

Imports and Flask Setup

Flask: Flask is a web framework for Python that allows you to build web applications.

dotenv: dotenv is used to load environment variables from a .env file.

os: Standard Python library for interacting with the operating system.

time: Standard Python library for time-related functions.

langchain: These are modules and classes imported from the langchain library, which seems to be a specialized library.

Flask routes: Defines routes / and /predict for handling requests.

index(): Renders an HTML template (index.html) for the root route.

predict(): Handles POST requests containing JSON data.

greetings: Defines a dictionary of greeting keywords and their corresponding responses.

retrieve_documents(input_prompt): Processes the input prompt to retrieve relevant documents or provide default response.

Flask App: Initializes a Flask application.

load_dotenv(): Loads environment variables from a .env file into the Flask application.

groq_api_key and google_api_key: Loads API keys from environment variables for authentication purposes.

Debug Print: Prints out the loaded API keys for debugging purposes.

Initializing Session State

initialize_session_state(): Function to initialize session state variables if they do not already exist.

GoogleGenerativeAIEmbeddings: Initializes embeddings for Google Generative AI.

PyPDFDirectoryLoader: Loads PDF files from a directory for data ingestion.

RecursiveCharacterTextSplitter: Splits text into chunks for processing.

FAISS: Utilizes FAISS (Facebook AI Similarity Search) for vector storage and retrieval.

NLP Components Setup

ChatGroq: Initializes a ChatGroq object for language processing tasks.

ChatPromptTemplate: Creates a template for generating responses based on context and input questions.

Retrieving docs

retrieve_documents(input_prompt): Function that retrieves documents based on the input prompt.

initialize_session_state(): Ensures session state is initialized before processing.

create_stuff_documents_chain() and create_retrieval_chain(): Functions to create document and retrieval chains for NLP.

FAISS vector retrieval: Utilizes FAISS vectors to retrieve relevant documents.

response_time: Measures the time taken to retrieve and process the response.

Flask Routes

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Main Execution