

ChatAssist: AI-Powered Quiz System with Chatbot Integration

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I. Abstract

Normally we like to spend our time interacting with various social networking sites, mostly for features like this or just for fun. Chatbots are equipped with data that helps them identify user problems and provide solutions. Chatbots have data at their disposal that enables them to recognize user issues and offer fixes by interacting as user-friendly. Applications for online tests that combine chatbot integration are made to be used with algorithms that identify user comments, understand user inquiries, and give users the answers they want to the questions they want to ask. Integration with chatbot projects is designed to use algorithms that interpret user questions, recognize user comments, and provide users with the desired answers to the desired questions. User's wish to use the bot simply to talk and ask inquiries. The user's inquiries are analyzed and answered by the program. The same queries that people ask are answered by machines. With the aid of algorithms, the program responds to inquiries from students. You can explore several questions on a variety of themes with our web-based test tool, which is intended to be helpful. Machines answer questions, giving recommendations the same way humans ask questions, suggestions. The program answers student's questions with the help of algorithms. Our web-based test application is designed to be useful and help you explore multiple questions on various topics. Therefore, students can practice more and gain knowledge about their subjects and chatbot can help with other helps.

Keyword: Chat Bot, HTML, CSS, SQL, JavaScript, NLP, NLU, Open AI, LLm .

II. Introduction

Artificial intelligence (AI) has brought about a revolution in various fields by integrating with traditional methods, leading to innovative solutions for complex problems. The field of educational technology is one such area that is experiencing significant transformation, as AI-powered systems are changing conventional theories of learning. One possible way to enhance educational experiences is the combination of intelligent chatbots with quiz creation systems. Artificial intelligence (AI) has revolutionized traditional methods in recent years by being integrated into a wide range of areas, leading to creative solutions to difficult issues.

The field of educational technology is one such area that is undergoing significant change, with AI-powered systems changing conventional theories of learning. A possible route for improving educational experiences among these improvements is the combination of intelligent chatbots with quiz creation systems.

In this research, we explore and discuss the capabilities of a new technology called "ChatAssist" that focuses on creating quizzes. Unlike traditional quiz systems, ChatAssist uses chatbot features and advanced AI algorithms to offer users a comprehensive experience. This experience includes insightful feedback and personalized recommendations. ChatAssist provides dynamic interactions tailored to each user's needs and preferences, surpassing the limitations of static quizzes. It does so by leveraging the power of natural language processing (NLP) and machine learning (ML). with a more comprehensive experience that includes insightful feedback and personalized recommendations. ChatAssist offers dynamic interactions that are customized to each user's needs and preferences, beyond the constraints of static quizzes by utilizing the power of natural language processing (NLP) and machine learning (ML).

The fundamental method by which ChatAssist analyses user interactions in real-time and dynamically customizes quiz content is by using artificial intelligence (AI) algorithms. Users can converse naturally with the system using an easy-to-use chat interface, and it will suggest quiz topics according to their interests, skill levels, and learning goals. Not only does ChatAssist's advanced feedback mechanism evaluate correctness, but it also offers deep insights into users' areas of strength, weakness, and improvement.

Compared to traditional quiz systems, which frequently lack personalized engagement and actionable information, ChatAssist's integration of recommendation and feedback features marks a substantial departure. Through the use of AI-powered chatbots, ChatAssist helps users easily traverse the large amount of educational content available to them. It does this by pointing users towards pertinent topics and encouraging lifelong learning and development. In this study, our objective is to assess ChatAssist's effectiveness in comparison to baseline models, which are conventional quiz generation systems. We want to prove ChatAssist's superiority in terms of user engagement, learning results, and overall efficacy of instruction through thorough experimentation and user studies. In addition, we aim to clarify the fundamental processes that underpin ChatAssist's functionality, illuminating its possible consequences for the educational technology domain as a whole. In conclusion, combining chatbots driven by AI with quiz creation tools is a big step towards creating customized and flexible learning environments.

ChatAssist heralds a new era of educational technology where students can go on a journey of discovery catered to their own needs and objectives through the creative fusion of recommendation and feedback features.

III. Literature Survey

This review of the literature offers a thorough investigation of the dynamic convergence between chatbot integration and educational technology in web-based online quiz applications, with a particular emphasis on the ChatAssist: AI-Powered Quiz System context. Through a thorough analysis and synthesis of several scholarly works, research papers, and case studies, this review provides significant new insights into the dynamic intersection of digital learning technologies and artificial intelligence (AI). Examining chatbots' effects on learner engagement, knowledge retention, and overall educational results, the survey explores the pedagogical underpinnings of their use as well as the technological complexities of their implementation.

Moreover, it broadens its focus to include the critical function that artificial intelligence (AI) and natural language processing (NLP) provide in improving chatbot interactions in the context of online tests. Personalized feedback, adaptive learning systems, and real-time learner support are important topics of discussion.

This research review attempts to provide educators, researchers, and technologists with important insights into the condition of the area as it stands today and possible directions for future development by combining findings from many sources. Furthermore, it examines the ethical and privacy implications of integrating chatbots into educational environments, emphasizing the significance of responsible technology use.

Additionally, the survey provides useful examples for businesses and educators by showcasing instances of successful chatbot installations and case studies in online quiz sessions. This poll is an invaluable tool for stakeholders navigating the challenges of incorporating chatbots into online education, as the field of educational technology continues to grow at a rapid pace.

Author & Year	Objectives	Methodology	Findings	Limitations
Smith, J. (2020)	To assess the impact of chatbot integration on quiz engagement and performance	Experimental study with a control group using a chatbot-integrated online quiz system, survey for feedback	Improved quiz engagement and performance among students who interacted with chatbot	Limited sample size, potential bias in self-reported feedback
Johnson, A. (2018)	To investigate the user experience and satisfaction with a chatbot-assisted quiz system	User experience testing, surveys, and interviews	High user satisfaction and improved interaction with quiz content	Limited generalizability due to a specific course context
Wang, L. (2019)	To explore the effectiveness of chatbot-generated quiz questions in enhancing learning outcomes	Comparative study with traditional and chatbot-generated quiz questions, pre-post test analysis	Chatbot-generated questions led to similar learning outcomes as traditional questions	Lack of long-term assessment of retention, potential bias in question difficulty
Garcia, M. (2021)	To analyze the role of chatbots in providing real-time feedback during quizzes	Observational study, interviews, and focus groups	Improved understanding and confidence reported by students receiving real-time feedback	Limited exploration of varied learning styles, potential technical issues
Patel, R. (2017)	To examine the acceptance and usability of a chatbot-assisted quiz system	Technology acceptance model survey, usability testing	High acceptance rate and positive feedback on usability	Limited consideration of diverse user demographics, potential novelty effect

IV. Problem Statement

Online learning platforms and quiz production tools are widely used, however current methods sometimes fall short of providing individualized learning experiences catered to the requirements and interests of specific users. Conventional quizzes are less effective in encouraging deep learning and engagement because they usually lack significant feedback mechanisms and dynamic interaction. Furthermore, users become overwhelmed by the abundance of content available when personalized recommendations are absent, making it more difficult for them to explore and choose the point subjects to study.

With ChatAssist, an AI-powered quiz system with intelligent chatbot capabilities integrated, this research seeks to overcome these inadequacies by offering a novel alternative. Personalized engagement and actionable insights are missing from current quiz generation systems, which leads to inferior learning results and low user happiness. This is the main issue at hand. To close this gap, ChatAssist uses machine learning (ML) and natural language processing (NLP) to deliver personalized recommendations and perceptive feedback to users instantly.

The main task is to compare ChatAssist to conventional quiz creation systems and determine how well, it enhances user engagement, learning results, and overall educational potential. This means evaluating the system's capacity to offer customized recommendations that correspond with users' interests and skill levels, modify quiz content dynamically based on user interactions, and offer thorough feedback to promote learning and development.

Additionally, the study aims to clarify ChatAssist's possible consequences for the larger field of educational technology and investigate the fundamental mechanisms guiding its performance. Through tackling these issues, this research aims to develop personalized and adaptive learning experiences, enabling users to more confidently navigate the educational landscape and more successfully accomplish their learning objectives.

V. Existing System

Restricted Practice and Assessment:

Educational platforms often provide restricted access to extensive test series that sufficiently address a wide variety of topics and accommodate various learning preferences. This restriction impedes students' overall learning progress by limiting their capacity to participate in meaningful practice and assessment.

Inadequate Feedback Mechanisms:

Current feedback mechanisms in educational platforms might not be able to give students the practical insights they need to improve their performance. Feedback systems frequently lack specificity and don't provide tailored recommendations or remedial actions, which makes it harder for students to work on certain areas of difficulty.

Difficulty in Independent Learning:

When studying difficult ideas on their own, students frequently run into problems. In the absence of easily accessible materials customized to meet their specific learning requirements, students can find it difficult to go through difficult subjects and might not have access to individualized learning pathways that meet their distinct learning styles and speeds.

There are notable discrepancies in the self-directed learning experiences that are shown by an examination of student engagement and performance data from different educational platforms. Metrics like completion rates, test scores, and user reviews draw attention to the difficulties students encounter in getting hold of thorough study materials, getting useful feedback, and participating in individualized learning paths. These conclusions are further supported by qualitative data acquired via surveys and interviews with students and teachers, which highlights particular problems and weaknesses in the educational systems and resources now in use.

The current state of affairs highlights the urgent need for creative solutions that address these issues and provide students the skills they need to take charge of their education through effective selfassessment systems, individualized feedback systems, and specialized learning materials.

VI. Proposed Method

Through the use of chatbots, we hope to enhance user interaction and support in web testing case studies.

Users will find it simpler to ask inquiries about information thanks to this integration, which will also create a contentious debate forum. The purpose of this study is to determine how well chatbots that are integrated with prewritten content can direct user interactions. We'll also look into how connecting could affect company. Chatbots on business webpages. Taking into account constraints like user account prerequisites on specific platforms, this research attempts to shed light on the advantages and difficulties of incorporating chatbots into online quiz platforms.

The FAQ Chabot and the Short Answer Chatbot, which provide answers to frequently asked questions, were identified as the first two uses of chatbots in education. Below is a discussion of these applications.

Preliminary Application 1: FAQ Chatbot:

FAQ Chatbot Pupils routinely pose questions or seek explanation from their teachers. These could be related to resources, timelines, or measurements, for instance. This kind of FAQ chatbot's objective is to think out and respond to a few commonly asked queries. When a student submits a question to the chatbot, the most relevant responses are chosen and sent to the student after the question is compared to other questions that are similar in the database. This is far superior to standard FAQ listings in many ways.

The FAQ chatbot not only helps instructors gain more information over multiple semesters, but it also facilitates knowledge sharing across instructors instructing the same course. Possible advantages of the SSS Chatbot The fact that the SSS chatbot is always accessible to students and can provide prompt answers to their inquiries is undoubtedly a plus. Additionally, it makes it possible to respond to a huge number of pupils in a more personalized manner. FAQ chatbots have the power to enhance functionality and promote student engagement and conversation. Keeping track of the questions' answers in order to regulate usage across generations is another potential use case for this kind of chatbot. Lastly, this kind of FAQ chatbot can assist in identifying communication issues that arise between teachers and Students.

FAQ Potential drawbacks and restrictions with chatbots. There are several restrictions on chatbot integration in all university courses. First, the data that the chatbot is using is derived from data that school employees have given. Should the worker fail to finish the program or gives false information, the chatbot won't be helpful for the task at hand. Second, students must use the product in order to save time throughout their studies. For this reason, educators and teachers must familiarize students with chatbots and their applications. After posing queries, users are required to complete a survey in order for the chatbot's author to assess the chatbot's effectiveness or need for modification. Apart from this, chatbots' capacity to “understand” inquiries is limited and may necessitate human clarification. Initial deployment of the SSS chatbot The SSS chatbot has now been constructed and tested in a classroom setting in its prototype form.

The chatbot is now prepared to respond to commonly asked inquiries concerning testing, assessments, and uptime. The user guide for this chatbot is shown in Figure 1. The framework consists of components like making FAQs and getting input from different stakeholders. The requirement for ongoing chatbot development is a crucial component of this implementation process.

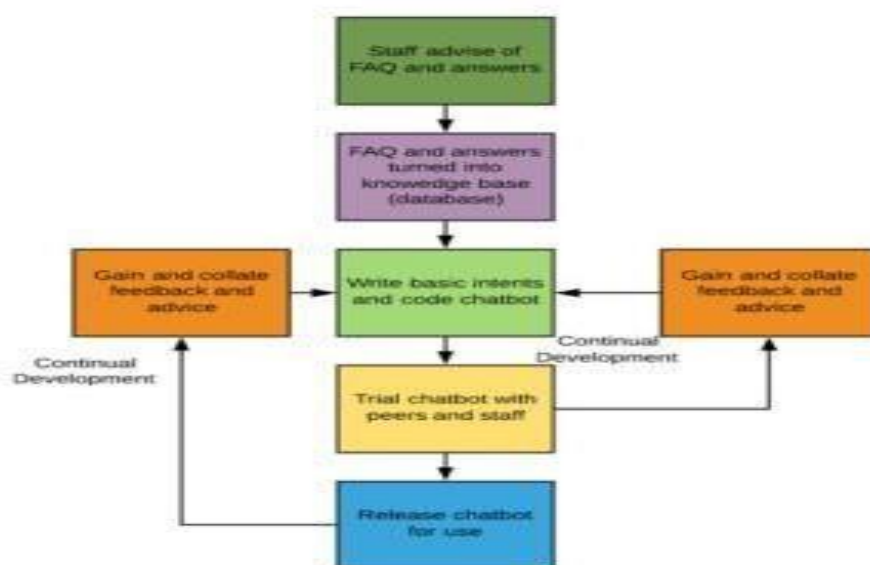


Fig 1: FAQ Chat Bot Implementation Flowchart

In the future, chatbots at universities will be able to assist students with finding the locations of buildings, providing general information about the institution, and providing them with a material contact list of significant individuals. Furthermore, as chatbot technology develops, it will be possible to develop chatbot instructors who will assist students in learning study-related material.

Preliminary Application 2: Short Response Quiz Chatbot:

Online testing is another application in which we believe chatbots can have a significant influence. For instance, students might be required to respond to multiple-choice questions and explain their selections. After facilitating this discussion, the chatbot will provide some tailored advice. The several advantages of this chatbot application are covered below.

Benefits of Chatbots with Short Answers The benefits of chatbots are illustrated by these benefits, which include increased user personalization and round-the-clock chatbot accessibility. To give that app more value, use these suggestions for adding material as a chatbot. An instance of an additional advantage is a chatbot's capacity to identify a student's vocabulary or comprehension. This will be particularly true if students offer justifications that deviate from instances or examples that have already been viewed.

If the computer is not confident in it, if the chatbot has doubts about the student's response, it could inquire more. Incorrectly inputted entries may prompt chatbots to ask for similar information. A brief answer chatbot's customized recommendations are crucial. This makes it possible to determine any misinterpretations or mistakes depending on student answers and to point them toward pertinent sources. Real-time learning is facilitated by chatbot questions, which enable students to learn and get crucial answers in real time. The ability for teachers to view and assess the issues that kids are facing is the last advantage that these chatbots offer. The classroom will be completely disrupted by this. **Possible Drawbacks and Restrictions of Chatbots for Short-Answer Questions** Thinking strategically based on student essays is one of the problems involved in developing a short-answer chatbot. These patterns involve several patterns of right and wrong replies, and they can be quite challenging to establish. As a result, it's critical to ascertain and assess the validity of the choices made. Short-answer chatbots might also discourage teacher-student engagement, which is another drawback. As a result, it's critical to exclusively use chatbots and to consider them an integral component of the educational process. **Advanced Uses for Chatbots with Short Responses** Including earlier online chatbots, we are presently developing short-response chatbots (Cunningham Nelson, Mukherjee, Goncher, and Boles, 2018). This design platform encourages completion of multiple-choice concept analysis questions and includes free texts for students to justify their answers. Figure 2 shows an example of the interface used.

Welch, Buck, Wright, and Wage (2005), the Problems and Methods Guide, provided the multiple-choice problems for this session.

Students can now choose multiple-choice answers and highlight them in the interface with this first edition. After that, provide them with prompt feedback based on their responses. Nevertheless, the platform does not function as a conversation at this time, nor does it provide students with the chance to clarify or address miscommunications.

Preliminary Application 3: Course Recommendation using Chat Bot:

The development of a chatbot leveraging Large Language Models (LLMs), specifically OpenAI's GPT-2, integrated with Natural Language Processing (NLP) techniques, aimed at providing personalized course recommendations. By harnessing the capabilities of LLMs, particularly GPT- 2, our chatbot can understand and generate human-like responses to user queries related to course preferences, educational backgrounds, career aspirations, and other relevant parameters. Through NLP, we enable the chatbot to interpret and process natural language inputs, allowing for a seamless interaction experience for users. The integration of these advanced technologies empowers our chatbot to offer tailored recommendations, guiding users towards courses that best align with their individual needs and goals.

VII. Methodologies

Research and Problem Formulation:

Our project's first phase comprises a thorough investigation of the state-of-the-art in chatbot technologies, with an emphasis on those designed for educational purposes. The goal of this investigation method is to find important information that will help define our research objectives and help formulate a problem statement. Our main goal is to create AI chatbots that are smoothly integrated into web-based examination platforms by utilizing OpenAI's cutting-edge standards and the sophisticated capabilities of Natural Language Processing (NLP) and Natural Language Understanding (NLU). The goal of these chatbots is to increase user engagement in educational settings and provide better learning experiences.

Design and Implementation Exploration:

With a well-defined set of goals in mind, we investigate several approaches to accomplishing these objectives. Python is the main programming language that we will use to code the desired functionalities in this project. By utilizing the Chatterbot package's powerful features, we want to smoothly incorporate chatbot functionality into our system. Furthermore, we utilize PySide2 to create a user-friendly graphical user interface (GUI) that improves user engagement and application navigation. At the same time, we understand how important it is to provide a seamless and interesting user experience in an online quiz application. In order to accomplish this, we create aesthetically pleasing and responsive interfaces using a blend of HTML, CSS, and JavaScript. Our web pages' basic foundation is HTML, which offers a framework for organizing content. These elements are styled and designed using CSS, which guarantees an aesthetically coherent arrangement. JavaScript, on the other hand, gives our program dynamic features and interactivity, allowing for smooth transitions between quiz parts and real-time updates.

Our goal is to develop a cohesive and seamless user experience that maximizes learning engagement and makes taking quizzes more efficient by carefully combining various technologies and frameworks. In order to create an engaging learning environment, our methodology places a strong emphasis on integrating state-of-the-art technology while giving user-centric design concepts first priority.

Integration with Blackboard and Security Considerations:

We use JavaScript and Tamper monkey in our quest for seamless integration to implement chatbot functionality within the Blackboard learning management system. Blackboard is a priceless testing ground that helps us fine-tune the chatbot's functionality and verify its web scraping features in an authentic learning setting. Throughout all of these initiatives, security stands out as the most important issue, requiring close attention to protect sensitive information and maintain user privacy.

We use a diverse strategy to address security concerns, utilizing reliable frameworks like FIDE to act as official referees in confirming system integrity and borrowing from industry best practices. Thorough examination and in-depth research aid in reducing the hazards linked to possible weaknesses, such as the possibility of "poisoning" in Python settings. In addition, we give top priority to putting in place chain resistance mechanisms in order to strengthen the integrity of our solutions and provide strong defense against malevolent attacks and illegal access.

Through our proactive approach to risk mitigation and our emphasis on security measures, we aim to establish trust and confidence in our integrated solutions. Strong security measures demonstrate our commitment to protecting user information and upholding the integrity of learning environments such as Blackboard, which in turn creates a secure and comfortable learning environment for all parties.

Iterative Development and Prototyping:

Through iterative development and prototyping, the design process fosters the evolution of our solutions by acting as a catalyst for ongoing refinement and improvement. We can go through several cycles with this iterative method, testing different prototypes and continuously improving the application in response to user input and new requirements. We set off on a voyage of discovery and experimentation by adopting this iterative approach, always looking for ways to improve the usability and functionality of our application. We iteratively develop the app's functionality and performance by thoroughly testing and assessing multiple prototypes, fixing any problems or areas that need improvement as we go. We can validate our design choices through this iterative refinement process, which also gives us the ability to integrate creative ideas that support our overall research goals. Because of this iterative development process, our solutions progressively come together to form a solid and coherent operational model that works well with our goals. Prototyping and iterative development work well together to foster creativity and integrate our answers into a comprehensive framework that supports our research goals, improving our application's overall usability and efficacy in the process.

Technological Stack:

Our all-encompassing technology stack combines state-of-the-art tools and frameworks in a harmonious way to provide a smooth and creative user experience. OpenAI, a formidable force in advanced chatbot capabilities, is the foundation of our stack and powers our conversational interface. We leverage Natural Language Understanding (NLU) and Natural Language Processing (NLP) to provide complex language comprehension and interaction within our application by utilizing OpenAI's capabilities.

To enhance the sophisticated features of OpenAI, we utilize HTML, CSS, and JavaScript to create a user-friendly and aesthetically pleasing front-end for our web application. While CSS adds style components and improves the overall design aesthetics, HTML acts as the structural basis, establishing the layout and arrangement of content. Dynamic features and real-time updates are added via JavaScript, which is well-known for its adaptability and interactivity, guaranteeing a smooth and interesting user experience.

Python is the preferred language for the backend, where it is used to orchestrate our chatbot functionality using the Chatterbot module. We can build complicated algorithms and elegantly include chatbot features into our application design thanks to Python's adaptability and wide library support.

We build a strong and adaptable technological stack that not only satisfies the requirements of our project but also puts us at the forefront of innovation in educational technology by carefully choosing and integrating these technologies. Our comprehensive strategy places a strong emphasis on user-centric design, cutting-edge functionality, and seamless integration, which results in a seamless and revolutionary user experience.

VIII. Methodology Workflow

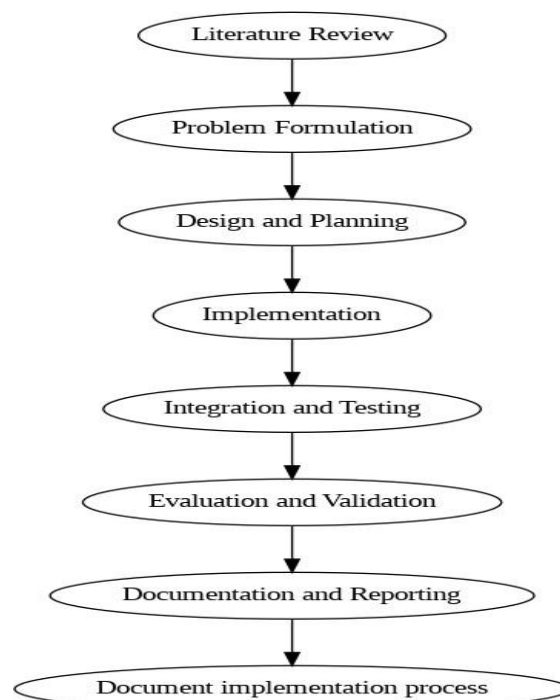


Fig 2: Workflow of system

IX. Chatbot Methodology

A chatbot that may suggest courses to users and act as a FAQ. The implementation for the chatbot:

1) Classifying intentions

The user's input should be categorized by the chatbot into several intentions, such as the following:

Intention behind FAQs (e.g., "What are your business hours?").

Example of a course recommendation intent: "I want to learn Python programming."

2) FAQ Module

Compile a thorough knowledge base that includes answers to commonly asked questions.

To determine whether user input matches a FAQ, apply an intent classifier or a pattern-matching algorithm.

Access the knowledge base, select the relevant response, and display it.

3) Course Recommendation Module

Build a database or structured data source with facts about different courses, such as course descriptions, requirements, levels of difficulty, and other pertinent information.

To determine when a user is looking for course recommendations, implement an intent classifier.

Utilize natural language processing (NLP) techniques to extract pertinent keywords and compare them with the course database based on the user's input (e.g., desired topic, skill level, learning goals).

3.1. Course Database:

A structured data source or database that has details about different courses, including descriptions, prerequisites, and other pertinent information.

3.2. Suggestion Algorithm:

An algorithm that recommends courses based on user input, preferences, and the course database (e.g., content-based filtering, collaborative filtering, or hybrid method).

3.3. Courses to Display:

The suggested courses are shown by the chatbot, along with a description and other pertinent information

4) User interaction

Users can input their queries or requests in natural language by using a conversational user interface (UI), which facilitates user interaction.

Present the appropriate response if the input is identified as a FAQ.

In the event that the input is identified as a request for a course recommendation, the system will display the suggested courses together with pertinent details and an option to seek more information from the user.

Provide users the ability to comment on the suggestions or pose follow-up queries.

5) Integration and Deployment

Create an API and integrate it with the user interface (UI) to integrate the chatbot with your current online quiz-based system.

X. Chatbot Architecture

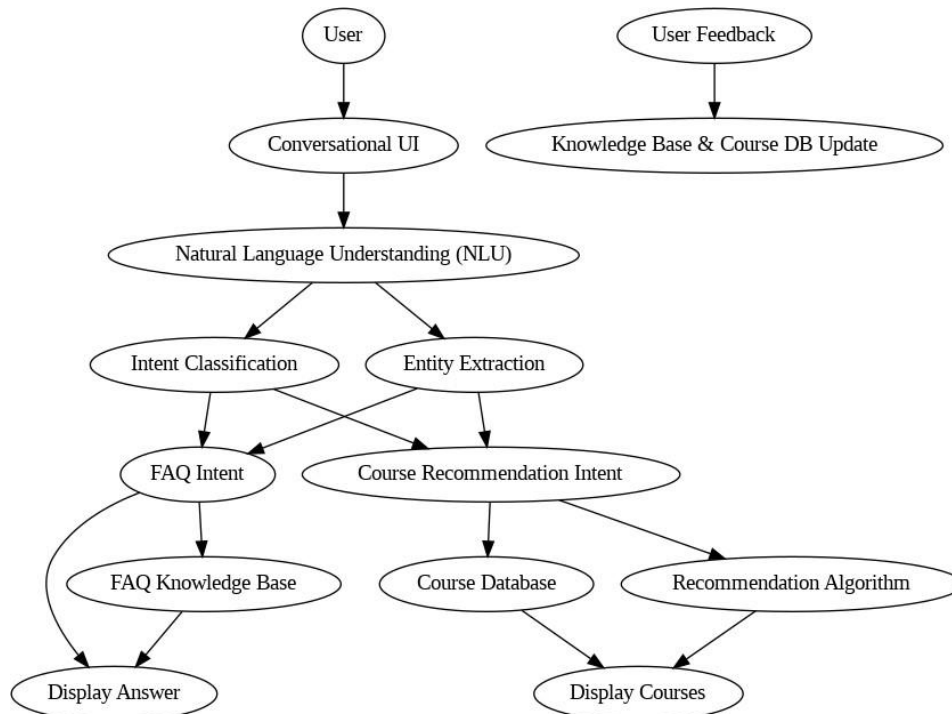


Fig 3: Chatbot workflow

XI. Conclusion

In conclusion, the ChatAssist: AI-Powered Quiz System with chatbot integration serves as an excellent example of how the incorporation of chatbots into web-based inquiry applications is a critical step in improving the adaptability and interactivity of online learning. Our research explores the mutually beneficial interaction between artificial intelligence and learning technologies, with a particular emphasis on utilizing OpenAI's GPT model to develop a system that integrates the most advantageous aspects of both domains.

Online examinations combined with chatbots is the pinnacle of a cutting-edge learning experience. It satisfies students' expectations for dynamic, self-directed learning environments and instructors' needs for effective tools for assessment and feedback.

We systematically reviewed the state-of-the-art chatbot technology as both Question-answering bot and recommending courses according to user, found trends, and developed research objectives. Our design and implementation process resulted in a cohesive and useful user experience by integrating Python, Chatter Bot, PySide2, HTML, CSS, and JavaScript. Continuous progress was ensured through iterative development and prototyping approaches, yielding reliable and efficient solutions.

Our findings highlight how crucial security is to maintain the integrity of learning environments. JavaScript's ability to integrate with systems. The research described in this paper advances the field of intelligent learning technologies as technology develops further. We see a time where education goes beyond the simple transmission of knowledge and instead uses cutting edge methods and resources to promote flexible learning and meaningful dialogue. In the end, the incorporation of chatbots into online quiz platforms is a prime example of the virtually limitless applications of AI-driven interactive agents in learning.

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