# Project EngiBot: Engineering Insights through NLP- driven Chatbot

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*Abstract: A chatbot is an automated system designed to engage with users, offering human-like conversations and promptly responding to their queries based on the input provided. This technology creates a seamless illusion of interacting with a human interlocutor. This chatbot empowers students with the ability to access information about college activities from anywhere with an internet connection. Furthermore, it extends its capabilities to guide engineering students on various aspects, including identifying colleges with the highest salary packages, exploring trending domains within the field, and providing a roadmap for mastering these domains. The development of the college inquiry chatbot involved the utilization of a Natural Language Processing (NLP) system that assesses and understands user questions and messages. Understanding that people interact with varying emotional states and attitudes, chatbots adhere to defined rules, ensuring polite and accurate communication with customers, mirroring human interaction. Additionally, the chatbot offers invaluable insights on the technologies essential for achieving expertise in a specific engineering domain, serving as a comprehensive resource for students in their educational journey. They significantly reduce response times, allowing students to receive prompt and accurate answers.*
*Keywords: Chatbot, NLP, enquiry, query, Machine Learning, User queries, Engineering students.*

## I. INTRODUCTION

In the ever-evolving world of engineering education, students are constantly faced with complex concepts, intricate problem-solving scenarios, and a multitude of queries that demand prompt and accurate answers. Recognizing this need, we present "Project EngiBot," an innovative solution designed to revolutionize the way engineering students access and interact with engineering-related knowledge Project EngiBot, "Engineering Insights through NLP-driven Chatbot," aims to revolutionize the engineering industry by leveraging Natural Language Processing (NLP) to provide engineers and enthusiasts with instant access to up-to-date information, cross-disciplinary insights, educational resources, and personalized support. In a world overwhelmed by information, EngiBot offers a streamlined solution to empower engineers, helping them stay current, make informed decisions, and connect with a like-minded community, ultimately contributing to professional growth and innovation in the field. Chatbots are commonly known as digital helpers. This application has been pre-configured with your insights, ensuring it's remarkably straightforward to use. It employs methods such as recognizing patterns, understanding natural language, and analyzing data. The chatbot compares the sentences you input with patterns stored in its knowledge base. Each stored pattern has been cross-referenced with the chatbot's broad knowledge, which has been collected from various sources and references.

## II. LITERATURE SUREVY

The integration of chatbots in the educational sphere, particularly for engineering students, has been a subject of growing interest within the academic community. Chatbots, as automated conversational agents, have shown significant potential in assisting students with various academic queries and aiding in their educational journey. Several scholarly articles and studies have focused on the efficacy of chatbots in delivering timely and accurate information. Project EngiBot (2023) devised a college-specific chatbot system tailored to the education domain, illustrating its adeptness in providing accurate and domain-specific responses to user queries. Furthermore, Kesarwan, et al. (2023) conducted a comprehensive review on educational chatbot systems, highlighting their pivotal role in enhancing student engagement and learning experiences Additionally, Kasthuri and Dr. Balaji (year) demonstrated the implementation of an educational chatbot on the Facebook Messenger platform, emphasizing its efficiency in identifying discoverability and characteristics of various engineering domains. Other research by Mallikarjuna Gowda et al. (2021) underscored the applications of chatbots in information technology and telecommunications, focusing on its utilization for conducting web chat conversations and its role in dialog systems for information gathering and customer service. These studies collectively showcase the potential and effectiveness of chatbots in catering to the diverse information needs of engineering students, paving the way for further advancements in the integration of artificial intelligence in educational support systems. The current landscape of literature on chatbots suggests a strong foundation for the development and implementation of an engineering student-oriented chatbot to cater to queries about colleges, domain specifics, and technology roadmaps.
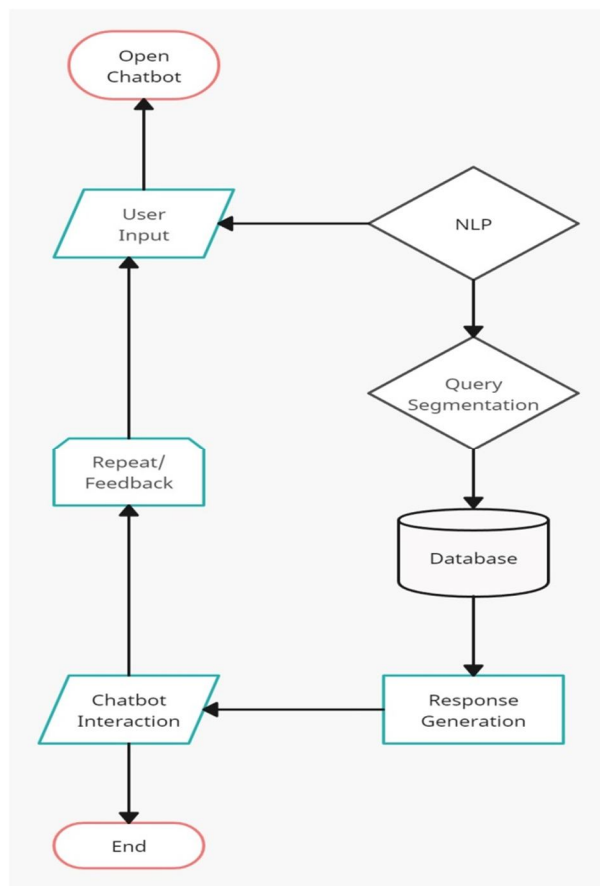
## III.    PROCESSED SYSTEM



Fig 1.  Processed system Diagram

1) *User Input:* The engineering student interacts with the chatbot, posing queries related to colleges, highest packages, engineering domains, and technology learning paths.
2) *Natural Language Processing (NLP):* The user's queries are processed by the NLP module to comprehend the intent behind the questions.The NLP engine categorizes queries based on college details, domain trends, and technology skills.
3) *Query Segmentation:* Based on the categorization, the system segments the queries into specific domains: college details, highest packages, engineering domains, and technology learning.
4) *Data Retrieval:* For college details, the system accesses a database containing comprehensive information about colleges, their activities, and highest packages offered.For engineering domains, the chatbot retrieves details on trending domains and their relevance.
5) *Technology Recommendations:* When users inquire about technology learning paths, the system recommends specific technologies to master within a chosen engineering domain.
6) *Response Generation:* Utilizing the retrieved data, the system generates responses tailored to the user's query, delivering accurate and informative content.
7) *Chatbot Interaction:* The chatbot communicates the responses back to the user, providing detailed information about colleges, domains, technology suggestions, and career roadmaps.
8) *Feedback Loop:* The system encourages user feedback to improve future interactions, enhancing the chatbot's performance and data accuracy.

This flow diagram outlines the architecture and process flow of the chatbot system. The system operates by interpreting user queries through NLP, retrieving specific data related to colleges, engineering domains, and technology suggestions, and providing precise and human-like responses to support engineering students in their academic and career.
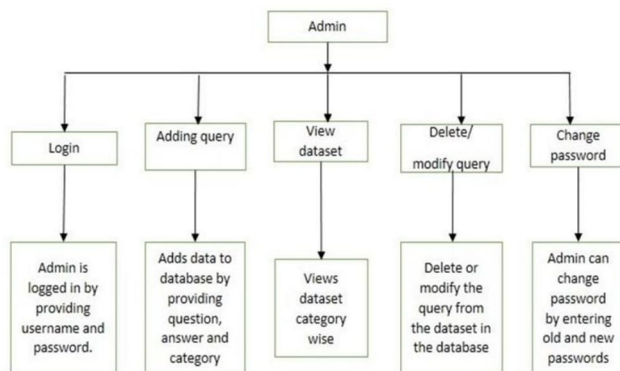
Fig 2. Flowchart for user(Admin)

a) *Login:* Admin can loged in by providing username and password . Admin are able to log in only of username and password is valid. If the detail are matching with dataset then admin can get access.

b) *Adding Query:* User can ask query after login dataset providing question, answer and category.

c) *Delete Query:* Chatbot allow to delete query from page itself by selecting respective category.

d) *Change Password:* If admin want to change the password chatbot allow to change the password. Admin must be provide old password, new password and re enter the new password.

## IV.     RESULT AND DISCUSSION

Chatbot system is implemented to meet academic requirements of the users. Simulation or Generating response from a chatbot is a knowledge-based one. EngiBot is engineered to address all engineering-related queries with precision by leveraging a vast dataset and a feedback loop to ensure relevance to user inquiries. It not only resolves queries but also offers guidance to students grappling with the daunting task of selecting an engineering domain for their future careers.When a user submits a query to EngiBot, the system diligently searches its extensive database to retrieve the most pertinent response.

The chatbot employs natural language processing to discern the user's intent and deliver a tailored answer that aligns with the query. If the system encounters queries to which it cannot provide a satisfactory response, it initiates a feedback process, engaging users in the quest for improvement.In cases where the system fails to locate a suitable response, it automatically notifies the administrator to ensure that all user queries are addressed promptly.

EngiBot is not just an answering machine; it's a dynamic, learning tool that aims to enhance the educational journey of engineering students, providing accurate information and valuable guidance.Beyond its utility as a quick-reference tool, EngiBot has the potential to serve as an educational aid, promoting independent learning and problem-solving skills among engineering students. EngiBot's feedback mechanism proved invaluable for ongoing improvements. Continuous user feedback collection and analysis are essential to enhancing the chatbot's performance and user satisfaction. EngiBot's natural language processing capabilities allowed it to engage users in human-like conversations.

## V.     CONCLUSION

In summary, chatbots serve as helpful guides, steering students toward the most reliable and current sources of information. They are especially beneficial for handling inquiries related to fees and academic matters during the application process and all the queries such as information related to particular fields of enginnering , trending technologies. This convenient access saves students time and efforts.Chatbot's primary goal was to create an efficient system for understanding and responding to user queries. It stores relevant data and is designed to work well with limited computational resources. Language processing locates answers from a vast database, and future work aims to optimize response accuracy and speed. With this chatbot, learning and accessing engineering knowledge will be easy. The chatbot analyzes the question and gives an appropriate answer.

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