

# Uniquet: A SPPU Chatbot

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*Abstract-In today's digital age, universities are constantly seeking innovative ways to improve communication and student services. This gives rise to the development of a University Chatbot, an AI-powered virtual assistant designed to facilitate seamless interactions between students, faculty, and administrative staff. The University Chatbot leverages NLP and ML algorithms to offer a range of services. It can assist students with inquiries related to course registration, academic advising, campus events, and more. Faculty and staff can benefit from the chatbot's ability to automate administrative tasks, such as scheduling appointments, managing office hours, and providing real-time updates on campus information.*

**Keywords-** *Artificial Intelligence; Chatbot; Machine Learning.*

## 1. INTRODUCTION

Today, when individuals frequently use websites to look for information, websites have become very popular. As a result, most businesses, organizations, and even the government have developed their own websites, including universities. Based on the owner's desire, websites may be used for a variety of reasons. However, the increasing adoption of websites has created numerous issues with engaging stakeholders through university websites. Chatbot has been introduced to improve the responsiveness of the university website and the stakeholders.

[11] In many messenger-based platforms like Google, Facebook, and WhatsApp, the idea of chatbots is presented as automated conversational systems that may enhance response, increase availability, and decrease dependence on personnel. The requirement to answer inquiries from learners and students in educational organizations is addressed, considering the lack of manpower and time disparities between nations. This is the driving force behind building a chatbot in the educational domain.[8]

### 1.1 BACKGROUND

Researchers Siti Nazurah and Mazilina claim that because stakeholders require great website accessibility while surfing it, websites have

navigational and accessibility problems. Most website owners have added technology their websites in order to boost engagement. Chatbots are a growing technology at the moment, 63% of stakeholders prefer to use the website to communicate with the chatbots. [11] The creation of a chatbot for colleges or universities to inform students and visitors is covered in the article. The chatbot can be accessible from anywhere and offers a variety of information about the university or college. Concepts from artificial intelligence and machine learning are used in the project, while PHP is being used for development. [1] Like a messaging program, the chatbot analyses user inquiries and presents the appropriate responses. The time-consuming issue of obtaining necessary information from colleges or institutions is what the chatbot seeks to address. Similar to messaging apps, the chatbot offers users a welcoming environment that can be accessible from anywhere at any time. [9]

### 1.2 RESEARCH GAP AND OBJECTIVE

When it comes to users who aren't skilled at communicating their inquiries through chat, like parents in this example, there are still shortcomings in managing big amounts of data and dynamically responding to user requests. An interesting but useful addition to the University webpage may be a chatbot that is placed in a webpage. This paper's goal is to identify methods for managing huge datasets from diverse university organisations using cloud services and improving the query experience using voice assistance.

### 1.3 LITERATURE SURVEY

The article referred describes the creation of a web based chatbot dubbed "UNIBOT" whose goal is to respond to user inquiries about schools or universities in an effective and pertinent manner. The time-consuming practise of visiting institutions and acquiring information is eliminated by the chatbot. It offers a user-friendly graphical user interface (GUI)

comparable to messaging programmes and can be accessed from anywhere. [12] The chatbot processes user communications using an algorithm to get the most pertinent material from the database. With less memory and database hits needed, it can give quick and precise replies. The prospective uses of the chatbot in industries like android chatbot development and healthcare are also mentioned in the study. [9] Under random forest validation, the suggested chatbot aids users by responding to their inquiries and earns an average F-measure score of 0.870. The difficulty of automating talks, particularly in open domain contexts without a clear objective or intention, is discussed in the study along with the requirement for a substantial quantity of training data. For the purpose of creating a labelled dataset for the chatbot's training, the authors gathered and pre-processed instructional interactions. [8] To determine the elements required for the Smart Chatbot Academic model, the research study starts with a survey of the literature from 2017 to 2020. In order to offer guidelines for universities to design their own Smart Chatbots, the listed components will be reviewed using a survey method. [4] The introduction, literature review, methods, findings, conclusion, and future work are only a few of the elements of the research study that are covered in the article. The article also discusses several types of material seen on university websites, including admissions details, news and events, useful information, and target audience segmentation. [11]

## 2. METHODOLOGY

We begin by laying out the goals and parameters of a chatbot for a university. Amass pertinent facts and comprehend user requirements. Develop the chatbot with NLP capabilities after selecting the platform and technology stack. Before integrating it into the systems at the institution, thoroughly train and test it. Create a user-friendly UI, then start the chatbot. [10] Encourage users to use it and collect their feedback to make it better. Make sure that privacy laws are followed and data security is maintained. Make any necessary improvements after evaluating its performance in terms of user satisfaction and response accuracy. [7] Using this process, a university chatbot that improves access to information and communication inside the institution is developed and

deployed successfully.

### 2.1 DATA CLEANING AND COLLECTION FOR CHATBOT

#### 2.1.1 Data Collection

Gather the information required to teach the chatbot. This includes relevant paperwork. A university chatbot's data collection process entails obtaining, sorting, and preparing data from multiple university sources so that the chatbot may give users accurate and beneficial information. [13] Choose the main information resources available at the university, such as the course descriptions, student handbooks, academic calendars, faculty directories, event schedules, campus maps, and FAQs.

Extract pertinent information from the sources you have found. This could entail human data entry, document parsing, database queries, or web scraping.

#### 2.1.2 Data Preprocessing

Cleaning and preprocessing the data involves taking out unnecessary details, anonymizing sensitive information, and structuring it so that the chatbot can interpret it. Remove duplicates, fix errors, and standardize formats to clean up the data. The knowledge base's accuracy and consistency are ensured by data cleaning. [8]

### 2.2 FEATURE EXTRACTION FOR CHATBOT

#### 2.2.1 Text Preprocessing

Text analytics and natural language processing (NLP) both require extensive preprocessing of the input data. It entails cleaning up and converting unprocessed text input into a form that can be used for machine learning and analysis operations. Tokenization is the process of separating text into tokens, such as individual words or phrases. Due to the fact that it enables you to work with discrete text units, this is crucial for subsequent analysis. [6] Lowercasing ensures uniformity by changing all text to lowercase. This stops terms like "Word" and "word" from being treated as separate entities by the model. Reducing words to their basic form by eliminating suffixes is known as stemming. As an illustration, the words "jumping," "jumps," and "jumped" might all be shortened to "jump."

#### 2.2.2 Feature Engineering

Extract relevant features from the text data, such as keywords, sentiment scores, or named entities, to help the chatbot understand user queries and provide meaningful responses. Example Input: "Hi there!"

Term: "Hi" (class: Greetings) Term: "there" (no matches) Classification: Greetings (score=1) In this example, the input sentence is "Hi there!" It is being classified into the "Greetings" category. Here is the breakdown: 1 The term "Hi" is matched with the class "Greetings." 2 The term "there" has no matches in the provided terms. As a result, the classification is determined to be "Greetings," and it receives a score of 1. This score indicates that "Greetings" is the most likely category for the input sentence based on the term matches. However, as mentioned before, the score does not guarantee a perfect match and serves as a relative measure of intent. [8]

### 2.3 MODEL BUILDING FOR CHATBOT

#### 2.3.1 Model Selection

An appropriate natural language processing (NLP) model or framework for chatbot development is chosen.

#### 2.3.2 Training

Train the chatbot model on the pre-processed data. Fine-tune the model using dialogue datasets to improve its conversational abilities.

#### 2.3.3 Dialog Management

*Implementing dialog management logic to handle multi-turn conversations and context tracking.*

### 2.4 DEPLOYMENT FOR CHATBOT

#### 2.4.1 Integration

Deploy the chatbot into the desired platforms, such as websites

#### 2.4.2 Testing

Thoroughly test the chatbot to ensure it responds accurately and handles various user inputs effectively.

#### 2.4.3 Monitoring

Continuously monitor the chatbot's interactions, collect user feedback, and analyse user satisfaction metrics to identify areas for improvement.

#### 2.4.4 Maintenance

Regularly update the chatbot with new data and fine-tune its models to adapt to changing user needs and language patterns [8]

## 3. FRAMEWORK

Rasa is a powerful open-source framework for building chatbots and conversational AI applications. It offers flexibility, modularity, and a wide range of tools to create engaging and intelligent bots. Here's an overview to get you started:

### 3.1 UNDERSTANDING RASA

Rasa works on a modular architecture, consisting of three key components: Natural Language Understanding (NLU): This component analyzes user input, extracts intent and entities, and understands the meaning behind the words. Dialogue Management (Core): This component manages the conversation flow, decides how to respond based on the NLU output and the current context, and guides the user towards the desired outcome. Actions: These are custom functions that perform specific tasks within the flow, such as database lookups, API calls, or external integrations.

### 3.2 TOOLS AND RESOURCES

Rasa Framework: The core chatbot development platform. Rasa X: Optional tool for easy model training and development with a graphical interface. Rasa Actions: Library for implementing custom actions within your chatbot. NLTK and SpaCy: Natural language processing libraries for text analysis and understanding. Dialogflow and IBM Watson: Alternative chatbot platforms to consider (may require different tools and approaches).

### 3.3 BENEFITS OF USING RASA

Open-source and flexible: Free to use and customize to your specific needs. Modular architecture: Easy to extend and add new features. Powerful NLU: Provides accurate understanding of user intent and context. Community support: Large and active community for help and resources.

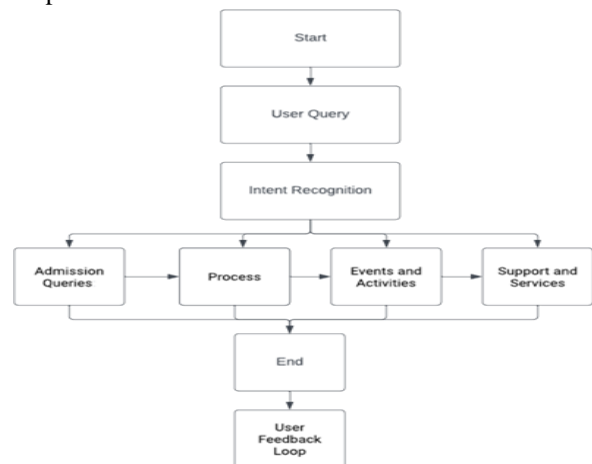


Fig. 1. Chatbot flowchart

As shown in fig 1 the chatbot conversation flow begins with the user's query, which is then analysed to determine their intent using natural language

processing (NLP). Depending on the detected intent, the chatbot branches into specific topics, such as general university information, admission queries, course details, campus facilities, events, and support services. Within each category, the chatbot can further drill down to address specific subtopics. Once the user's query is resolved, the conversation can conclude, and the chatbot may ask if there are additional questions. [12] Collecting user feedback is crucial for continual improvement of user experience.

#### 4. CONCLUSION AND FUTURE WORK

This university chatbot represents an innovative and valuable addition to the university's digital ecosystem. By addressing the challenges of handling large datasets and improving user interactions, particularly for those who may struggle to express themselves clearly, such as parents, this project aims to enhance the overall user experience. The integration of cloud services and voice assistance technology opens new possibilities for efficient and accessible information retrieval. Future work includes integrating advanced NLP for better understanding, diverse interaction modes for user flexibility, a feedback loop for continuous improvement, enhanced accessibility features, and robust security measures. These enhancements will ensure the chatbot remains at the forefront of technology, enhancing communication and information access within the university community.

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