IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 4, May 2022
Impact Factor: 6.252

Intelligent Chatbot

Prof. Prajakta Jadhav[1], Alim Samnani[2], Aman Alachiya[3], Vraj Shah[4], Alexander Selvam[5]
Professor, Department of Computer Engineering [1]
Students, Department of Computer Engineering[2,3,4,5]
Dhole Patil College of Engineering, Pune, Maharashtra, India

Abstract: *A Chatbot is a software application that replaces a live human agent to conduct a conversation via text or text to speech. It is designed to behave like a human would behave in that conversation. In this system, we demonstrate a chatbot that uses Artificial Intelligence to produce dynamic responses to online client enquiries. This web-based platform provides a vast intelligent base that can help humans to solve problems. The chatbot recognises the user's context, which prompts an intended response. Because this is a dynamic response, the user's desired response will be generated. This also uses a machine-learning algorithm to learn the chatbot by experiencing various requests and responses. Chatbots come to use in numerous fields of our daily life. Because AI enhances the human touch in every communication, chatbots are becoming increasingly robust.. It triggers accurate responses after understanding a user's query. Its objective is to reduce human dependency in every organisation and reduce the need for different systems for different processes.*

Keywords: Artificial Intelligence, Chatbot, Machine Learning, Web-based

I. INTRODUCTION

With the advancement of AI, communication between machines and humans has improved dramatically, resulting in the development of the Chatbot. The need for an AI helper is increasing at an alarming rate these days. With the usage of Chatbots on almost all websites, specific content is obtained. Chatbots have increased product marketing and customer understanding. We will novitiate computers that only understand binary numbers using Deep Learning and Artificial Intelligence. Natural Language Processing (NLP) assists and directs this computer machine in understanding human language in order to respond to a person based on what they ask or demand. This, in turn, produces an output that enables the user to reach the conclusion that the solution was on par with human expertise. We now see chatbots all over the place. Chatbots are a source of responses to users' questions in the domains in which they operate. Chatbots are a source of responses to users' questions in the domains in which they operate. Today's most popular example is Amazon's Alexa. Chatbots may be found practically everywhere; in fact, they can be found on almost every website one visits. A bot is useful for answering questions about material that isn't immediately accessible on that website. Most websites provide customers with chatbots to assist them in navigating the website's features. In our daily lives, they are proving to be our virtual helpers.

1.1 Chatbots: The Basics

A chatbot is a machine with artificial intelligence that can converse with people. It could be a written or spoken conversation (in the case of voice-based queries). Chatbots are mostly used to gather information. It can run on local PCs and mobile phones, but it is most commonly accessed via the internet. It has the potential to be enthralling, fascinating, and spellbinding. It's a conversational agent that communicates with users in a certain domain or on a specific topic using natural language words as input.

A chatbot is often activated by a user asking a question or establishing a new topic of conversation. Software agents that impersonate humans are known as chatbots. These are AI-enabled agents that can respond to user questions using natural language processing (NLP). The use of a predefined knowledge base aids in the development of an answer to the question. The same query can be entered in a number of different ways.

Q1: What is the re-registration notification for PG courses, for example?

Q2: Tell me about our college's re-registration for PG courses.

Both Q1 and Q2 refer to the same thing (same sense). Furthermore, there will be many more alternatives for the same inquiry and discovering all of them will be impossible. The system's scalability and performance will be impacted as well. To solve

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 4, May 2022
Impact Factor: 6.252

this challenge, a resemblance between the user input and the inquiries in the accessible question set is discovered (whose answers are available with the system). The query that matches the input with the highest score (if more than the threshold) is chosen, and the appropriate response is returned.

The similarity score for two sentences is computed by averaging the similarity of each of the sentences' constituent keywords. Each keyword in the first sentence is compared to each keyword in the second sentence in order to determine the word that is the most similar to it. The sentence similarity is then calculated by averaging the similarity scores of each term. Path Similarity and Wu-Palmer (WUP) Similarity are used to discover the word similarity. Path similarity determines the shortest number of edges between two-word senses, assuming a hierarchical framework such as WordNet. In general, longer path distance word senses are less similar than short path distance word senses, e.g. man, dog versus man, tree (expectation is that man is more similar to a dog than it is to a tree). The Wu-Palmer measures the weights of the edges in the hierarchy based on their distance.

II. Natural Language Processing Techniques

2.1 Pattern Matching

In chatbots, this is the most frequent technique and approach. Every existing chatbot system uses some variation of a pattern matching algorithm.

A. Parsing

Textual parsing is a method for converting a text into a set of words (lexical parsing) with features, mostly to determine its grammatical structure. The lexical structure can then be tested to see if it forms permitted expressions (syntactical parsing). The first parsers were fairly basic, searching for recognisable keywords in the correct order. The lines "please take the gold" and "can you obtain the gold" would both be parsed into "take gold" as an example of such parsing. With this method, a chatbot with a small collection of patterns can cover a large number of input sentences. Later chatbots utilise complex parsers to finish the grammatical parsing of natural language utterances.

A.I.M.L

To build a Chatbot, a universal language is needed, which should be flexible and easy to understand. One of the most extensively used techniques that meet the requirements is AIML, a variant of XML. AIML represents the knowledge inserted into Chatbots and is based on the software technology developed for A.L.I.C.E. (the Artificial Linguistic Internet Computer Entity). It may specify the partial conductance of the programmes it processes and characterises the type of data item (AIML objects). These objects consist of two units: topics and categories; the data contained in these categories are either parsed or unparsed.

Deep Learning

Deep learning is a subset of machine learning in which a machine "learns" and simulates human-like decision-making by utilising large volumes of data and highly complex algorithms. Deep learning is the part of the AI's brain that connects to NLP and allows it to learn from its mistakes and improve in the future, just like humans.

As we all know, the use of automated machines is on the rise, which means that machine-human interaction is on the rise as well. Humans may be replaced by autonomous bots for specific system functions in the future. A chatbot will serve as the central system, receiving user input in the form of audio/voice. It's possible that the input is using a microphone, and then using pre-existing python libraries, this voice input will be translated to textual input.

The system will then send this textual input to the chatterbot, which will perform Natural Language Processing on it and search its database for the question. Two scenarios will be created:

(1) When the input is an identifiable inquiry for which the system already has a response.

The user will receive this matched response directly in this instance.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 4, May 2022
Impact Factor: 6.252

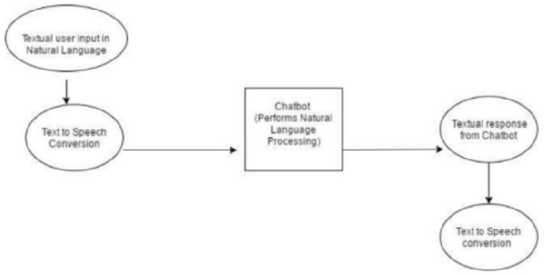


Figure No. 1: System Architecture

(2) When the entered input is not recognised, the bot's intelligence kicks in, and the system deciphers the input and responds using its knowledge. "Artificial Intelligence" is the word for this.

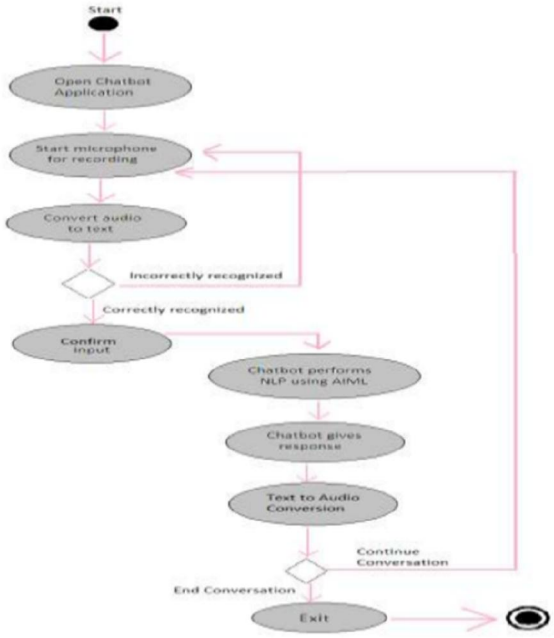


Figure No. 2: System Flowchart

III. ALGORITHMS

To construct a chatbot system, we could use any or all three algorithms.

3.1 N-gram Algorithm

The N-gram Algorithm is a method for calculating the number of letters in N-Grams are a method of assisting machines in comprehending a word in a piece of text. An adjacent sequence of n-items from a given sample of the text is called an N-gram. We can have two items, three items, and so on with N-items. As a result, it's a collection of items in a logical order. It aided in the prediction of subsequent words in a phrase. Characters, words, and sentences will be used. When n is two, we call it a bigram, and when n is three, we call it a trigram. We can adjust the value of 'n' based on the statement.

A. Cosine Similarity

A similarity between two non-zero vectors of an inner product space that measures the cosine of the angle between them is found using cosine similarity. In the realm of information (data) mining, this technique is also used to measure cluster cohesion.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 4, May 2022
Impact Factor: 6.252

Similarity in cosine=AB/|A||B|.

The cosine distance is just the distance between two vectors in an n-dimensional space. Words related to one another are represented by distance.

B. TF-IDF

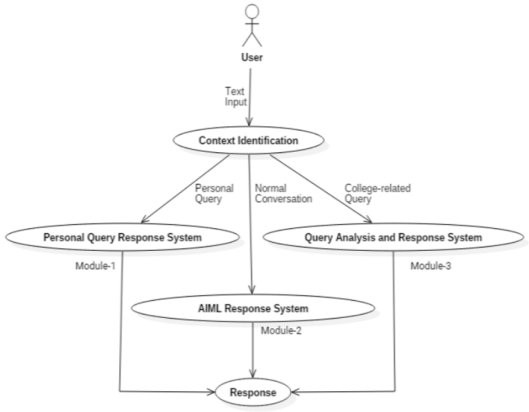
Term Frequency (TF)

Stop words are typically omitted when creating a model with the objective of interpreting the text. Another method is to use the TF-IDF to determine the relative value of words. The total number of times a word appears in a document is divided by the total number of words. The frequency of terms varies by the document.

Inverse Data Frequency (IDF)

The Inverse Data Frequency is the log of the number of documents divided by the number of documents containing the word (IDF). The weight of unique terms in all documents in the corpus is determined by inverse data frequency.

Use Case Diagram:
(Context identification)



3.2 NLP'S Applications and Future

A chatbot can be used in a variety of ways, as seen in the examples below. A chatbot can operate as a website navigator. This can take the shape of a simple descriptive guiding hand to the subject matter of all the pages — highlighting the main information of each page in its most basic form. This can be a complete chatbot capable of handling inquiries that a visitor may have about the site, the company, or its products or services - supplying the visitor with web pages relevant to the enquiry in its most complex form. This can be a good way to improve the experience for visually impaired people without sacrificing the website's accessibility.

3.3 Evaluation

To assess, we must perform inference one time-step at a time, with the preceding time-output steps as input. We don't usually use dropout during inference, however, we didn't provide a training argument for our model. Because training and mask are already built-in for us, we can simply call the model(inputs, training=False) to run the model in inference mode if we want to run it for evaluation.

IV. CONCLUSION

Chatbots driven by artificial intelligence is transforming the business sector. Chatbots are more efficient and can communicate with a large number of people. Chatbots have been around for a while now. They're only now making their way into the real world from universities and research labs. Apart from typical technology developments, we believe Chatbots are now ready for commercial application for three reasons:

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 4, May 2022
Impact Factor: 6.252

First, The ability to offer chatterbots as dynamic and speaking avatars is now available to the general public, making chatbots a far more rich and engaging experience than lines of text on a screen. To service all of their responsibilities, richer bots (with animation capabilities) require a substantial amount of bandwidth. Because of the widespread adoption of broadband by enterprises and its dominance in the household sector, this wealth can now be delivered to virtually any user via the internet. The bot will be able to deliver accurate responses in the future, and it may even be able to replace humans in live help, reducing infrastructure and resource expenses. User analytics can be used to track and analyse how well the bot assisted users.

ACKNOWLEDGMENT

I would like to express my very great appreciation to Prof. Prajakta Jadhav for her valuable and constructive suggestions during the planning and development of this research work. Her willingness to give her time so generously has been very much appreciated. She has been very supportive and expedited towards our work.

REFERENCES

[1]. Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Łukasz Kaiser "Attention Is All You Need" IEEE 2017

[2]. Parth Thosani , Manas Sinkar , Jaydeep Vaghasiya, Radha Shankarmani," A Self-learning Chat-Bot from User Interactions and Preferences", IEEE, 2020.

[3]. Prakhar Srivastava, Nishant Singh," Automatized Medical Chatbot (Medibot)", IEEE, 2020.

[4]. Urmil Bharti, Deepali Bajaj, Hunar Batra, Shreya Lalit, Shweta Lalit, Aayushi Gangwan, "Med bot: Conversational Artificial Intelligence Powered Chatbot for Delivering Tele-Health after COVID-19", IEEE,2020.

[5]. Falguni Patel, Riya Thakore, Ishita Nandwani , Santosh Kumar Bharti, "Combating Depression in Students using an Intelligent Chat Bot: A Cognitive Behavioral Therapy", IEEE, 2019.

[6]. Nitirajsingh Sandu , Ergun Gide, "Adoption of AI- Chatbots to Enhance Student Learning Experience in Higher Education in India", IEEE,2019.