Chatbot For Departmental Enquiry Using Sentimental Analysis

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ABSTRACT

A chatbot is a computer that can understand human speech and react like a human. The more human-like a chatbot is, the more useful it will be. There are many attempts to make chatbots intelligent or human-like. One of the daily tasks at the university is to answer frequently asked questions or questions found on official websites. This work is time consuming and wasteful. Chatbots are a solution to this problem. A good chatbot can answer these questions quickly and tirelessly. But creating an intelligent or human-like chatbot is difficult. A chatbot should be able to answer both basic and advanced questions. In this study, we present a chatbot system that uses machine learning techniques. So chatbots can learn from users to improve their results. We test our chatbots by testing real-world conversations. The results show that our chatbot can answer simple questions with higher accuracy than more advanced questions. Chatbots are designed to understand sentences, determine their meaning, and continue the conversation as needed, but they cannot capture the user's intent. It can enable the chatbot to not only respond to the user, but also understand them emotionally. Through our research, we focus on building a chatbot that responds based on the user's emotions to create a more empathetic and human experience for the user.

Keywords-Machine Learning,Chatbot,Sentiment Analysis

I. INTRODUCTION

Over the years, developments in technologies such as artificial intelligence (AI), big data, and the Internet of Things (IoT) have marked many advancements in the world of technology. These technologies have many applications. One such application is "Chatterbot" or "Chatbot". Chatbots are conversational intelligence that behave like humans during conversations. The technology is a combination of artificial intelligence and natural language processing (NLP). Chatbots have become part of technological development because they eliminate the need for humans and perform tedious tasks. The process turned out to be a difficult task. However, it turned out that chatbots can meet human needs. As the name suggests, chatbots are software applications that simulate conversations or interactions with users, allowing users to have a human experience in their interactions with digital robots. There are two types of chatbots; those that answer questions based solely on databases and those that try to learn and adapt from previous experiences to provide and include a high level of personalization in previous interactions.

Chatbots come in two types: legitimate and machine learning-based. Rule based bots are the simplest type of chatbots that use a set of predefined rules to respond to users' questions. These requirements may vary depending on the type of application they are used in. Although rule based bots are easier and more efficient to create, they cannot teach themselves to be malicious because they cannot respond to external questions.

Intelligent standalone chatbot using machine Learning (ML). They are trained to recognize specific terms and patterns that help answer user questions. They learn from past interactions and train themselves for future interactions with minimal human intervention. Over time, chatbots have evolved from rule-based bots to intelligence-based bots programmed using natural language processing (NLP) and machine learning. They are self-learning, which allows them to update themselves based on what they have learned from past interactions. The use of NLP makes human interaction between humans and robots possible. Chatbots are used in many applications, from banking, travel, ecommerce, real estate, media, and even education and healthcare. Therefore, chatbots not only entertain people by chatting, but also help them solve their problems.

II. LITRATURE REVIEW

In this survey [1] author present a chatbot building framework that considers the use of sentiment analysis and tree timelines to provide a better chatbot answer.

In [2] the research proposed a general framework based on sentiment analysis and machine learning, called Sentiment Analysis and Machine Learning Recommendation Framework (SAMLRF), including data preparation module, sentiment analysis module, recommendation module, human machine module and cloud computing module for a chatbot to facilitate user interaction to make recommendation.

In this paper[3] Deep feedforward neural network design shows interest while combining the main points of observational thinking and text. Due to the lightness of the model, user interaction is easy and latency is lower. The accuracy we recorded during the test was 93.45%. Chatbots can successfully interact with customers while checking their ideas. Chatbots can manage a conversation with a customer but cannot store the message if the conversation is long. The bot cannot correctly identify sarcasm or mockery in a sentence.

In [4] we developed and evaluated a ReAct-based chatbot agent that uses around 7 tools to interact with computer science data.

The system uses state-of-the-art technology and operating procedures to achieve this goal and has a user interface accessible through a web browser.

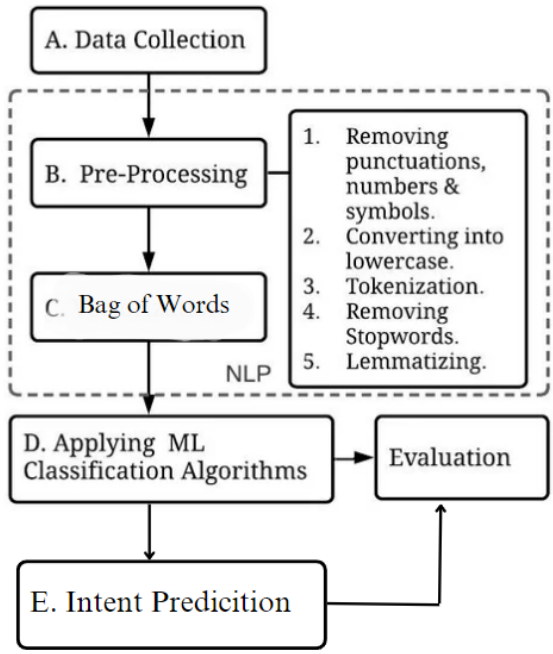
In this [5] paper deep learning models like CNN-RNN, LSTM , etc., and their various combinations have shown better performance compared to the machine learning algorithms. Added to this , Deep Learning Models were trained on various datasets of different domains and the models were achieving very high percentage accuracy for test data in respective domains. Doing this ensures that the final model will account for all the possible variance in the social media. The final prediction to be made by the model will be a voted system of all the models.

In [6] this paper we see, Sentiment analysis is also called sentiment mining in machine learning. Due to the difficulty of English and other languages, knowing how to think in writing is still a long way off. Show how to classify tweets as positive, negative, and neutral. Naive Bayes classifier is used to achieve better results. You can improve the classification by trying to extract more features from tweets, trying different types of features, and adjusting the drawbacks of Naive Bayes classifier and LSTM, or trying different high-level classification methods.

III. METHADOLOGY

Chatbot system is a web application that answers user questions. This system is used for search. Chatbot project was created using artificial intelligence Naive Bayes algorithm that analyzes user requests and understands the

language used. The system uses natural language processing (NLP) and built-in artificial intelligence to answer users' questions. We use Python programming language and Chatterbot library for chatbot development. With the help of machine learning algorithms, automatic responses to user input can be easily created to generate different types of responses. Students can ask questions from the bot used for discussion. Chatbot will answer questions with the help of intelligence. The proposed system will reduce administrative burden and will be able to provide content suitable for students and online failures. Students' problems will be solved without intervention by contacting the University's Administration Office. The system will be accessible to all students and teachers 24/7.



Among the many types of information found on the Internet, the most useful is a person's opinion on a topic, or rather, a person's opinion. For example, understanding your own reputation or the reputation of your company's competitors can be useful in terms of product development, marketing, or managing relationships with customers [6].

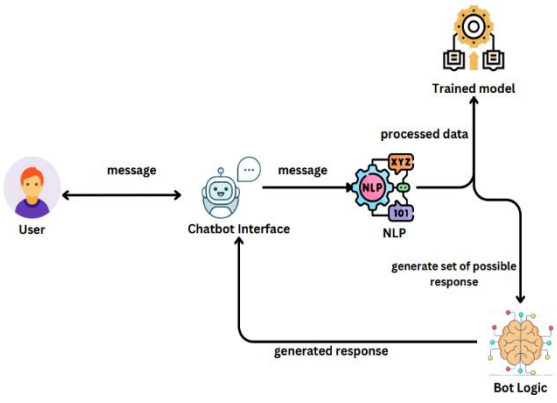
For example, in the proposition"Product A is good, but it's too expensive"there are two propositions. The first one, "Product A is good",indicates that the feeling is good, and the second one, "Product A is expensive", indicates that it is not good.Therefore, we may not be able to take the perspective of the answer,Instead, we try to extract all the good aspects and perspective of each piece [7].

A logical analysis that can eliminate the quality of each sentence,i.e. divide it according to the true value between - 1 and 1,where 1 is a good sentence and0 is a neutral sentence, 1 is a perfect sentence. The emotion library, one of the most emotional libraries (Valence Aware Dictionary and Emotion Reasoner), was developed within the NLTK framework [8].

Sentence	**Positivity**
I would like to check my account activity	0.3612
lovely	0.5859
You're not helping me at all	-0.2235

Table 1. Example of sentences and their positivities.

System Architecture –



User: The interaction begins with the user sending a message. This could be a text, voice message, or other form of input.

* **Chatbot Interface:** The user's message is received by the chatbot interface, which acts as the communication channel between the user and the chatbot.

* **NLP (Natural Language Processing):** The chatbot's NLP component analyzes the user's message to understand its meaning and intent. This involves tasks like tokenization, stemming, and part-of-speech tagging.

* **Processed Data:** The processed data from the NLP step is then used to generate a set of possible responses. This might involve using machine learning algorithms or rule-based systems.

* **Trained Model:** A trained model, which has been previously taught on a large dataset of conversations, is used to select the most appropriate response from the generated sentences.

* **Generated Response:** The chatbot sends the selected response back to the user through the chatbot interface.

* **Bot Logic:** The entire process, from receiving the user's message to generating a response, is controlled by the chatbot's logic. This logic determines how the chatbot should respond to different types of messages and situations.

Input:

- User message (text)

- User intent (optional)

Process:

1. Text Preprocessing:

- Tokenize the user message

- Lemmatize the tokens

- Remove stop words and punctuation

- Convert to lowercase

2. Intent Prediction:

- Use the trained model to predict the user intent

- Get the top-scoring intent

3. Response Generation:

- Use the predicted intent to select a response from the database

- Generate a response based on the user message and intent

4. Post-processing:

- Spell check and grammar check the response

- Convert to proper case

Output:

- Response (text)

- Confidence score (optional)

User Message → Text Preprocessing → Intent Prediction → Response Generation → Post-processing → Response

Note that this is a simplified architecture, and you may want to add additional components or modify the existing ones to suit your specific use case.

IV. RESULT

We present a chatbot system that uses machine learning techniques. So chatbots can learn from users to improve their results. We test our chatbots by testing real-world conversations. The results show that our chatbot can answer simple questions with higher accuracy than more advanced questions. we built a chatbot that responds based on the user's emotions to create a more empathetic and human experience for the user. In our chatbot user can provide voice input , then the system will display it as a text and give response .

V. CONCLUSION

In this paper , the deep feed-forward neural net established shows statisfactory results while incorporating sentimental analysis. The chatbot is successfully able to maintain conversations with the customers while keeping in check their emotional conditions. A chatbot that proves itself as a user-friendly interface that has a capability of solving user queries effectively.

VI. FUTURE SCOPE

Future development is to expand the assumptions made to evaluate predictive models for various decisions that require consideration of human Factors .We have thought that in future we will add real time attendance, PDF in it which will be helpful for the students.

VII. REFERENCES

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