IARJSET

ISSN (Online) 2393-8021
ISSN (Print) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

International Conference on Muti-Disciplinary Application & Research Technologies (ICMART-2023)

Geetanjali Institute of Technical Studies

Vol. 10, Special Issue 2, May 2023

Technocracy – AI chatbot

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Abstract: Technocracy is an AI chatbot based primarily on JavaScript. Its purpose is to answer frequently asked questions. It can be utilized on any website as well. The bot uses AI and NLP to automatically answer questions.
Keywords*:* Artificial intelligence, Chatbot, JavaScript, Automation, NLP

I. INTRODUCTION

In the modern times, time is gaining more and more importance. It has become quite common to try and automate things that take up too much time. One such field is customer care. On any platform (website, software, firm etc.) if there are several customers, it is guaranteed that there will be several queries as well. While some queries do require special “human” attention, most of them are common queries that are asked frequently. Such queries or questions, no matter asked how many times, will have the same answer. Hence, it makes perfect sense to automate the whole process. This chatbot does just that. It is designed to check if a question is frequently asked, and provide a pre-set answer if that is indeed the case. The bot is JavaScript based, and makes use of Artificial intelligence, along with NLP.

II. OVERVIEW

The field of artificial intelligence has seen tremendous growth over the past few years, with the development of chatbots being a significant area of focus. Chatbots are AI-powered conversational agents that can interact with users in a human-like manner. They have gained widespread popularity in recent years, with various industries using them for customer service, mental health support, and even entertainment.

This research paper aims to contribute to the development of chatbots by creating an AI-powered chatbot that can engage in human-like conversations with users. The chatbot has been designed to provide personalized responses based on the user's input and can learn from its interactions with users. The chatbot's effectiveness will be evaluated through user testing, which will assess its ability to understand and respond to natural language queries and its ability to provide helpful and accurate responses.

III. METHODS OF CREATING AN AI CHATBOT

There are several methods through which an AI chatbot can be created. Here are some of the most common ones:

A. Rule-Based Approach

This step's main purpose is to determine whether or not human faces can be seen in a particular image and where they may be found. The intended outputs of this phase are patches which contain each face in the input image. In order to obtain a facial recognition system that is more reliable and simple to construct.

B. Machine Learning Approach

This approach involves training the chatbot on large amounts of data using machine learning algorithms. The chatbot is trained to identify patterns in the data and to learn from its interactions with users. As the chatbot interacts with more users, its accuracy and ability to provide meaningful responses improve over time. The machine learning approach allows for more flexibility and adaptability in the chatbot's responses, but it requires a large amount of data and computational resources.

C. Hybrid Approach

The hybrid approach combines the rule-based and machine learning approaches to create a chatbot that is both flexible and efficient. The chatbot is designed using a set of predefined rules, but it also uses machine learning algorithms to learn from its interactions with users and to adapt to new situations.

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IV. OBJECTIVES AND APPLICATIONS

The team had established several objectives for this tool to fulfill right from the get go. These objectives are based on increasing the efficiency of the business, and to ensure ease of use. They are as follows:

A. TIME SAVING

The primary objective had always been to save time. Due to this bot taking care of FAQs, the business does not have to waste time answering them. This time can be utilized dealing with more important matters.

B. COST EFFICIENT

AI chatbots are also quite cost efficient. Businesses can save up to 30% in customer service costs by using chatbots [1]. This happens because the business no longer must hire extra people to answer customer queries.

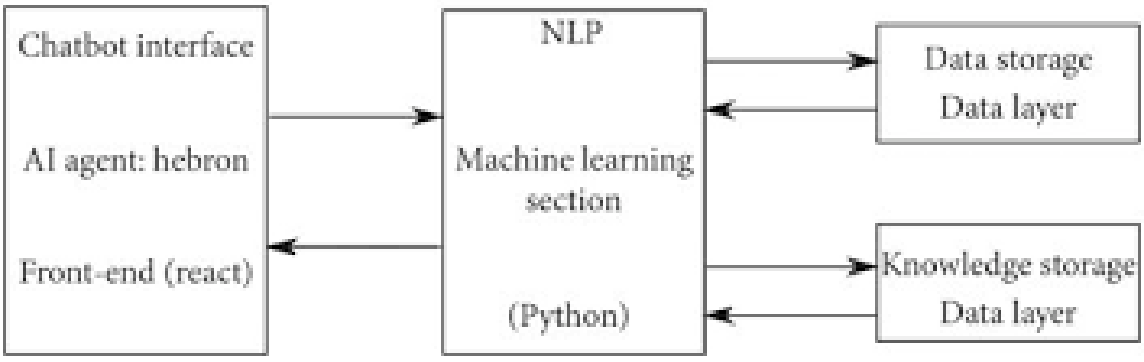
C. OPERATIONAL EFFICIENCY

As the number of customers increase, so will the queries, in such a case, a chatbot will help the business focus its manpower on other more productive pursuits.

D. COMMON APPLICATIONS

- As the number of customers increase, so will the queries, in such a case, a chatbot will help the business focus its manpower on other more productive pursuits.
- Sales and marketing - Aside from customer support, AI-powered chatbots can also help you with your sales and marketing initiatives. Chatbots help customers throughout their entire customer journey and play an important role in moving customers down the sales funnel [2].
- Retail and e-commerce - In a highly competitive market such as retail and e-commerce, you must engage in personalized conversations with customers in order to capture their attention and convince them to make a purchase decision. When you have a growing customer base, however, engaging in one-on-one conversations may not be feasible. This is where a chatbot proves to be helpful [3].
- Travel and hospitality - Customers in travel and hospitality, like those in e-commerce and retail, prefer personalized experiences (planning a vacation can be tedious!). Chatbots can help with everything from customizing itineraries to managing bookings and reservations in customer service. However, the usage of a chatbot in this industry has often been understated [4].
- AI chatbots are used by almost all platforms today. From Amazon to Flipkart, chatbots have become widely used.

V. BLOCK DIAGRAM



VI. SYSTEM REQUIREMENTS AND SOFTWARE USED

A. SYSTEM REQUIREMTNS

1. processor required: Intel™ core™ i3-7020U CPU @ 2.30GHz 2.30 GHz
2. Memory required: 4GB minimum
3. System type: 64-bit operating system, x64-based processor.

The system requirements have been kept quite light by modern standards.

B. TECHNOLOGY STACK

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Artificial intelligence chatbots employ AI and natural language processing (NLP) technology to recognize sentence structure, interpret the knowledge, and improve their ability to answer questions. Instead of relying on a preprogrammed response, AI chatbots first determine what the customer or user is saying. Let us discuss the various technologies used to build this chatbot in detail:

- **JavaScript:** As has been mentioned before, this project is largely based on JavaScript. This choice is obvious, since JavaScript is often called the "language of the web", and our chatbot is entirely web based.
- **Natural language processing (NLP):** Natural language processing (NLP) is the branch of computer science—specifically, the branch of artificial intelligence or AI—concerning giving computers the ability to understand text and spoken words in the same way that humans do. Naturally, since it is essential for our bot to understand and process written language, we had to use NLP.
- **Next.js:** Next.js is a React framework that adds features such as server-side rendering and the generation of static websites.
- **React** is a JavaScript library that is commonly used to create web applications that are rendered in the client's browser using JavaScript.

VI. RELATED WORKS

The field of chatbot development has been rapidly evolving over the past few years, with many innovative projects being developed. Here are a few examples of work that has been done in this field:

1. Mitsuku: Mitsuku is a chatbot that was created by Steve Worswick. It has won the Loebner Prize, which is an annual competition that tests the abilities of chatbots. Mitsuku is known for its ability to understand natural language and its ability to provide witty responses.

2. Replika: Replika is an AI chatbot that was designed to help people improve their mental health. It was created by Luka, a startup based in San Francisco. Replika uses machine learning algorithms to learn from its interactions with users and to provide personalized responses.

3. Xiaoice: Xiaoice is a chatbot developed by Microsoft. It was designed to have emotional conversations with users and to simulate human-like interactions. Xiaoice is widely used in China and has become a popular virtual friend for many users.

4. Google Duplex: Google Duplex is an AI-powered chatbot that was designed to make phone calls on behalf of users. It can make reservations, schedule appointments, and perform other tasks. Google Duplex uses natural language processing algorithms to understand and respond to the other party's responses.

5. ELIZA: ELIZA is a chatbot that was developed in the 1960s by Joseph Weizenbaum. It was one of the first chatbots ever developed and is known for its ability to mimic a therapist. ELIZA uses pattern matching to respond to user input and has been used to study the human-computer interaction

VII. CONSTRUCTION AND WORKING OF THE CHATBOT

Now that we have established the requirements and applications of the chatbot, we can now dive deeper and understand how exactly the chatbot works:

A. Construction and usage

Let us understand the construction of this chatbot with the help of an example. Let us assume that a customer asks any random question to the chatbot. Well, the question then goes to the backend.

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```
const { dockStart } = require('@nlpjs/basic');

async function neuralNetwork(question, callback) {
  const dock = await dockStart({ use: ['Basic', 'Qna'] });
  const nlp = dock.get('nlp');
  await nlp.addCorpus({ filename: 'neuralNetwork/qna.tsv', importer: 'qna', locale: 'en' }
  await nlp.train();
  const response = await nlp.process('en', question);
  callback(response)
}

export default function handler(req, res) {
  neuralNetwork(req.body.data, (r) => res.status(200).send(r))
}
```

Figure-1

The backend accepts the question from the user. Here the question is compared to the NLP dataset (figure 2). The dataset already contains a number of commonly asked questions, along with their answers. Even if the question does not match one in the dataset one to one, the best comparison is picked.

```
what is your personality  i'm a virtual agent
describe yourself i'm a virtual agent
tell me about yourself  i'm a virtual agent
tell me about you i'm a virtual agent
what are you  i'm a virtual agent
who are you i'm a virtual agent
i want to know more about you i'm a virtual agent
talk about yourself i'm a virtual agent
your age  i'm very young
how old is your platform  i'm very young
how old are you i'm very young
what's your age i'm very young
i'd like to know your age i'm very young
tell me your age  i'm very young
you're annoying me  i'll do my best not to annoy you in the future
you are such annoying i'll do my best not to annoy you in the future
you annoy me  i'll do my best not to annoy you in the future
you are annoying  i'll do my best not to annoy you in the future
```

FIGURE - 2

B. USAGE

Now let us take a look at the actual UI of the chatbot.

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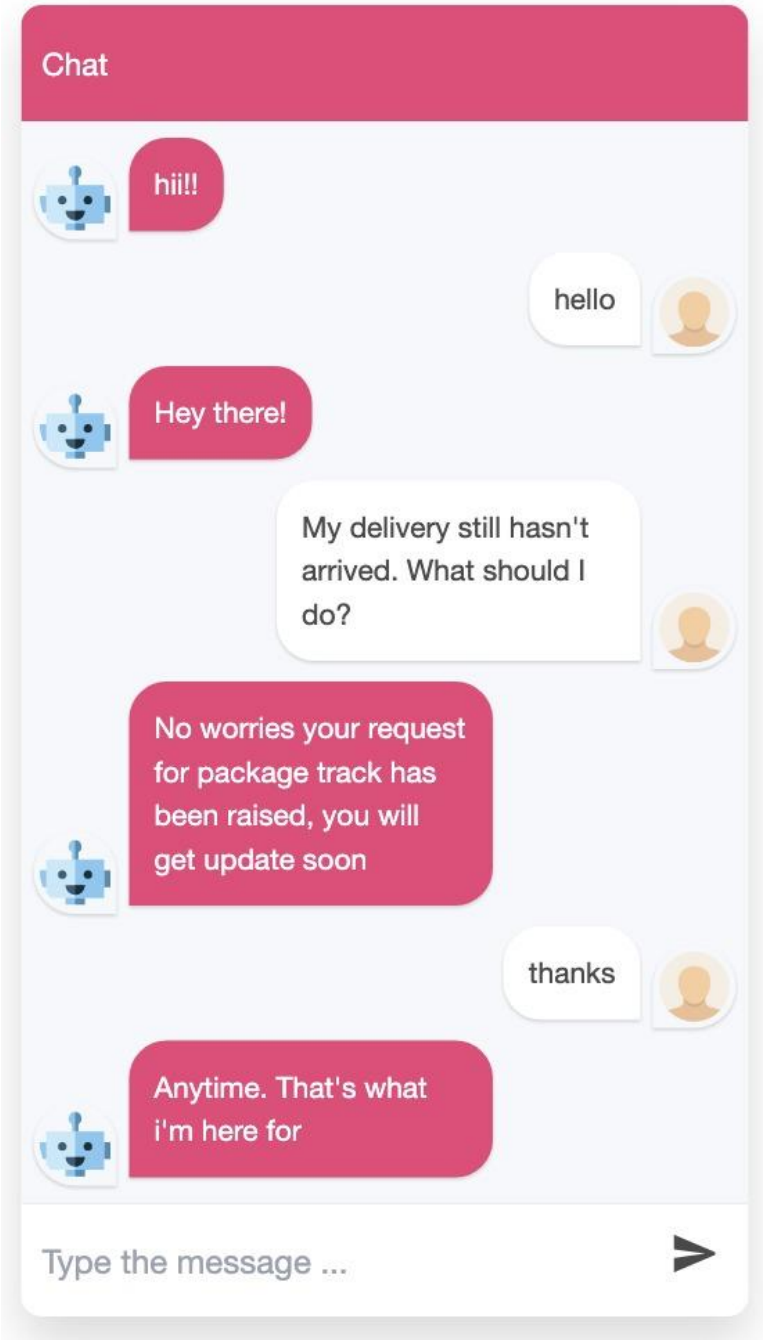

Figure – 3

As can be seen from Figure – 3, the bot first processes the question asked, then provides the user with an answer. Special care has been taken to make the UI appear friendly and non-imposing, as an imposing and "robotic" AI leads to user dissatisfaction [5].

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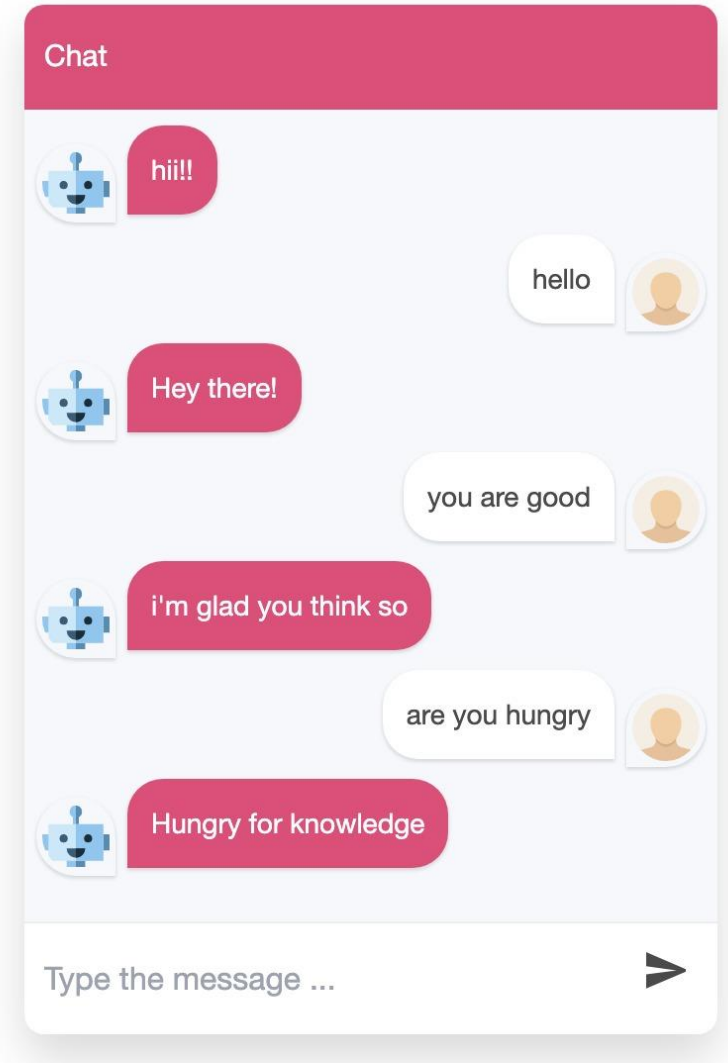

Figure – 4

The example provided in Figure – 5 is perhaps more practical while trying to understand the working of the chat bot. As can be seen, once the user raises their complaint, the chatbot provides an apt response. Also, notice how the AI ends the conversation on a positive note. This is just another way to make the chatbot less imposing, so that customers find it easy to work with.

VI. CONCLUSION

In this research paper, we have presented the development of an AI-powered chatbot that can engage in natural and meaningful conversations with users. Our chatbot has been designed to provide personalized responses based on the user's input and can learn from its interactions with users. Through user testing, we have evaluated its effectiveness, demonstrating its ability to understand and respond to natural language queries and provide helpful and accurate responses.

We have also provided an overview of the work that has been done in the field of chatbot development, highlighting the various methods through which chatbots can be created and the challenges faced in developing them. Our research builds on previous work in this field and contributes to the ongoing development of chatbots by creating a chatbot that can provide personalized and meaningful responses to users.

The potential applications of chatbots are vast, with various industries using them for customer service, mental health support, and entertainment. As chatbot technology continues to develop, we anticipate that they will become even more sophisticated and capable of handling more complex queries and interactions.

Overall, our research has demonstrated the potential of AI-powered chatbots to improve various aspects of human life, and we hope that our work will inspire further research in this field. We believe that the continued development of chatbots will have a significant impact on how we interact with technology and with each other, and we look forward to seeing how this technology will evolve in the future.

VIII. ACKNOWLEDGEMENTS

We would like to thank our college, Geetanjali Institute of Technical Studies for providing unending support throughout the building of the project. We would also like to extend special thanks to Mr. Jitendra Sharma (faculty GITS – CS) for sharing his wisdom and mentoring when we fell short.

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