

Voice Based Interactive system for college

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ABSTRACT

Students in the post-COVID world find it difficult to physically visit a college for any type of college information, such as scholarships, admissions procedures, and so on. It is indeed difficult to search and extract such information for someone who is not a student or employee there. Furthermore, the workload on office administration grows significantly, and it is no longer able to address more than 2-3 student's inquiries at a time. So, a virtual interface, such as a 'Chatbot' or a 'Voice bot' comes into the picture.

Nowadays people to engage with systems in an escalating number of ways via chatbots and voice assistants rather than visiting or interacting manually. This system proposes the development of a voice-based interactive system for colleges that can answer queries in regional languages. The system aims to bridge the language barrier that often exists in higher education institutions, especially in countries where multiple languages are spoken.

The proposed system utilizes natural language processing (NLP) and speech recognition technologies to interpret the user's spoken query and respond with relevant information in the user's preferred regional language. The system can help students and their parents to quickly and efficiently obtain information, such as courses offered, fee details, admission procedures, and more.

Keyword: - NLP, voice bot, Speech Recognition, Regional languages.

1. INTRODUCTION

In today's increasingly interconnected world, higher education institutions serve a diverse range of students and staff, many of whom may speak different languages. However, communication and accessibility in these institutions can be hindered by language barriers that make it difficult for users to access information or communicate effectively. As a result, institutions of higher education often face the challenge of communicating effectively with a multilingual population, especially when it comes to providing information and support in a language that the students are comfortable with.

Students in the post-COVID world find it difficult to physically visit a college for any type of college information, such as scholarships, admissions procedures, and so on. It is indeed difficult to search and extract such information for someone who is not a student or employee there. Furthermore, the workload on office administration grows significantly, and it is no longer able to address more than 2-3 student's inquiries at a time. So, a virtual interface, such as a 'Chatbot' or a 'Voice bot' comes into the picture.

To address this challenge, we propose the development of a voice-based interactive system for colleges that can answer user queries in regional languages. The system utilizes cutting-edge technologies such as natural language processing (NLP) and speech recognition to provide a user-friendly interface that enables users to easily access information on placement details, courses offered, admissions, and more. By enabling users to speak in their preferred regional language, the proposed system aims to bridge the language gap that often exists in higher education institutions, and to enhance overall user experience. Overall, the proposed system is intended to enhance the overall user experience in higher education institutions, by providing a user-friendly interface that can be accessed by anyone. The system can potentially improve communication and engagement with students, especially those who are not fluent in the dominant language.

1.1 OBJECTIVE

- The main objective of this system is to develop a voice bot that answers all the queries of the users related to the college.
- This interactive voice based system responds to the users in the native language like Kannada and Hindi.

1.2 DRAWBACKS OF THE EXISTING SYSTEM

Existing voice-based interactive systems for colleges in regional languages may have several drawbacks. Here are some common limitations:

Limited Language Support: Many existing systems may have limited language support, especially for regional languages. This restricts the accessibility and usability of the system for students and faculty who primarily communicate in regional languages.

Accuracy and Understanding: Voice recognition and natural language understanding technologies may not be as accurate or robust when it comes to regional languages. They may struggle to accurately understand and interpret the nuances and accents of different regional dialects, leading to misinterpretation of user commands or queries.

Technical Infrastructure and Connectivity: Implementing voice-based systems in regional languages may require a robust technical infrastructure, including high-quality microphones, servers for speech recognition, and reliable internet connectivity. In regions with limited technological resources, these requirements may pose challenges and impact the overall performance of the system.

Training Data Availability: Developing accurate voice recognition and natural language processing models for regional languages often requires substantial amounts of training data. Availability of such data for regional languages may be limited, making it difficult to train robust models that perform well in real-world scenarios.

2. LITERATURE SURVEY

i. College Enquiry Chatbot

According to Ms. Ch. Lavanya Susanna Et al. A Student chatbot project is developed with the help of a code igniter which is widely called as a php framework. It analyses the user queries and also perceives user messages. [1]. As per Prof. Ram Manoj Sharma Et al. proposal, a college enquiry chatbot system that was made using AI (Artificial Intelligence) algorithms and included few modules like Online chatbot, Online Noticeboards, etc. [2]. P. Nikhila Et al. have collectively designed a chatbot using AIML (Artificial Intelligence Mark-up Language) to make a response to user queries. Here, to customize the Alice bot that could be a chat-bot application supported Alice free code the AIML was used.

ii. Speech to Text recognition

This approach aimed to apply Speech to Text Recognition (STR) for individual oral presentations and group discussions of students in a synchronous cyber classroom. An experiment was conducted to analyse the effectiveness of applying STR on learning performance. Student's perceptions and behavioural intentions toward using STR were also investigated. The results revealed students of the experimental group performed significantly better compared to the control group students in two sessions of writing essays, intermediate test and post-test. Most of students perceived that STR was useful for individual presentations and for essays writing. Students also expressed they are willing to use the STR for learning in the future. However, the students who obtained transcripts with low accuracy rate and experienced delay in STR-text generation did not perceive the STR as easy to use and useful for group discussions. Meanwhile, the results of this study showed that the STR is beneficial to students' oral presentations and group discussions in a synchronous cyber classroom so as to improve their overall learning performance.

3. METHODOLOGY

In this proposed concept effective way of implementing a voice bot, Speech Recognition library has many in-built functions, that will let the bot understand the command given by user and the response will be sent back to user in voice, with Text to Speech functions. When voice bot captures the voice command given by user, the under lying algorithms will convert the voice into text.

The system design consists of :

- Taking the input as speech patterns through microphone.
- Audio data recognition and conversion into text.
- Comparing the input with predefined commands.
- Giving the desired output.

The initial phase includes the data being taken in as speech patterns from the microphone. In the second phase the collected data is worked over and transformed into textual data using NLP. In the next step, this resulting string the data is manipulated through Python Script to finalize the required output process. In the last phase, the produced output is presented either in the form of text or converted from text to speech using TTS.

The System shall be developed to offer the following features:

- 1) It keeps listening continuously in inaction and wakes up into action when called with a particular predetermined functionality.
- 2) Browsing through the web based on the individual's spoken parameters and then issuing a desired output through audio and at the same time it will print the output on the screen.

Some of the modules imported for the voice based interactive system are mentioned below:

OS : The OS module in Python provides functions for interacting with the os. OS comes under Python's standard utility modules. This module provides a way of using operating system dependent functionality.

Pyaudio: PyAudio is a set of Python bindings for PortAudio, a crossplatform C++ library interfacing with audio drivers. With PyAudio, you can easily use Python to play and record audio on a variety of platforms, such as GNU/Linux, Microsoft Windows, and Apple macOS.

Python Backend : The python backend gets the output from the speech recognition module and then identifies whether the command or the speech output is an API Call and Context Extraction. The output is then sent back to the python backend to give the required output to the user.

Speech to text conversion :Speech Recognition is used to convert speech input to textual output. It decodes the voice and converts it into a textual format which will be understood by pc easily.

The proposed system is supposed to have the following functionality:

- (a) The voice bot asks the user for input and keeps listening for commands. The time for listening can be set according to user's requirement.
- (b) If the assistant fails to clearly grasp the command it will keep asking the user to repeat the command again and again.

There are several steps you can follow to develop a voice-based interactive system for colleges:

- Identify the main objectives and use cases for the system. For example, the system could be used to provide information about the college, such as course offerings and schedules, or to facilitate student services, such as registration and financial aid.
- Determine the target audience for the system. This will help you tailor the content and functionality of the system to the needs of your users.
- Choose a voice platform and develop a plan for integrating it into your existing systems and processes. There are several options available, including Amazon Alexa, Google Assistant, and Microsoft Cortana.
- Design the voice user interface (VUI) for the system. This includes creating a conversation flow and defining the voice commands that users can use to interact with the system.
- Develop the content and functionality for the system. This may involve creating new databases or integrating with existing ones to provide information to users, as well as developing any custom functionality that is required.
- Test and refine the system. This may involve user testing to ensure that the system is easy to use and meets the needs of your target audience.
- Launch the system and provide ongoing support and maintenance. This may involve adding new content and functionality over time, as well as addressing any issues that arise.

The voice based interactive system, on starting, will initially wait for the input to be given from user. If the user gives input command, via voice, the assistant will capture it, and searches for the keyword present in the input command.

If the assistant was able to find a keyword related to the given command, then it will perform the task according to the input, and returns the output back to user, in voice. If not, the assistant will again start waiting for the user to give valid input. Each of these functionalities is having their own importance in the whole system working.

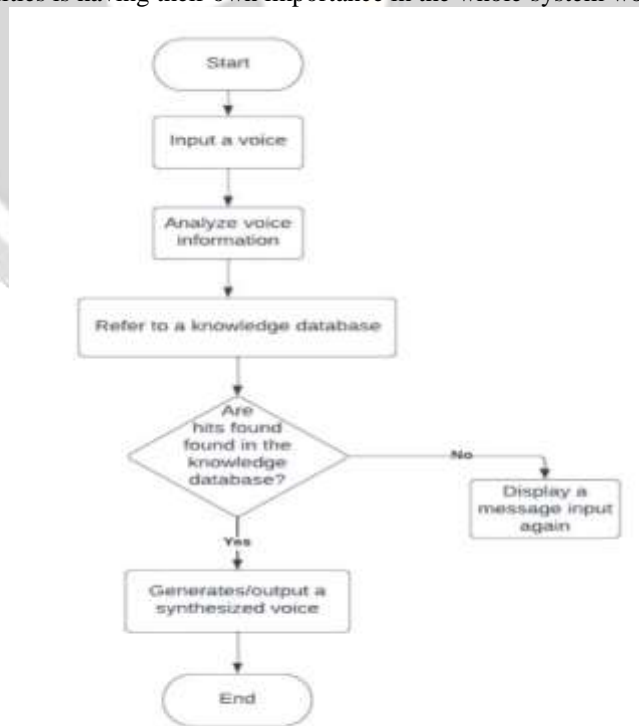


Fig-1 Flowchart for the working of the voice based interactive system

3.1 SYSTEM ARCHITECTURE

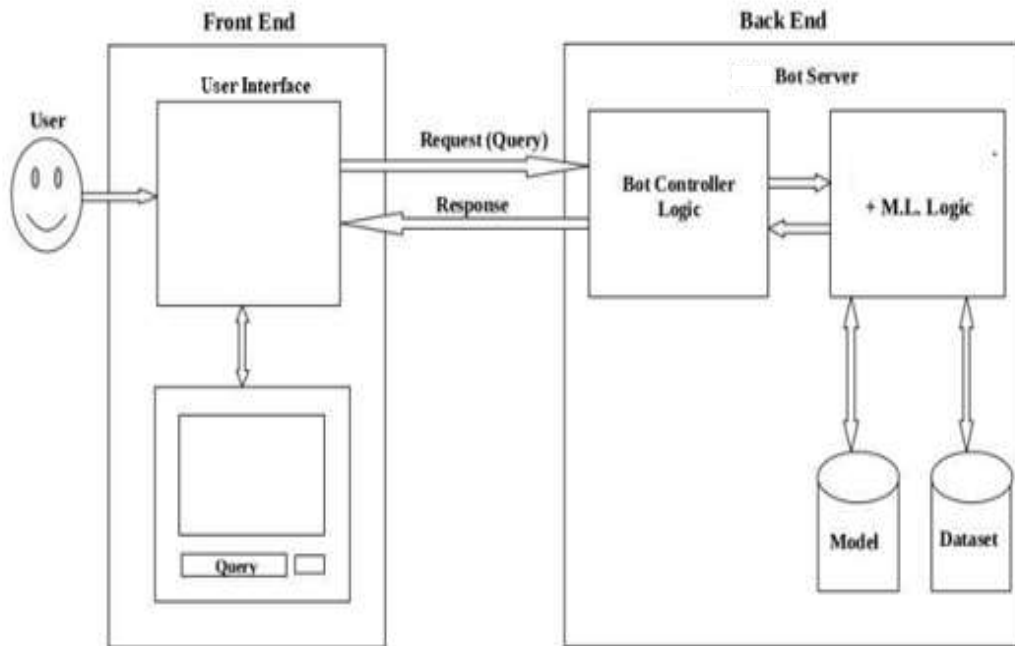


Fig-2 System architecture

System architecture is a conceptual model that defines the structure and behaviour of the system. It comprises of the system components and the relationship describing how they work together to implement the overall system.

Figure shows the System architecture of the proposed model. This voice bot helps the students and the parents to answer about the college in the regional languages. The user gives the input through the voice commands then the voice bot identifies the key word in the given input and searches the keyword in the database. If the keyword is present in the database then it responds back to the user in the regional language

4.CONCLUSION

A Voice based interactive system can help to reduce the workload of administrative staff by automating routine tasks and providing information to users in a convenient and accessible manner. To provide personalized assistance to students and parents with regards to admission, financial aid and other college related queries. This interactive voice-based system responds to the users in the native language like Kannada and Hindi.

Moreover, a voice-based interactive system in regional languages can contribute to the preservation and promotion of local cultures and languages. It helps reinforce the importance and value of regional languages by integrating them into the technological infrastructure of the college. This recognition and support for regional languages can have positive impacts on language retention and cultural heritage. However, implementing such a system requires careful consideration and planning. It involves developing robust natural language processing capabilities, ensuring accurate speech recognition and language understanding in various regional languages. Additionally, providing ongoing maintenance and updates to accommodate language nuances and changes is essential to deliver a seamless user experience.

In conclusion, a voice-based interactive system for college in regional languages can significantly enhance communication, accessibility, and inclusivity within the college community. By embracing linguistic diversity and leveraging technology, colleges can create an environment that empowers individuals from different language backgrounds and enriches the overall experience. As a future scope the system could be expanded to perform a wider range of tasks, such as scheduling appointments and making payments also the regional language-based voice-based interactive system could help students with career services, including job search strategies, resume building.

5. ACKNOWLEDGEMENT

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6. REFERENCES

[1] Ms.Ch. Lavanya Susanna, R. Pratyusha, P. Swathi, P. Rishi Krishna, V. Sai Pradeep, "College Enquiry Chatbot", International Research Journal of Engineering and Technology (IRJET), e-ISSN: 2395- 0056, p-ISSN: 2395- 0072, Volume: 07 Issue: 3 Mar 2020 pp 784-788

[2] Assistant Prof Ram Manoj Sharma, "Chatbot based College Information System", RESEARCHREVIEW International Journal of Multidisciplinary, ISSN: 2455-3085 (Online), Volume-04, Issue03, March-2019, pp 109-112.

[3] Bhalotia Shashank, Ashish Pal and Shreya B., "Implementation of a Chat Bot System using AI and NLP", International Journal of Innovative Research in Computer Science & Technology (IJIRCST), Issue.3, Vol.6, May 2018.

