VeriBot: AI-Powered Academic Answer Validation System

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ABSTRACT: Veribot is an AI driven bot developed to help students for preparing exams and giving standard answers from the official subject references. Using the langchain approach, Veribot takes input as PDF or DOC forms, and gives the output as correct and precise answers. This is allowing students to cross verify the answers with official academic references. It can be used as a tool in educational institutions. It improves the accuracy and confidence in the examinations.

KEYWORDS: Chatbot, Queries, Accuracy, Artificial Intelligence, Summarizer, Parsing, Ingestion, Processor.

1. INTRODUCTION

AI-driven solutions to enhance learning and academic achievement have been developed as a result of education's growing reliance on technology.AI has been effectively incorporated into the fields of education, including intelligent mentoring programs, automated grading systems, and individualized learning. VeriBot is an artificial intelligence (AI) tool designed to verify test answers for students studying for exams at different universities. The research employs a langchain approach, an AI technique that guarantees precise input processing.

VeriBot allows students to enter their study materials into the system. The system processes input items from PDF or DOC formats. As a virtual teacher, the Veribot reads the input and responds appropriately to the questions posed by the students. The primary objective is to provide students with a trustworthy tool that increases their precision when answering to test questions.

Because of its user-friendly design, students from various institutions may use with the system with easily. In order to reduce mistakes and improve learning results, the project handles the problem of making sure that students' answers align with accepted academic references. VeriBot promotes self-evaluation and a greater comprehension of the subject matter by giving prompt feedback.

2. RELATED WORK

The integration of AI-driven chatbots in educational domains has made great progress and simplified the manual work and able to access a lot of information. Vannala et al. (2022) presented an AI chatbot focused on efficiently answering FAQs across various sectors, leveraging natural language processing (NLP) to improve response accuracy and relevance. The common doubts can be clarified by using AI-driven quick responses from the chatbots. This approach has been effective in customer service and technical support, where reducing response times and improving the customer satisfaction.

Expanding on the application of AI in education, Kesarwani et al. (2023) reviewed a range of student-focused chatbot systems, it shows how these tools influence the learning experience and improve access to information to the students. The authors underscored the adaptability of educational chatbots, noting that they provide a unique advantage in personalized learning by offering on-demand support and customized feedback.

VeriBot builds upon these foundations by addressing the need for document-based, context-aware answer validation within an academic setting. Unlike general - purpose chatbots this targeted approach not only enhances the accuracy of responses but also fosters a more interactive and self-guided learning experience. Furthermore, VeriBot's drag-and-drop In this way, VeriBot represents a significant step forward in adaptive educational technology, filling a notable gap identified in previous research.

3. EXISTING METHODOLOGIES

The existing methodologies mainly revolve around providing general mentoring, answering student questions. These systems focus on improving the learning experience but often lack the correctness required for verifying examination answers based on standard academic materials.

Many educational chatbots use Natural Language Processing (NLP) techniques to read and respond to student queries. The systems, like ELIZA, provide answers using machine learning techniques and algorithms. Due to the lack of extensive integration with reference materials and document-based input, these chatbots are not specifically designed for verifying exam answers, despite their proficiency in general tutoring. But, the chatbot proposed takes main focus on verifying examination answers with respect to a standard reference material.

Certain current systems rely on rule-based strategies, in which certain keywords in student queries are used to generate prepared answers. Due to their relative rigidity, these systems struggle to adjust to sophisticated queries or document-based analysis. Intelligent tutoring systems (ITS) and other knowledge-based systems leverage expert knowledge and organized databases to provide answers to queries. However, they frequently have trouble responding dynamically or confirming responses based on semi-structured or unstructured materials (such as DOC or PDF files). The current approaches are not linked to document-based verification procedures; instead, they usually use an NLP engine or rule-based system to analyze user questions and produce answers.

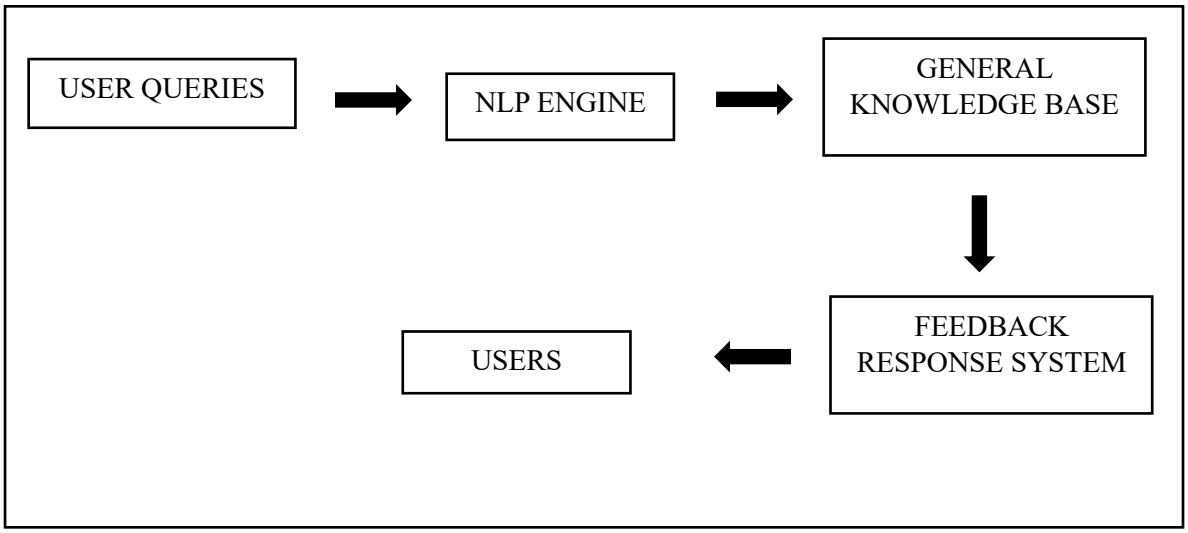

Fig 1 Existing Methodologies

4. PROPOSED METHODOLOGIES

The proposed methodology of VeriBot is centred on enhancing the accuracy of response generation by integrating a Langchain approach that links document processing with intelligent answer verification. Unlike existing methods that rely on generalized knowledge retrieval, VeriBot processes inputted materials in PDF or DOC formats, cross-referencing student answers with these documents to ensure they align with academic standards. This approach bridges the gap between general tutoring chatbots and specialized exam preparation tools. The core innovation in the proposed methodology is the application of a Langchain-based AI engine that processes input documents (PDF, DOC formats). When a student inputs a document and asks a question from it , the system will uses the NLP techniques to interpret the query and extract keywords These keywords are then searched in the document and checks whether it matches with the students questions.

Semantic similarity algorithms are used to check whether the answers are generated are based on the actual meanings.

Once after the generates the answers it provides the output to the user , if not it asks the user for a clear resource. This takes place in a loop for the many number of questions asked by the user.

The advantages of the system includes the generation of answers from the particular document and handling complex doubts from the users. It also uses document referencing methodologies for generating some feedback to the queries more effectively. This has introduced a new method of learning from documents using the bot. It may also create a new method of learning using this technique. It has also enhanced the exam preparation techniques by introducing document-based learning.

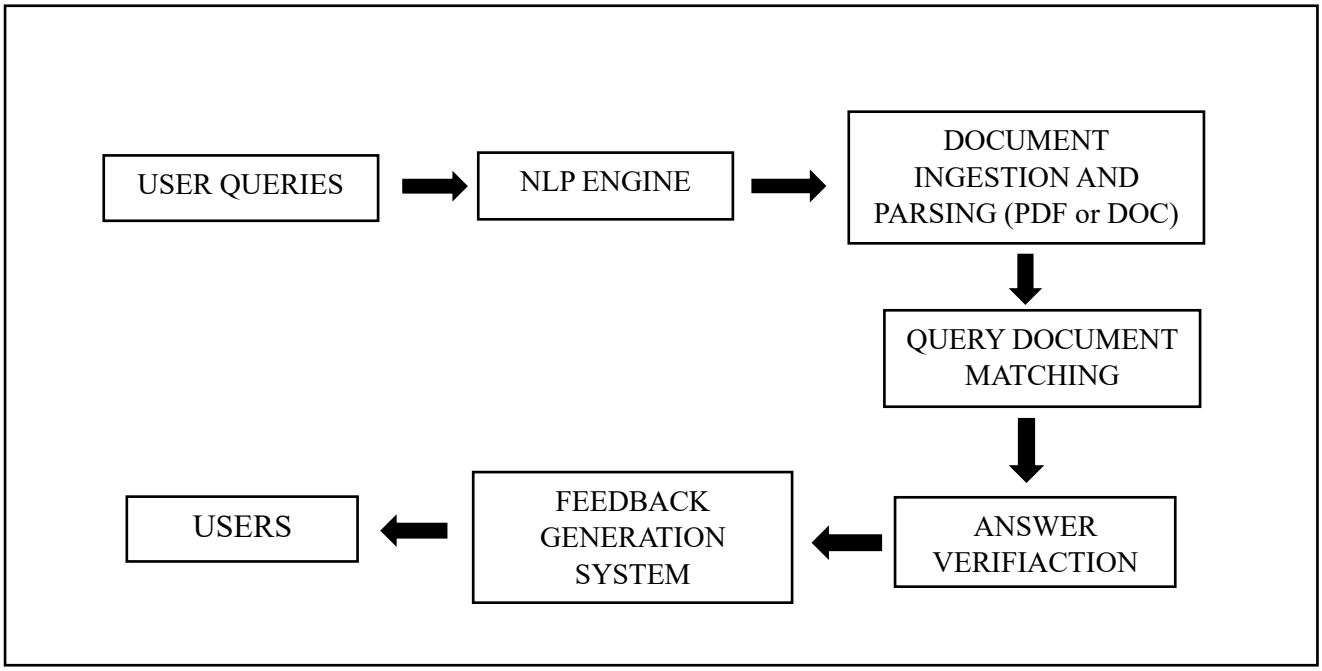

Fig 2: Proposed architecture diagram

5. RESULTS AND DISCUSSION

To check the quality of VeriBot, documents of various subjects were uploaded. It checked whether it worked on various subjects and different languages. The primary criteria for evaluating VeriBot was its ability to correctly identify and verify whether a student's answer matched with the academic content provided in the document.

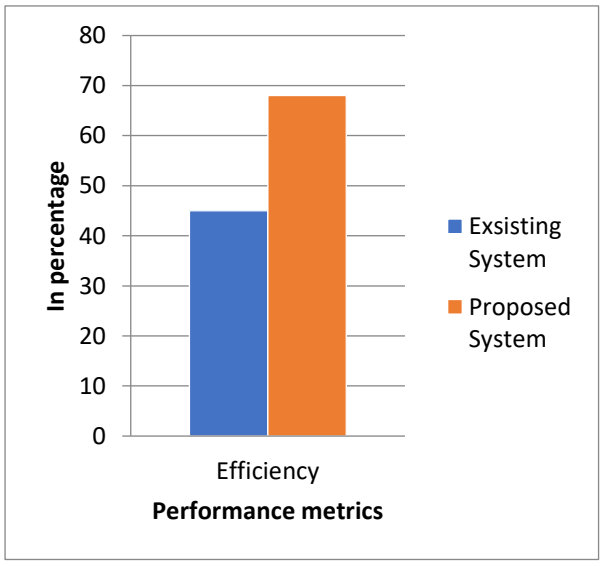

Fig 3: Performance chart

One of the features of VeriBot was the Langchain approach used for document-based learning. VeriBot has ability to process and verify answers based on inputted documents resulted in more accurate and relevant answers.

A important benefit of VeriBot is its ability to understand similar answers, rather than checking for the exact answers. For example, A student has answered a question with correct answer but using different words from the document it is still considered correct. This flexibility encourages great learning, as students are not forced to memorize exact words but are instead they understand the concepts and write answers in their own words. Veribot in the educational field will have great impact on students. Firstly, it encourages the students in self assessing themselves and able to check the places where they make mistakes and lag. Secondly, they will get know what would be concepts to be

written for a particular question and able mover deeper into that topic. When compared to the other chatbots, this Veribot is able generate answers from a particular document and we will be able to set limits for the answer so that the answers don't go beyond the syllabus.

CONCLUSION

Veribot offers a unique and simple solution for the student's answers being consistent in exams and learning concepts correctly and deeply within the boundaries. It also allows us to prepare the answers from the pre-defined official academic references. The use of Langchain ensures a high accurate answer and providing flexibility in using the chatbot.

Veribot has made possible that students able to prepare and verify their answers from a particular document. The Veribot allows us to upload documents as input and generate answers from it.

The integration of the AI-Chatbot in education will improve the student-centred learning and gives confidence to students in learning and writing the tests.

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