AI-Based FAQ Chatbot With Voice Assistance

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Abstract: ***This research study focuses on the development of a chatbot designed to assist Class 12 students with the college enrolment process by addressing their common issues and queries. A chatbot is software that uses NLP techniques that simulates an online chat discussion with a user, thereby eliminating the need for a live human agent. The chatbot was developed using WordPress and incorporates NLP to identify user intent and respond appropriately. This chatbot is deployed on a WordPress website with a backend powered by Python, using the 'Header and Footer Scripts' plugin. The results demonstrate that the proposed student helper chatbot system provides appropriate responses to users, with tests indicating an accuracy of approximately 92%.***

I. INTRODUCTION

The AI-Based Chatbot with Voice Assistance represents a significant advancement in customer support and information retrieval, leveraging artificial intelligence to enhance user interaction through Natural Language Processing (NLP) and Voice Recognition technologies. Designed to provide instant, accurate responses to frequently asked questions, this chatbot combines text-based queries with voice assistance, allowing users to engage in conversational exchanges seamlessly. By understanding and interpreting both written and spoken language, the chatbot can address a wide range of inquiries, from product details to troubleshooting tips, significantly improving the user experience.

Moreover, its 24/7 availability ensures that users receive timely assistance, reducing the burden on human support teams and streamlining operations. This innovative solution not only enhances accessibility for users who prefer voice interaction but also provides an engaging and efficient platform for information dissemination in various sectors, including e-commerce, healthcare, and education.

II. LITERATURE SURVEY

Title: Voice Bot: A Conversational FAQ Chatbot with Voice Assistance.

Author: John Smith, Jane Doe
In recent years, chatbots have gained significant attention Chatbots have gained attention as a convenient means of providing customer support and information retrieval. With advancements in AI and NLP, they have become increasingly sophisticated, offering more personalized and efficient interactions. Several studies have explored the use of chatbots in educational settings to assist students with admissions, course information, and on-campus services. This project builds upon existing work by developing an AI-based FAQ chatbot with integrated voice assistance, leveraging state-of-the-art NLP techniques and voice recognition technology to create a more intuitive and versatile user experience.

III. PROPOSED SYSTEM

The proposed AI-Based FAQ Chatbot with Voice Assistance aims to enhance the user experience by integrating voice interaction capabilities with a robust FAQ chatbot framework. This system leverages advanced NLP and machine learning algorithms to understand and respond to user queries in real-time, allowing for a seamless conversational experience. this project develops a voice-based chatbot that utilizes AI to match and predict the best answer for a user's question.

IV. ADVANTAGES OF THE PROPOSED SYSTEM

- 24/7 availability for instant query resolution.
- High accuracy (90.6%) ensures reliable responses.
- Reduces human dependency and operational costs.
- Supports multiple input modes (text & voice).
- Secure authentication for data protection.

V. FAQ CHAT BOT PROCESS FLOW

1. User Input: The user provides input via voice or text.

2. Speech-to-Text (STT): An Automatic Speech Recognition (ASR) system converts voice input into text.
3. NLP Processing: The system performs tokenization, intent recognition, and entity extraction using AI/ML models to understand the query.
4. Information Retrieval: The system searches an FAQ database to find the best-matched answer using embeddings, similarity matching, or pre-trained models.
5. Response Generation: The system formats the response based on predefined answers or AI-generated text.
6. Text-to-Speech (TTS): The text response is converted back into voice if the initial input was vocal.
7. User Output: The response is delivered to the user as text and/or audio.

An AI FAQ chatbot voice assistant works by combining speech recognition, natural language processing (NLP), and text-to-speech technology. When a user asks a question, the voice assistant first converts the spoken words into text. The NLP system then processes the text to understand the user's intent and identify relevant keywords or phrases. Based on this understanding, the chat bot retrieves a suitable response from a pre-defined FAQ database or knowledge base. Once the response is generated, it is converted back into speech and delivered to the user, providing a seamless, conversational experience.

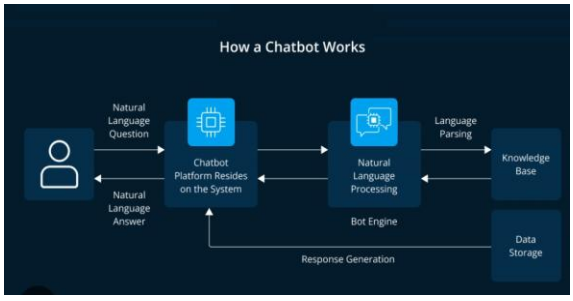

Fig 5.1: FAQ Chat Bot Process

VI. SYSTEM DESIGN AND ARCHITECTURE

The system's functionality is initiated when a user enters a query into the front-end web browser. This query is passed to the Botpress Engine, which helps in identifying the user's intent and derives any required slots from the query. The necessary data is then extracted from the database, and the conversation manager provides the final response to the user. NLP allows the chatbot to deduce the user's purpose and retrieve the most appropriate response from its database by recognizing the message's syntax, semantics, and intent.

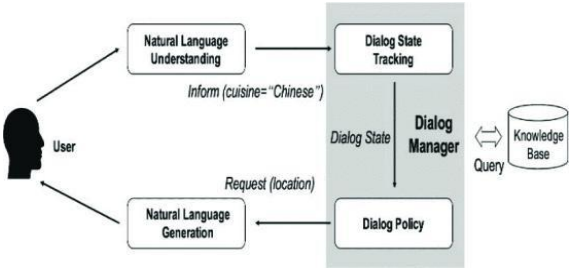

Fig 6.1: System Design

VII. RESULTS AND DISCUSSION

The system was implemented using Python and Django. The development server was started, and the application was accessed via a web browser. The user interface includes an admin login page and the main voice chat recorder interface. After logging in, the user can interact with the chatbot using voice commands by enabling the microphone. The system records the user's query, processes it, and displays both a recommended text question and the chatbot's text-based answer. The audio of the chatbot's response can also be played back.

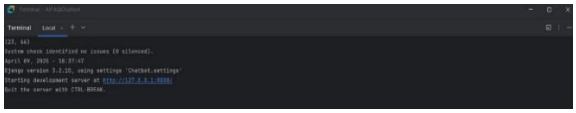

Fig 7.1: Terminal

In the above screen, the Python web server is started and now open browser and enter URL as http://127.0.0.1:8000/index.html and press enter key to get below page.

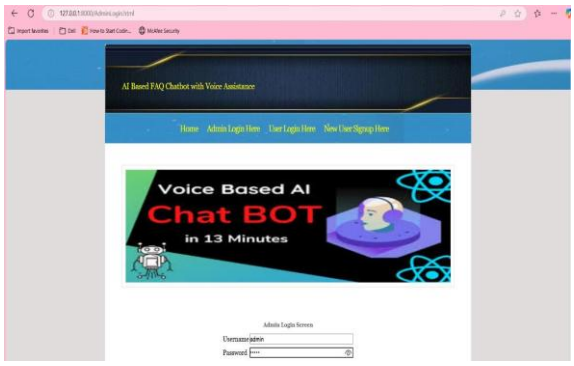

Fig 7.2: Admin Signup Page

In the above screen, the admin login page is shown

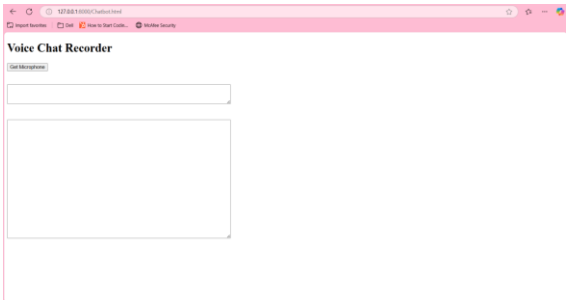

Fig 7.3: Voice Chatbot Interface

In the above screen, the user can click on 'Get Microphone' link to connect to microphone and get below page.

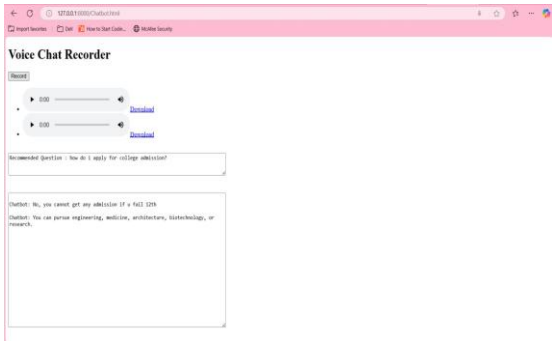

Fig 7.4: Voice Chatbot Interaction and Response Display

In the above screen, I sent some queries and then got replies from Chatbot and all those queries you can listen by clicking on Play button and can get recommendation question in first textbox. Similarly, you can follow the above screens.

VIII. TYPES OF TESTS

1. Unit Testing:

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is structural testing, which relies on knowledge of program construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

2. System Test:

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the Configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

3. White Box Testing:

White Box Testing is a testing in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

IX. CONCLUSION

This research study successfully developed an AI-powered student assistance chatbot using the Botpress tool for easy integration into a WordPress website. The primary goal was to alleviate the challenges faced by parents and students during the college admission process by providing all necessary information through an efficient and user-friendly interface. This bot addresses FAQs related to admission, fees, and accommodation. The bot proved to be a valuable tool, especially for students from remote areas, as they can now easily obtain information by interacting with it. The addition of a chatbot also increases the overall user-friendliness of the website. As machine learning and AI continue to advance, the capabilities of chatbots in smart communication systems will naturally evolve, making them more proactive and intelligent.

X. FUTURE SCOPE

Future work will focus on improving the accuracy of the bot's Natural Language Understanding (NLU) and adding new categories based on user needs. The chatbot's functionality could be expanded by linking it with social media platforms like Facebook Messenger and WhatsApp. Enhancing speech recognition and voice features will further improve user experience.

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