School of Computer Engineering & Technology Synopsis

Group No.: ***P49***

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Abstract:

This project introduces a novel voice-based chatbot that leverages the power of large language models (LLMs) and external data sources to answer user inquiries. The core engine is an LLM from Hugging Face, enabling the chatbot to understand natural language questions and provide informative answers. LangChain, a conversational AI framework, manages the conversation flow, ensuring smooth interaction and context awareness. Streamlit facilitates a user-friendly interface for voice interaction. Additionally, the chatbot integrates with the Elevenlabs API, allowing it to convert voice to text and generate spoken responses. Finally, the system extracts information from provided PDFs, expanding its knowledge base and offering a richer user experience. This project bridges the gap between traditional document analysis and voice interaction, creating a user-friendly and informative platform for knowledge seekers.

Project Objectives:

1. Design an LLM based voice chatbot which can answer questions based on the provided PDF documents.
2. Utilize the Large Language Model from Hugging Face as the core engine for natural language understanding and generation, enabling the chatbot to engage in meaningful and contextually relevant conversations.
3. Implement LangChain, a conversational AI framework, to manage the flow of interactions between the chatbot and users, ensuring smooth and coherent conversations while maintaining context across multiple exchanges.
4. Develop a user-friendly interface using Streamlit, a Python library for building interactive web applications, to provide users with an intuitive and accessible platform for interacting with the chatbot.
5. Create a function that converts voice to text and vice versa using the Elevenlabs API, as well as another function for speech recognition.
6. Integrate with external data sources, particularly PDF documents, to enable the chatbot to extract relevant information and insights directly from provided documents, enriching the user experience, and expanding the scope of available knowledge.

H/w & S/w Requirements:

Hardware:

- Computer or server with sufficient processing power to run the chatbot application.
- Adequate RAM to handle the computational demands of the Large Language Model (LLM) and other software components.
- Storage space for storing the chatbot application, data, and any additional resources.

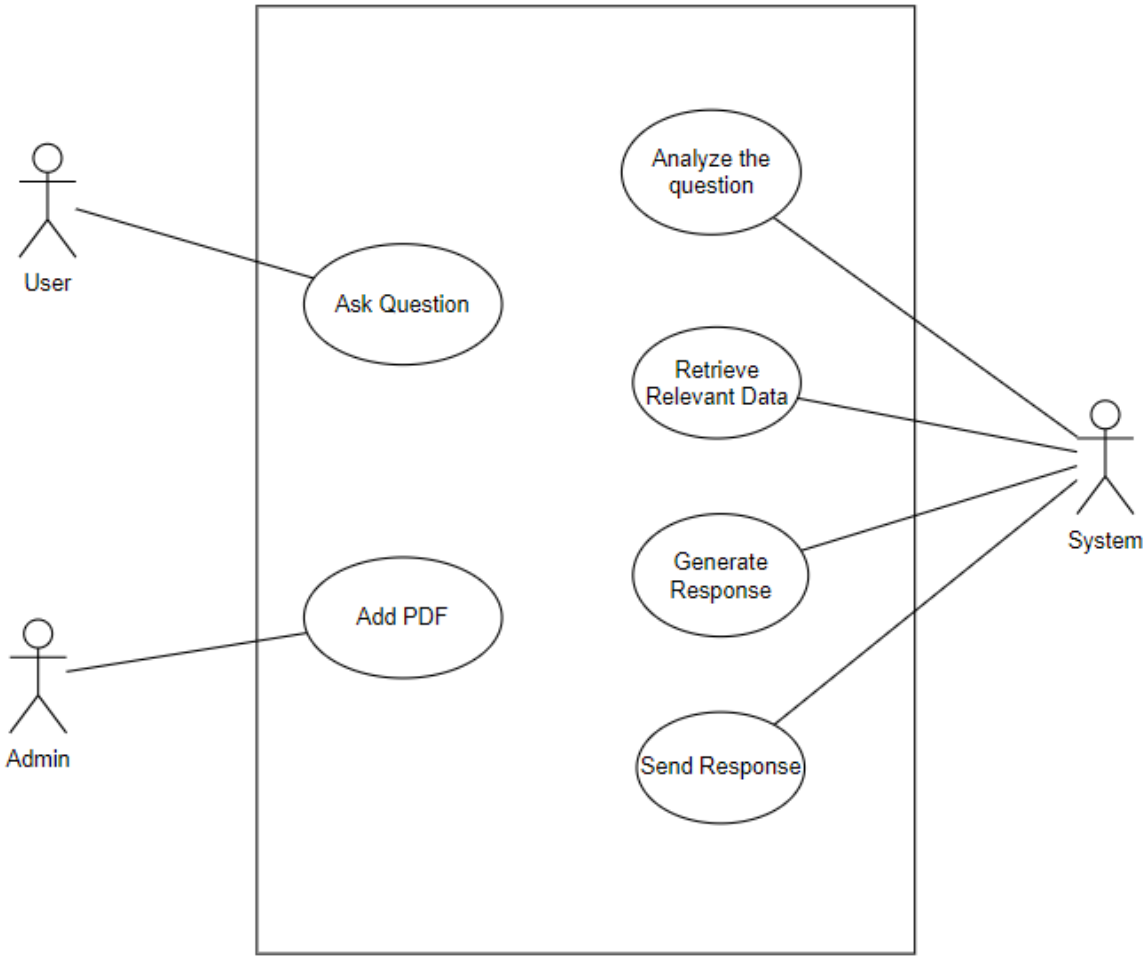
Software:

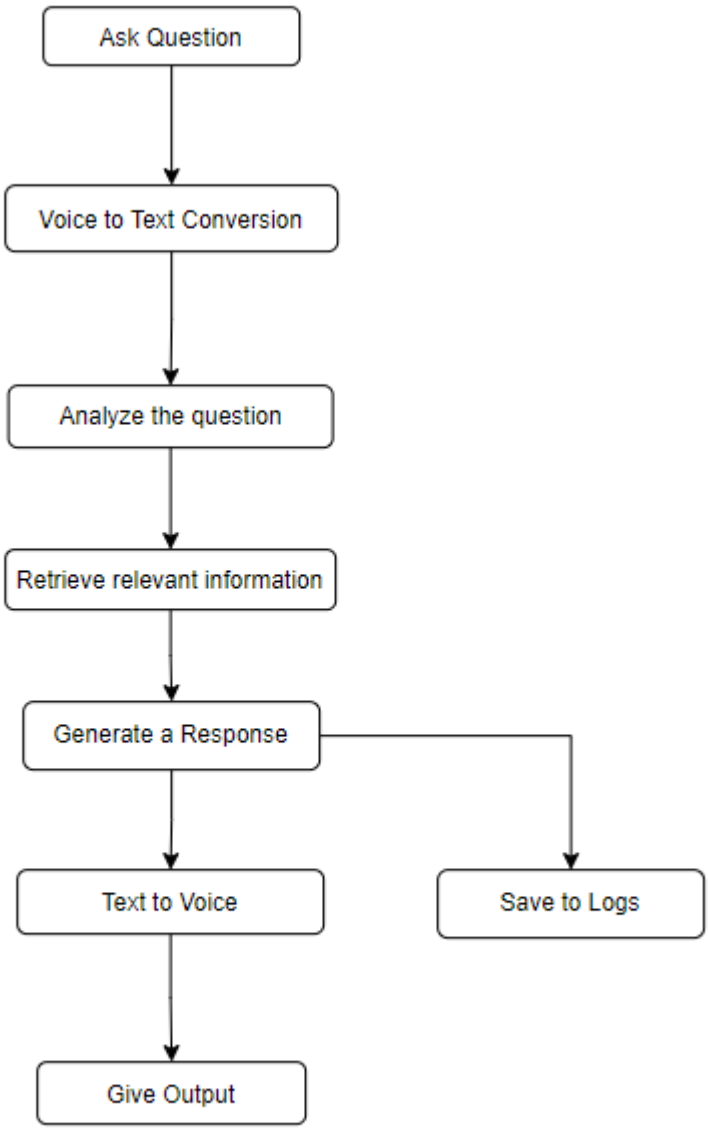
- Operating System: Compatible with Windows, macOS, or Linux distributions.
- Programming Languages: Proficiency in Python for development.
- Libraries and Frameworks:

- Hugging Face: For utilizing the Large Language Model
- LangChain: For managing conversational flow and context.
- Streamlit: For building the user-friendly interface.
- Speech Recognition: For voice recognition and text conversion.
- Elevenlabs: For generating custom voice from text.

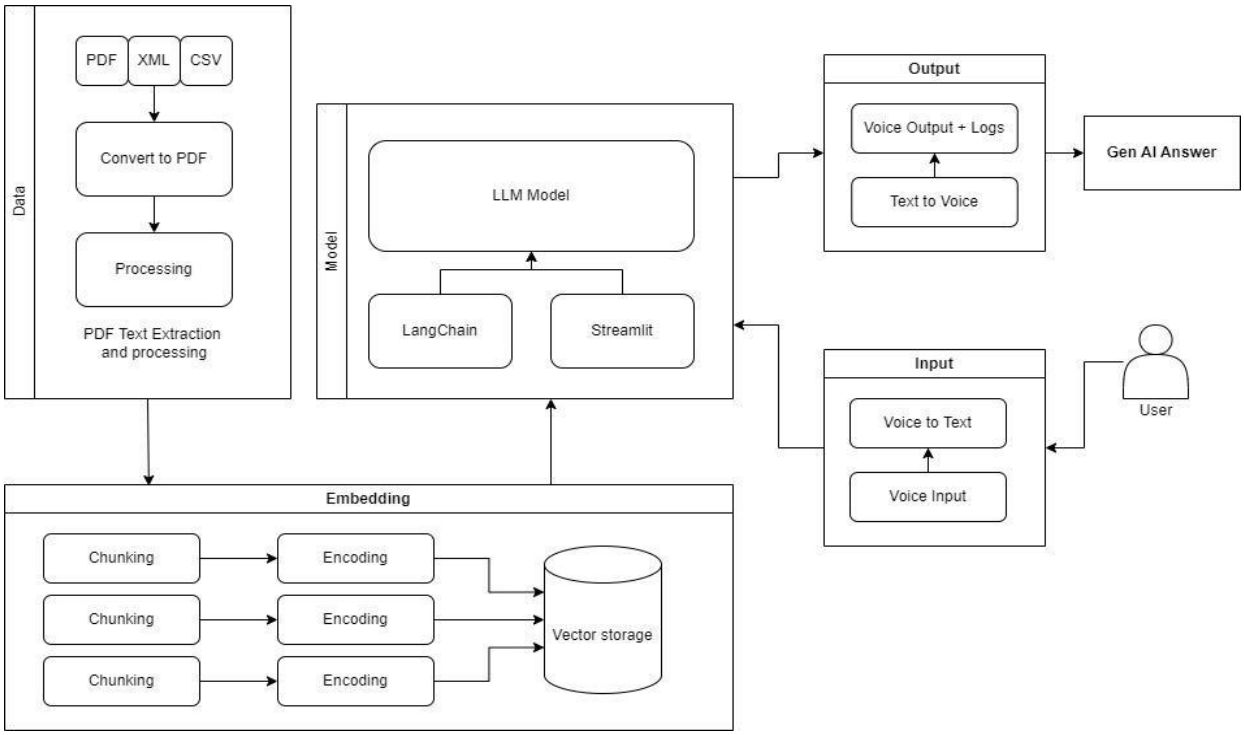
- External Data Integration: Ability to integrate with external data sources, particularly PDF documents, for comprehensive information access.

High Level Design:




Ask Question
Voice to Text Conversion
Analyze the question
Retrieve relevant information
Generate a Response
Text to Voice
Save to Logs
Give Output

Low Level Design:



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