AI Data Science Tutor - Project Documentation

1. Introduction

The AI Data Science Tutor project is an interactive web application built using Streamlit. It utilizes Google's Generative AI (Gemini) via LangChain to act as a personalized tutor capable of answering questions related to Data Science at different levels (Beginner, Intermediate, Advanced).

2. Libraries Used

- streamlit: Used to create the interactive web interface.

- os: Access environment variables (for securely fetching API keys).

- langchain: Provides memory and schema support to manage conversation history and structure messages.

- langchain_google_genai: Enables integration with Google's Gemini model.

3. Step-by-Step Project Flow

1. Import necessary libraries.
2. Fetch the `GOOGLE_API_KEY` securely from environment variables.
3. Initialize the ChatGoogleGenerativeAI model with proper error handling.
4. Initialize conversation memory using LangChain's `ConversationBufferMemory`.
5. Configure Streamlit layout and add custom CSS for UI enhancements.
6. Display sidebar with app info and user learning level selection.
7. Define the AI's system message based on user level.
8. Show existing conversation history from memory.
9. Take user input using `st.chat_input()`.
10. Append the user query to the chat history and invoke the Gemini model.
11. Display the AI's response and update memory with new messages.
12. Allow the user to download chat history or reset the session.

4. Key Features

AI Data Science Tutor - Project Documentation

- Level-based AI tutoring (Beginner, Intermediate, Advanced).

- Conversational memory using LangChain.

- Downloadable chat history.

- Stylish UI using custom CSS in Streamlit.

- Error handling for missing API keys and failed model invocation.

5. Conclusion

This project demonstrates how Generative AI and LangChain can be combined in a Streamlit app to provide a user-friendly educational experience. It can be extended further with features like voice input, quiz generation, or integration with learning platforms.