A Survey on Campus Companion

Mrs. G. Ramanjinamma[1], Anushree G M[2], Mandara K S[3], Manisha G N[4], Pavithra A S[5]

[1]*Assistant Professor, Dept of Computer Science, K S Institute of Technology, Bengaluru, Karnataka*

[2, 3, 4, 5]*Dept of Computer Science, K S Institute of Technology, Bengaluru, Karnataka*

Abstract: Chatbots are expert systems designed to understand and respond to user queries in their own language, engaging in conversations similar to human interactions. This chatbot offers two modes of interaction, text and audio, enhancing user experience, particularly in answering through voice messages. College bot project addresses the challenges faced during the academic admission procedure at our institute, especially for parents residing in different locations. The system aims to provide a platform for students and parents to ask questions and resolve doubts using simple English text messages or audio commands, reducing the need for physical visits to the inquiry window.

Chatbots, powered by Artificial Intelligence, gather responses with each user interaction, continuously improving their accuracy. This project's primary goal is to implement a chatbot feature and API for K S Institute of technology, demonstrating the application of Artificial Intelligence and Machine Learning in enhancing service delivery. The chatbot selects responses by matching input to known statements using WordNet and a database of predefined responses. It leverages Natural Language Processing and Machine Learning techniques to communicate with users in natural language and generate relevant responses.

Keywords: Chatbot, College chatbot, Artificial intelligence, Machine learning, WordNet, Natural language processing, Natural language understanding, Pattern matching technique.

I. INTRODUCTION

In recent times, the field of artificial intelligence (AI) has witnessed remarkable progress, particularly in the realms of inter-networking and information technology. These advancements have ushered in a new era of AI systems, demonstrating an increasingly sophisticated ability to understand and interact with human behavior. From decision support networks to robotics and natural language processing (NLP), AI has made significant inroads into various facets of our daily lives. What makes this journey of AI particularly fascinating is the integration of NLP and intelligent systems, enabling them not only to autonomously learn and adapt but also to draw insights from a vast repository of electronic documents available on the web.

Among the standout achievements of AI, chatbots, often referred to as talkers, Bots, or Artificial Conversational Entities, have garnered significant attention, especially in the educational domain. These AI programs are designed to emulate human interactions, engaging in both text-based and voice-based exchanges using sophisticated AI techniques, including NLP, image and video processing, and voice analysis. In educational institutions, the development of chatbots within administrative systems has revolutionized the way students and faculty interact with the institution's services. These intelligent chatbots, empowered by cutting-edge AI algorithms, excel at addressing student queries promptly and accurately, offering a user-friendly platform that simplifies the process of seeking information. Gone are the days of cumbersome searches on institutional websites; these chatbots streamline the entire experience, making it accessible and efficient. To access this virtual assistant, users simply need to register and log in, granting them access to a range of dedicated help services, covering various aspects of institutional life, from admissions to academics and social events. The chatbot interacts with users through an intuitive Graphical User Interface (GUI), ensuring that inquiries related to institutional matters are easily accessible. With its ability to provide timely and relevant information, these chatbots play a pivotal role in keeping students and stakeholders informed about institutional affairs. This not only underscores the remarkable capabilities of artificial intelligence but also significantly enhances the interactions between humans and machine systems, contributing to an improved user experience.

II. RELATED WORKS

The current assessment of virtual assistants (VAs) revolves around three primary dimensions: user experiences [3-5], performance expectations (references 7-8), and concerns related to privacy [9-10]. It has been observed that users tend to exhibit higher levels of satisfaction when utilizing VAs for simpler tasks rather than complex ones that involve dialogue-based interactions [3]. In another study [4], researchers investigated the usage experiences with VAs in a non-English language context, specifically in a Danish-speaking environment.

They found that such interactions are relatively infrequent, occurring on average approximately once a month, and user satisfaction in this scenario is considered moderate. This moderate satisfaction primarily stems from the VAs' limited ability to comprehend non-native languages. Additionally, a separate researcher, as referenced in [11], conducted a comparative analysis involving VAs from different manufacturers and evaluated various types of services. The findings revealed issues functionality of certain services, and the accuracy of the VAs. Collectively, these factors have a notable impact on the usability and overall utility of virtual assistants.

Another area of ongoing research is centered on evaluating the quality of virtual assistants (VAs, specifically concerning performance expectations. Many researchers have endeavored to enhance the quality of speech recognition, as reflected in studies [12-14]. Furthermore, certain researchers have explored the use of artificial intelligence as a means to facilitate smooth, natural dialogues between humans and VAs [16-17]. In addition, authors in [18-19] have taken an information retrieval perspective, analyzing VA performance by examining voice-log data and identifying voice interaction sessions. It's worth noting that the research direction in the Quality of Experience evaluation of VAs appears somewhat fragmented, with a predominant focus on developing advanced speech recognition systems rather than placing greater emphasis on their overall usability.

Addressing the insulation aspect of virtual assistants (VAs) is the third key area that has garnered significant attention. In the era of the Internet of Things (IoT), insulation measures are crucial for individual users [20]. Consequently, numerous researchers have endeavored to assess the impact of insulation on the handover and continuous operation of VAs [9-10, 21-22]. These studies collectively demonstrate a strong correlation between insulation and user acceptance, which has led to a concerted effort in designing scripts for VA operations that conserve insulation [23-24]. While the relationship between insulation risks and user acceptance of VAs is well-established, there remains a question about whether these risks influence the overall usability of VAs.

III. OBJECTIVES

The primary objectives of implementing a college chatbot are multifaceted and aimed at enhancing various aspects of the educational institution's administrative and student support functions. First and foremost, college chatbots are designed to provide a seamless and efficient means of addressing student inquiries and concerns. These chatbots offer immediate and accurate responses to questions related to admissions, course registration, academic schedules, and other essential services. By doing so, they reduce the workload on human staff, prevent unnecessary congestion, and improve overall service quality, contributing to a more streamlined and user-friendly experience for students.

Secondly, college chatbots aim to enhance accessibility and availability. By providing round-the-clock assistance, these chatbots eliminate the need for students to adhere to specific working hours or wait in long queues for support. Students can easily interact with the chatbot through web browsers on their laptops or smartphones, posing their questions in natural language and receiving accurate responses. This accessibility not only caters to the needs of a diverse student population but also ensures that students can seek information at their convenience, ultimately improving their satisfaction with the institution's services. In summary, the objectives of college chatbots revolve around improving administrative efficiency, enhancing accessibility, and ensuring students' prompt access to information, ultimately contributing to an enhanced overall educational experience.

IV. METHODOLOGY

The interaction between a chatbot and its user is shaped by the chatbot design process. Chatbot designers are responsible for crafting the overall interaction experience, defining the chatbot's personality, and determining the questions that users will be presented with. To streamline this design process, designers make use of dedicated chatbot design tools, which facilitate team collaboration, offer immediate previews, and support video export capabilities. Conducting user testing is a vital component of chatbot design, enabling designers to gather valuable feedback and make necessary improvements.

A. Bot Client

Users have the option to engage with the system through a graphical user interface (GUI). In this interface, they can enter their queries or doubts into a provided text box. When the user submits a query, the system routes the request to the conversation interface for further processing and handling.

B. Conversational Interface

Conversational interfaces are platforms capable of engaging in human-like conversations. Typically, users rely on Graphical User Interfaces (GUI) to issue commands to computers, which then interpret these commands and execute the desired actions.

However, in the case of conversational interfaces, users can communicate with computers using their natural language instead of issuing commands or relying on GUI interactions. To make this possible, Natural Language Processing (NLP) is employed, enabling computers to comprehend the meaning of user inputs and carry out tasks accordingly. Given the inherent ambiguity of human languages, it can be challenging for computers to consistently grasp the precise meaning of user inputs, a phenomenon known as Natural Language Understanding (NLU).

C.   Service Gateway

Dialogue definition

A computer system designed for human interaction is referred to as a Dialogue System. The phases within a dialogue system encompass the following:

Users articulate their queries in plain English using the system's microphone.

The Automatic Speech Recognizer (ASR) converts the spoken input into plain text.

A Natural Language Understanding unit (NLU) analyzes the transcribed text.

The Dialog Manager takes charge of interpreting semantic information, maintaining the dialog's history and state.

Task Managers, possessing expertise in specific domains, are engaged by the Dialog Manager.

The Dialog Manager employs an Output Generator to create responses.

Finally, the generated output is rendered with the assistance of an Output Renderer and presented as a response to the user.

D.   Knowledge Extraction

Structured relational databases and XML documents play a pivotal role in the process of knowledge extraction and creation.

V.   ACKNOWLEDGEMENT

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