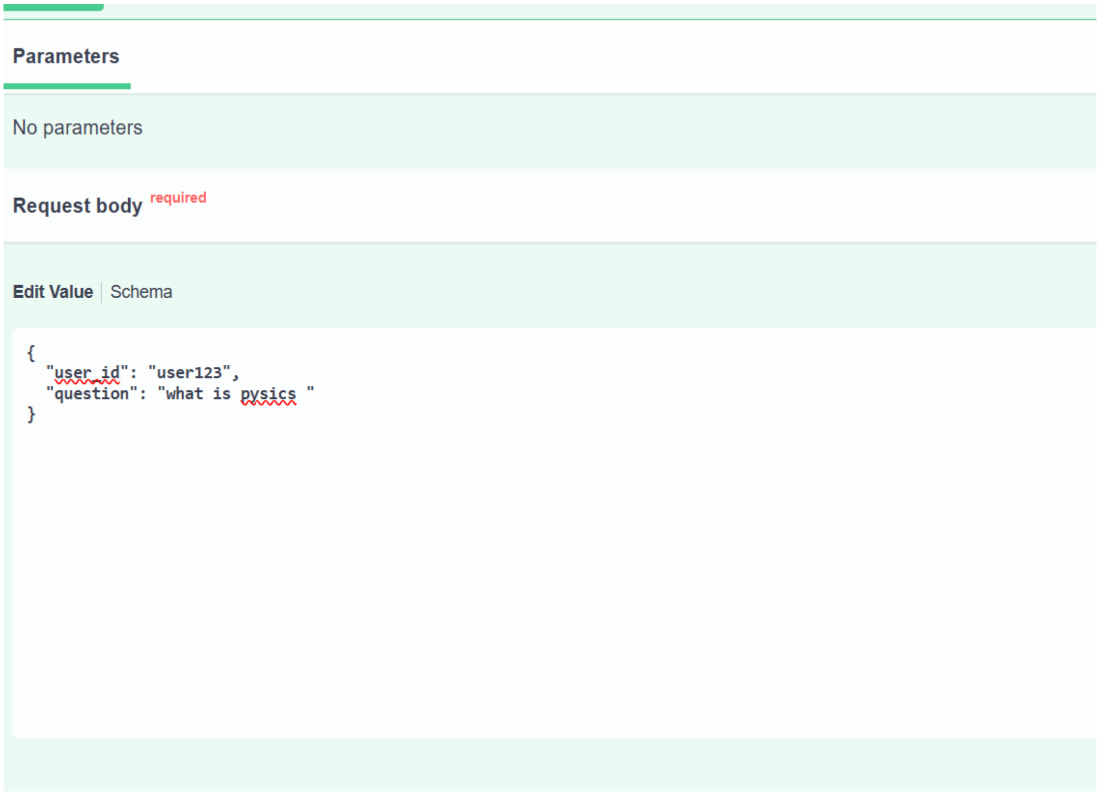
Server response

Code | Details

200

Response body

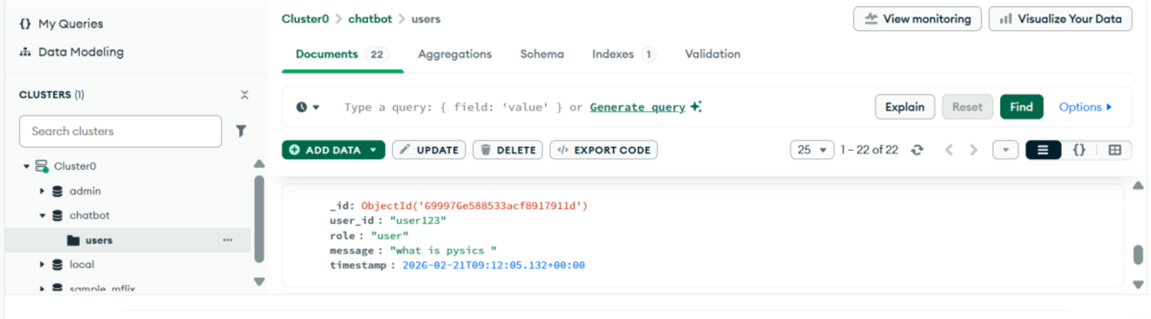
```
{
  "response": "**Physics** is the natural science that studies the fundamental principles governing matter, energy, space, and time. It seeks to explain how the univ
erse behaves—from the tiniest sub-atomic particles to the largest galaxies—and to develop mathematical models that predict physical phenomena.\n\n---\n\n### Core Are
as of Physics\n\n| Area | What It Studies | Key Concepts |\n|------|-----------------|--------------|\n| **Classical Mechanics** | Motion of macroscopic objects | Ne
wton’s laws, kinematics, dynamics, energy, momentum |\n| **Electromagnetism** | Electric and magnetic fields | Coulomb’s law, Maxwell’s equations, EM waves |\n| **Th
ermodynamics** | Heat, temperature, energy transfer | Laws of thermodynamics, entropy, statistical mechanics |\n| **Quantum Mechanics** | Behavior of particles at at
omic and sub-atomic scales | Wave-particle duality, Schrödinger equation, uncertainty principle |\n| **Relativity** | Spacetime and gravity | Special relativity, Gen
eral relativity, spacetime curvature |\n| **Optics** | Light and its interactions | Reflection, refraction, diffraction, polarization |\n| **Condensed Matter** | Pro
perties of solids & liquids | Crystal structure, electronic band theory, superconductivity |\n| **Astrophysics & Cosmology** | Universe as a whole | Big Bang theory,
stellar evolution, dark matter/energy |\n\n---\n\n### Why Physics Matters\n\n1. **Technological Innovation** – From semiconductors and lasers to GPS and medical imag
ing, physics underpins modern technology.\n2. **Fundamental Understanding** – It answers “why” questions about the cosmos, guiding philosophical and scientific inqui
ry.\n3. **Interdisciplinary Links** – Physics principles are applied in chemistry, biology, engineering, economics, and even art.\n\n---\n\n### Famous Physicists & C
ontributions\n\n| Physicist | Key Contribution |\n|-----------|-----------------|\n| **Isaac Newton** | Laws of motion, universal gravitation |\n| **Albert Einstein
** | Theory of relativity, E=mc² |\n| **Niels Bohr** | Quantum model of the atom |\n| **Marie Curie** | Radioactivity, radium & polonium isolation |\n| **Richard Fey
nman** | Quantum electrodynamics (QED) |\n\n---\n\n### Common Misconceptions\n\n| Misconception | Reality |\n|---------------|---------|\n| **Physics is only math**
| While math is essential, physics also relies on experiments, intuition, and observation. |\n| **Quantum mechanics is “weird”** | It’s a well-tested, predictive fra
mework; the “strangeness” comes from our classical intuitions. |\n| **Relativity only matters at high speeds** | General relativity also explains everyday phenomena
like GPS satellite timing. |\n\n---\n\n### How to Dive Deeper\n\n- **Textbooks**: *“Fundamentals of Physics”* by Halliday & Resnick; *“The Feynman Lectures”*.\n- **O
nline Courses**: MIT OpenCourseWare, Coursera, Khan Academy.\n- **Experiments**: Simple labs (e.g., pendulum, Faraday’s law) can illustrate core principles.\n- **Sim
ulations**: PhET Interactive Simulations for visualizing concepts.\n\n---\n\n**Questions?** \nWhether you’re curious about a specific subfield, need help with a phy
```



No parameters

```
{
  "user_id": "user123",
  "question": "what is pysics "
}
```

Mongodb screenshot



```
_id: ObjectId('699976e588533acf8917911d')
user_id : "user123"
role : "user"
message : "what is pysics "
timestamp : 2026-02-21T09:12:05.132+00:00
```