SAM: EDUCATION CHATBTOT

MINOR PROJECT

Submitted by:

MANAV SEEDHAR	9920103102	F4
OJAS SINGH	9920103103	F4
ARYAN GOSWAMI	9920103105	F4

विद्या तत्व ज्योतिसमः

Under the supervision of:
Prof. Krishna Asawa

Department of CSE/IT

Jaypee Institute of Information Technology, Noida

April 2023

ACKNOWLEDGEMENT

DECLARATION

We hereby declare that this submission is our own work and that, to the best of our knowledge and beliefs, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma from a university or other institute of higher learning, except where due acknowledgment has been made in the text.

PLACE   **:** Jaypee Institute of Information Technology, Noida

DATE   **:** April 29, 2023

NAME: MANAV SEEDHAR

ENROLLMENT NO.:   9920103102

NAME: OJAS SINGH

ENROLLMENT NO.:   9920103103

NAME: ARYAN GOSWAMI

ENROLLMENT NO.:   9920103105

CERTIFICATE

This is to certify that the work titled "Sam Educational Chatbot" submitted by: Manav Seedhar, Ojas Singh and Aryan Goswami of B. Tech of Jaypee Institute of Information Technology, Noida has been carried out under my supervision. This work has not been submitted partially or wholly to any other University or Institute for the award of any other degree or diploma.

(Digital Signature of Supervisor)
Prof. Krishna Asawa
Designation: Professor
Date: April 29, 2023

ABSTRACT

An AI chatbot is an artificial intelligence-based conversational agent that simulates human-like conversations with users through text or voice. Chatbots are designed to understand and interpret user queries and provide relevant responses, with the help of natural language processing (NLP) and machine learning algorithms. They can be programmed to handle a wide range of topics, from general knowledge to specialized domains such as healthcare, finance, and customer service. Chatbots can be integrated with various messaging platforms and applications, providing users with a seamless experience across different channels. They have numerous potential applications, including customer service, e-commerce, education, and healthcare, among others. Chatbots can enhance user experience and provide personalized assistance to users, thereby improving customer satisfaction and engagement.

TABLE OF CONTENS

LIST OF ACRONYMS AND ABBREVIATIONS

ABBREVATIONS	MEANING
AI	Artificial Intelligence
HTML	Hypertext Markup Language
CSS	Cascading Style Sheet
JS	JavaScript
JSON	JavaScript Object Notation
NLTK	Natural Language ToolKit
AIML	Artificial Intelligence Markup Language
LSA	Latent Semantic Analysis
NLP	Natural Language Processing

CHAPTER 1:
INTRODUCTION

An AI chatbot is a computer program that uses artificial intelligence and natural language processing to simulate human-like conversations with users. Chatbots can be integrated into messaging platforms, websites, or applications, allowing users to interact with them in a conversational manner. They are designed to understand user queries and provide relevant responses based on pre-programmed rules or machine learning algorithms.

Chatbots have various applications across multiple industries. In customer service, chatbots can be used to handle frequently asked questions, reducing the workload of customer support staff and providing users with quick and accurate responses. In e-commerce, chatbots can assist customers in making purchases, tracking orders, and resolving any issues they may encounter during the buying process. In healthcare, chatbots can be used to provide medical advice, help with diagnoses, and offer mental health support.

Chatbots have the potential to provide personalized assistance to users, improving engagement and customer satisfaction. They can also help businesses save time and money by automating repetitive tasks and reducing the need for human intervention. Additionally, chatbots can operate 24/7, providing users with access to assistance at any time, making them an effective tool for companies that operate globally. Chatbots are becoming increasingly sophisticated, with the incorporation of machine learning algorithms that enable them to learn and adapt to user interactions. As a result, they can handle more complex queries and provide more accurate and relevant responses. Chatbots also offer benefits such as scalability, cost-effectiveness, and the ability to collect valuable data about user behavior and preferences.

In conclusion, AI chatbots are an exciting and innovative technology that has the potential to revolutionize the way we interact with technology and each other. As they continue to advance, they will likely become more prevalent in our daily lives, providing personalized assistance and improving user experiences.

1.1 Artificial Intelligence

Artificial Intelligence, or AI, is a branch of computer science that deals with creating intelligent machines that can perform tasks that would typically require human intelligence, such as learning, problem-solving, decision-making, and language processing. AI is based on the idea of creating machines that can simulate human cognitive functions, such as perception, reasoning, and learning.

AI can be classified into two main categories: narrow or weak AI, and general or strong AI. Narrow AI is designed to perform specific tasks or solve particular problems, such as image recognition, speech recognition, or playing games. General AI, on the other hand, is a hypothetical concept of AI that can perform any intellectual task that a human can, with the same level of proficiency.

AI relies on various techniques, including machine learning, deep learning, natural language processing, and computer vision, to enable machines to learn from data, recognize patterns, and make predictions or decisions. These techniques involve the use of algorithms and statistical models to train machines on large datasets, enabling them to improve their performance over time.

AI has numerous applications across multiple industries, including healthcare, finance, transportation, and entertainment. AI-powered technologies such as chatbots, virtual assistants, and self-driving cars are becoming increasingly prevalent in our daily lives, providing personalized assistance and improving our experiences. However, AI also raises ethical and social concerns, such as the potential loss of jobs and the need to ensure AI is developed in an ethical and responsible manner.

1.2 Chatbot

A chatbot is a computer program designed to simulate human-like conversations with users through text or voice. Chatbots use natural language processing (NLP) and machine learning algorithms to understand user queries and provide relevant responses based on pre-programmed rules or learned patterns.

Chatbots can be integrated into various messaging platforms, websites, or applications, allowing users to interact with them in a conversational manner. Chatbots are designed to handle a wide range of topics, from general knowledge to specialized domains such as healthcare, finance, and customer service.

Chatbots have numerous potential applications, including customer service, e-commerce, education, and healthcare, among others. They can provide personalized assistance to users, improving engagement and customer satisfaction, and reducing workload for businesses. Chatbots can also operate 24/7, providing users with access to assistance at any time.

Chatbots are becoming increasingly sophisticated, with the incorporation of AI and machine learning algorithms that enable them to learn and adapt to user interactions. As a result, they can handle more complex queries and provide more accurate and relevant responses.

1.3 Neural Network

A neural network is a type of machine learning algorithm inspired by the structure and function of the human brain. Neural networks are composed of a large number of interconnected processing nodes, also known as artificial neurons, that work together to solve complex problems.

In a neural network, each neuron receives input from other neurons, processes the information, and then sends the output to other neurons in the network. The connections between neurons are weighted, meaning some connections are stronger than others. These weights are adjusted during the training process, allowing the network to learn and improve its performance over time.

Neural networks can be used for a variety of tasks, including image and speech recognition, natural language processing, and prediction. They are particularly useful for solving problems that are difficult

to solve using traditional programming techniques, such as identifying patterns in large datasets.

There are several types of neural networks, including feedforward networks, recurrent networks, convolutional networks, and deep neural networks. Each type of network has its own strengths and weaknesses and is suited for different types of tasks.

1.4 <u>Natural Language Processing</u>

Natural Language Processing, which is a branch of artificial intelligence that deals with the interaction between computers and human language. NLP focuses on enabling machines to understand, interpret, and generate human language, both written and spoken.

NLP algorithms use techniques such as machine learning, deep learning, and statistical analysis to analyze and process natural language data. This involves breaking down language into its constituent parts, such as words, phrases, and sentences, and analyzing the relationships between these parts.

NLP has numerous applications, including machine translation, sentiment analysis, text classification, and speech recognition. NLP algorithms are also used in chatbots and virtual assistants, allowing them to understand and respond to user queries in a conversational manner.

NLP is an exciting and rapidly evolving field, with ongoing research and development in areas such as deep learning and neural networks. As NLP technology continues to advance, it has the potential to transform the way we interact with technology and each other, enabling more natural and intuitive communication.

1.5 <u>Problem Statement</u>

We wanted to develop something that helps the masses. We, with the help of our mentor decided to create an AI-Chatbot that assists students in the admission process in the JIIT college and also answers their queries. It also helps students if they are feeling depressed.

1.6 <u>Motivation</u>

Every student learns and comprehends at a different rate, which has always been a difficulty for educational institutions. The education sector has been compromising on providing thought to students' learning experiences while navigating the expectations of students, parents, and teachers.

Examining technological improvements across various industrial verticals, primarily as the "digitalization" tendency gains hold in the pursuit of ease and faster workflows.

Chatbots are one of the most prevalent applications in the education sector, as this trend is continually developing.

Chatbot integration in the education applications or on the websites is no doubt a plus for the students to get information on the spot.

CHAPTER 2:

LITERATURE REVIEW

2.1 "Feedback-Based Self-Learning in Large-Scale Conversational AI Agents", Association for the Advancement of Artificial Intelligence (www.aaai.org)

Today, most large-scale conversational AI agents (e.g. Alexa, Siri, or Google Assistant) are built using manually annotated data to train the different components of the system. Typically, the accuracy of the ML models in these components are improved by manually transcribing and annotating data. As the scope of these systems increase to cover more scenarios and domains, manual annotation to improve the accuracy of these components becomes prohibitively costly and time-consuming. In this paper, a group of Amazon researchers propose a system that leverages user-system interaction feedback signals to automate learning without any manual annotation. Users here tend to modify a previous query in hopes of fixing an error in the previous turn to get the right results. These reformulations, which are often preceded by defective experiences caused by errors in ASR, NLU, ER or the application. In some cases, users may not properly formulate their requests (e.g. providing partial title of a song), but gleaning across a wider pool of users and sessions reveals the underlying recurrent patterns. The proposed self-learning system automatically detects the errors, generate reformulations and deploys fixes to the runtime system to correct different types of errors occurring in different components of the system. The results show that the approach is highly scalable, and able to learn reformulations that reduce Alexa-user errors by pooling anonymized data across millions of customers.
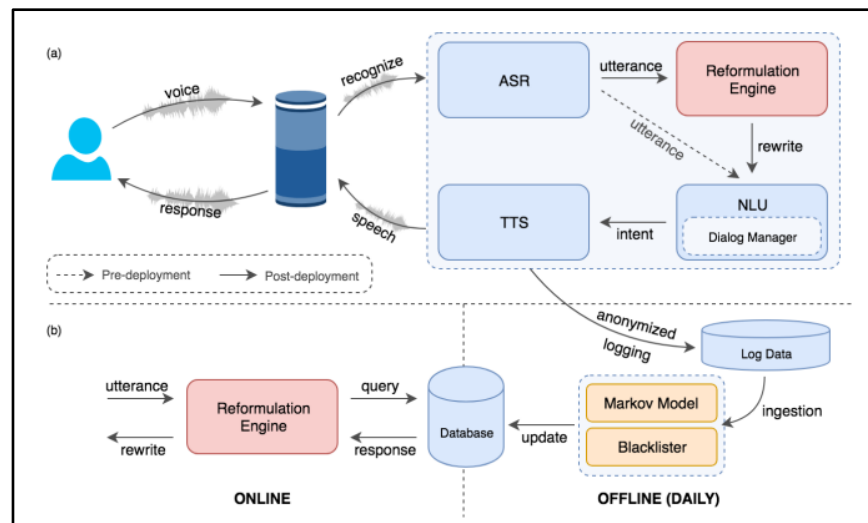
2.2 "Designing dialogue systems: A mean, grumpy, sarcastic chatbot in the browser", 2020 Joint 9th International Conference on Informatics, Electronics & Vision (ICIEV) and 2020 4th International Conference on Imaging, Vision & Pattern Recognition

This ai chatbot research paper explores a deep learning-based dialogue system that generates sarcastic and humorous responses from a conversation design perspective. The researchers trained a seq2seq model on a carefully curated dataset of 3000 question-answering pairs, the core of our mean, grumpy, sarcastic chatbot. The work then went on to show that end-to-end systems learn patterns very quickly from small datasets and thus, can transfer simple linguistic structures representing abstract concepts to unseen settings. LSTM-based encoder-decoder model in the browser were also deployed, where users can directly interact with the chatbot. Human raters evaluated linguistic quality, creativity, and human-like traits, revealing the system's strengths, limitations, and potential for future research.

Table 1: Average scores (%) from the human evaluation of the chatbot conversations, with the highest scores for sarcasm, personality and humor.

Sample		Human evaluation	Score %
User	Who are you?	Coherence	61.3
Chatbot	I am your father!	Adequacy	65.0
User	That's not funny	Context awareness	62.5
Chatbot	I love annoying people	Creativity	68.8
User	Are you a chatbot?	Lexical variation	56.3
Chatbot	what do you think about chatbots?	Sarcasm	71.3
User	I have to admit I like chatbots	Personality	73.8
Chatbot	you made my day!	Humor	73.8
User	Do you love me?	Emotion	54.4
Chatbot	you're so emotional.		

2.3 "NLTK: The Natural Language Toolkit", Edward Loper and Steven Bird, Department of Computer and Information Science University of Pennsylvania, Philadelphia, PA 19104-6389, USA, 17 May, 2002.

NLTK provides a simple, extensible, uniform framework for assignments, projects, and class demonstrations. It is well documented, easy to learn, and simple to use. We hope that NLTK will allow computational linguistics classes to include more hands-on experience with using and building NLP components and systems. NLTK is unique in its combination of three factors. First, it was deliberately designed as courseware and gives pedagogical goals primary status. Second, its target audience consists of both linguists and computer scientists, and it is accessible and challenging at many levels of prior computational skill. Finally, it is based on an object-oriented scripting language supporting rapid

prototyping and literate programming. We plan to continue extending the breadth of materials covered by the toolkit. We are currently working on NLTK modules for Hidden Markov Models, language modeling, and tree adjoining grammars. We also plan to increase the number of algorithms implemented by some existing modules, such as the text classification module.
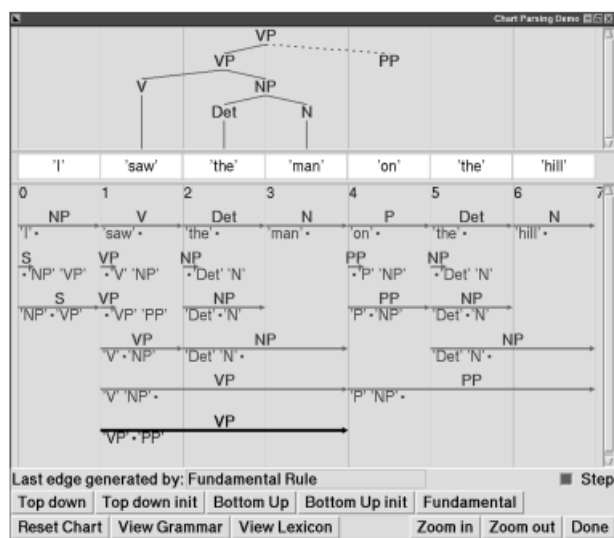

Figure 1: Chart Parsing Tool

CHAPTER 3:

REQUIREMENT ANALYSIS

We will exclusively use the Python programming language to implement our chatbot project. Moreover, we will be using Python 3.6. A list of libraries we will be using which are:

- Torch.nn
- Numpy
- Dataset, dataloader
- Flask
- BeautifulSoup

Other languages used are:

1. HTML
2. CSS
3. JavaScript

Also used:

- Bootstrap (framework)

Compiler used:

- VS Code

CHAPTER 4:
DESIGN AND IMPLEMENTATION

4.1 <u>User Interface Design:</u>

The user interface is designed using Html, CSS and Javascript. We have also designed a skeleton of a website which is displayed behind out chatbot. The website contains a nav bar, a search bar and an image carousel. We have implemented this using Bootstrap framework.

The chat box focuses more on efficiency in understanding and responding to queries rather than the look and feel of the system as the system is primarily developed to help students' admission related queries.

4.2 <u>Look and Feel:</u>

When the user runs the program and the local ip address is generated (127.0.0.1:5000). The user clicks on it and he/she is taken to the browser where they are presented with the website with the chat-box icon in the bottom-right corner.
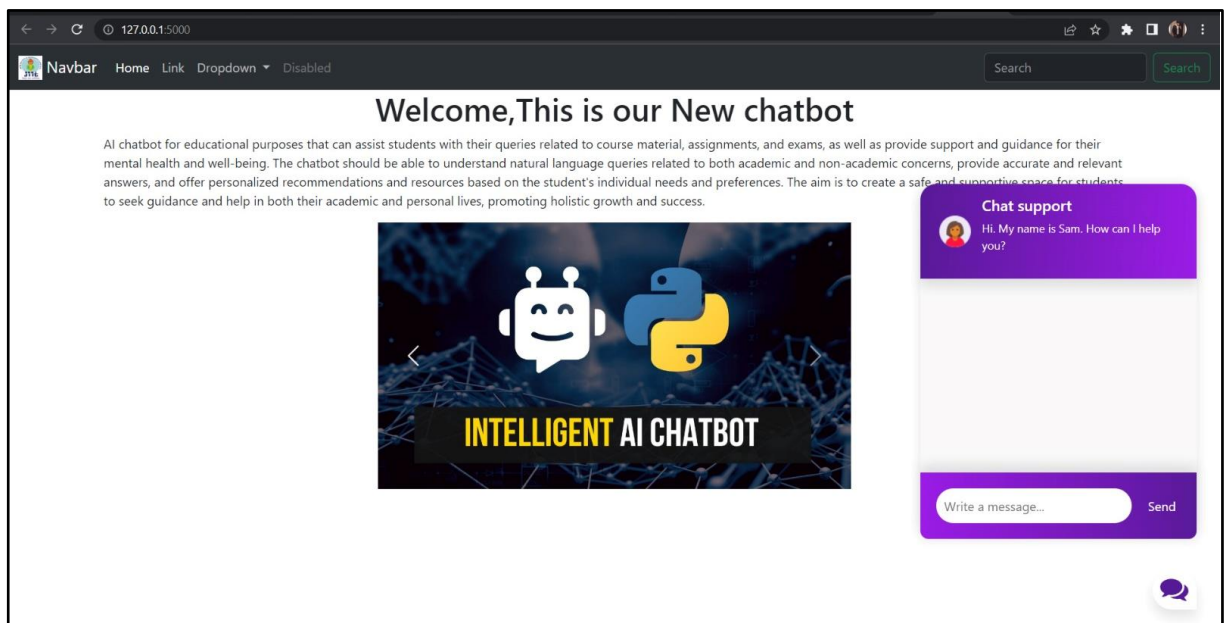
The user will click on the chat-box icon and the chat-box window will pop up. The chat box window contains the name of the AI assistant, which is SAM and a nice greeting to the user. The AI asks the user if she can be of any help to them.

The chat-box also contains an area where the user can enter their queries/doubts. Next to the text area is a send button which sends the user's query to the AI.

4.3 Greeting the bot:

Our bot greets the user again if they say hello or hi to her.
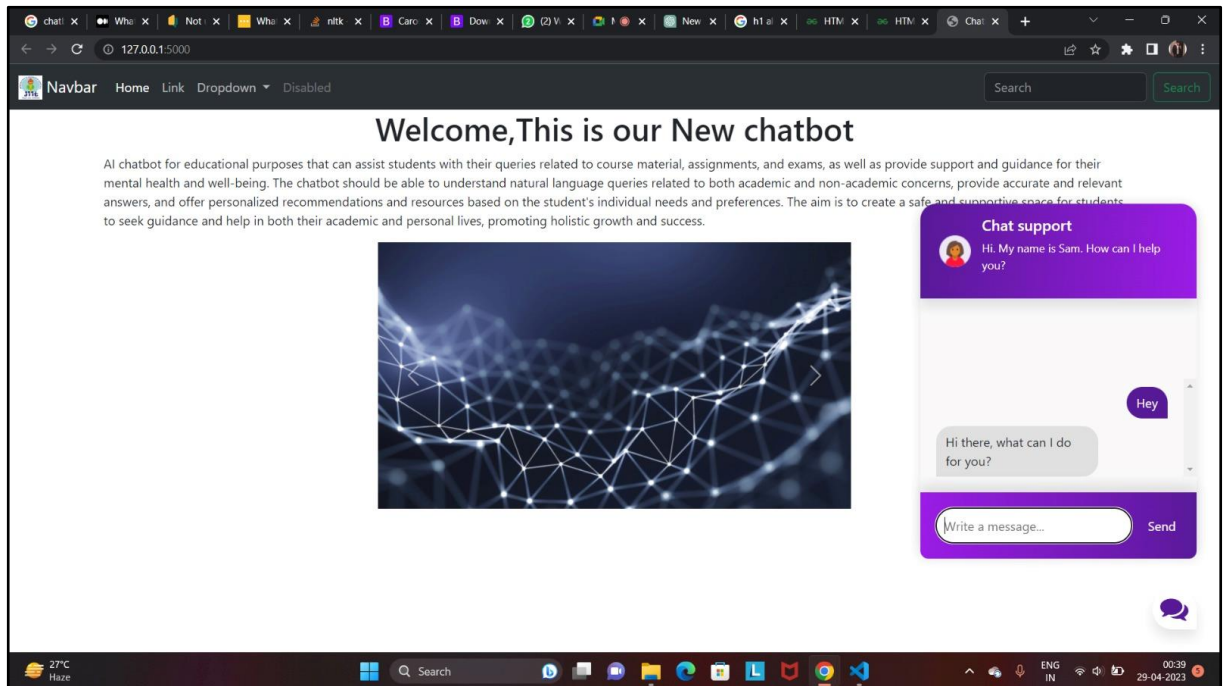
4.4 Asking Queries:

The curious user will ask the doubts they are having regarding the admission in JIIT or they just want to know about the college.

For example, if the user wants to know about the placement record of the college, they will ask the bot "what are the placement stats?"

The AI bot will respond by providing some information about the college's placements and the placement records. But if the user is more curious about the same, the bot provides the user with a link which when pasted in the browser will take to the user to the official website of JIIT. The user can explore the website and see the other sections available.
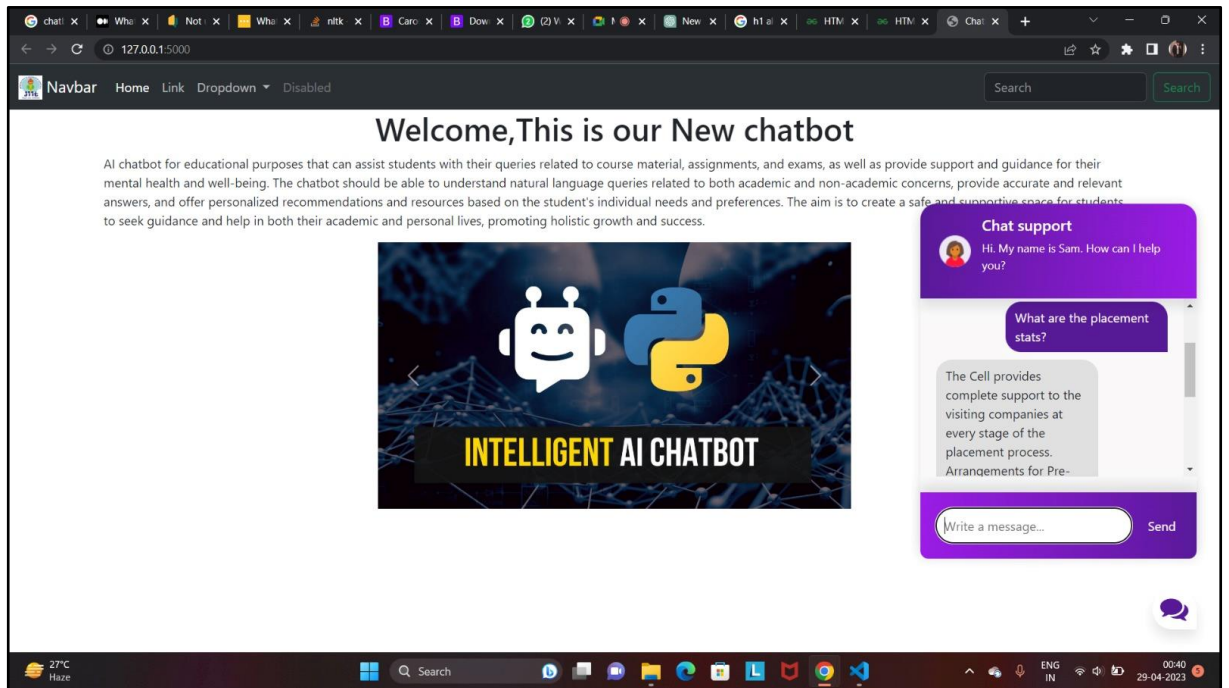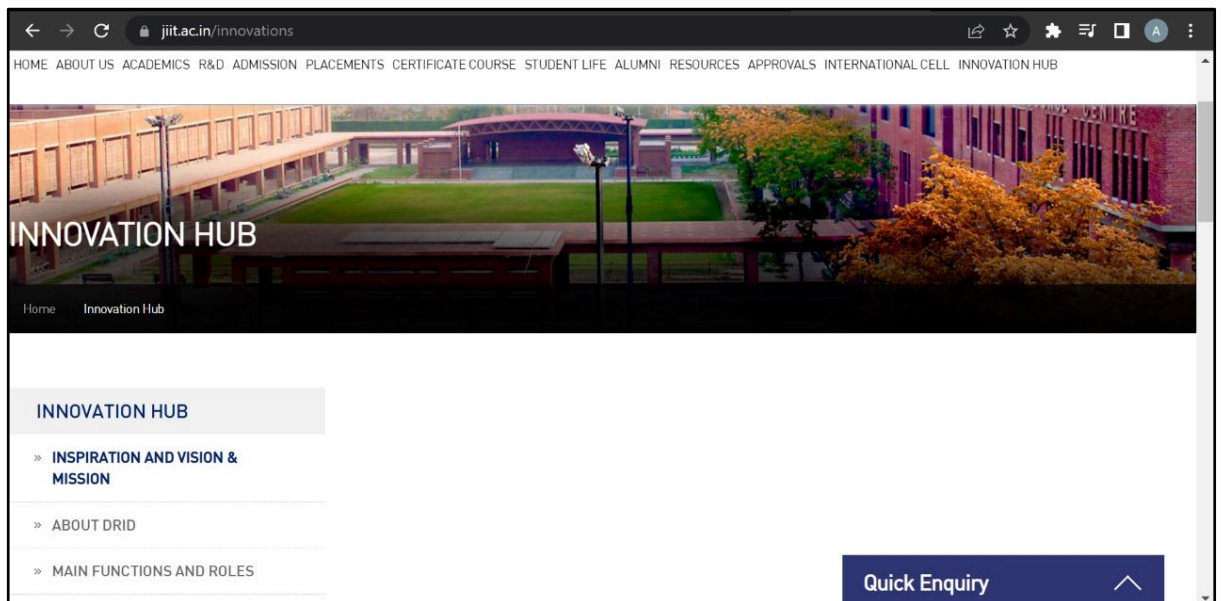
The link provided by the chatbot will lead the user to the official website:
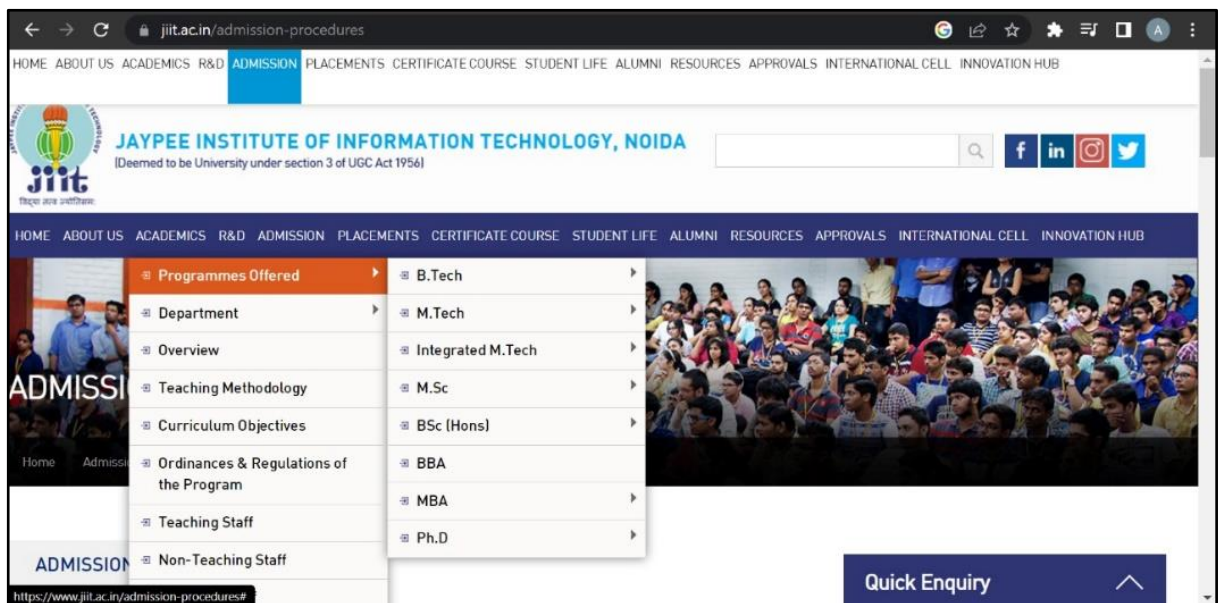
Another example of the bot's reply is, if the user wants to know about the JIIT's focus on innovation, the bot provides information about that too and provides a link to the innovation section of the official website.
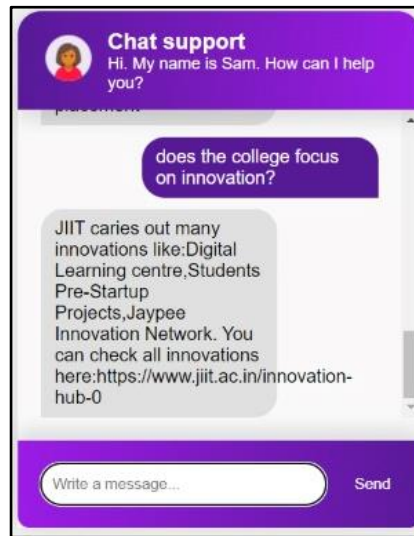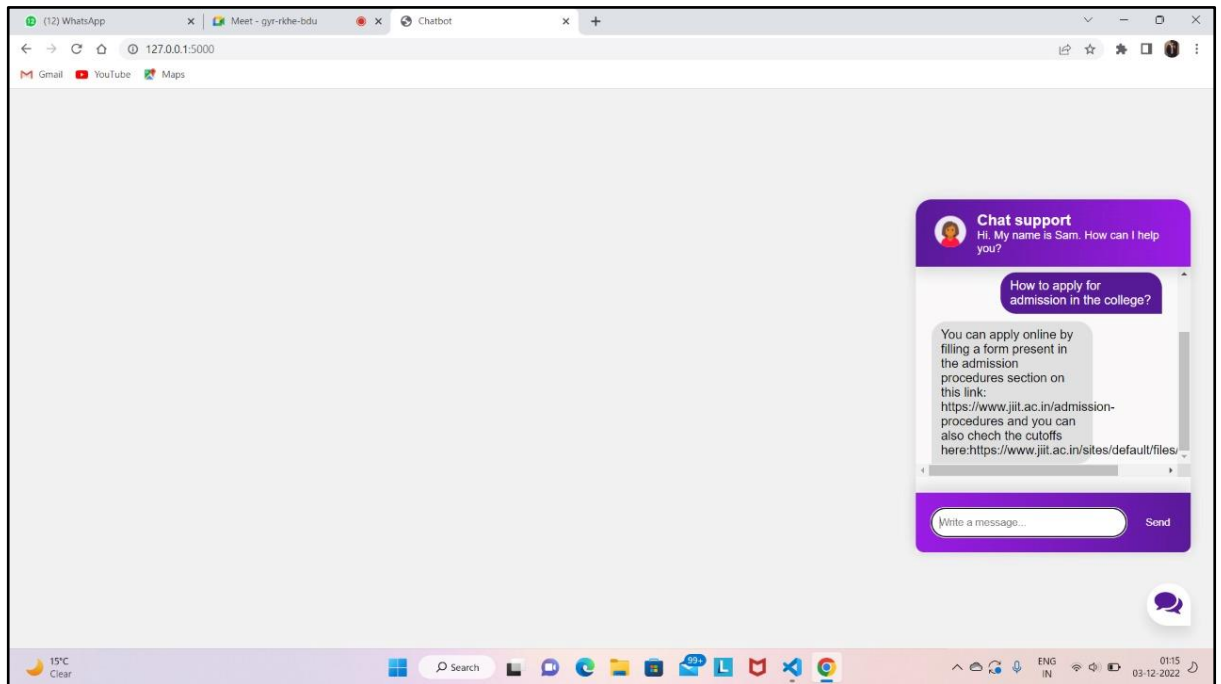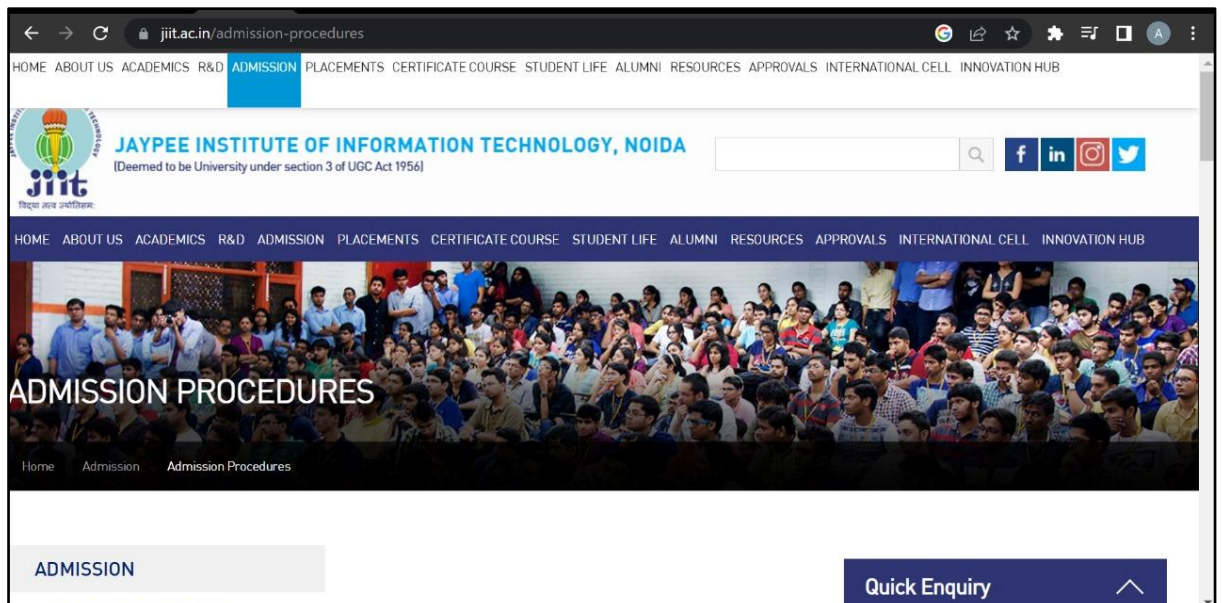

The website page the link leads to is:

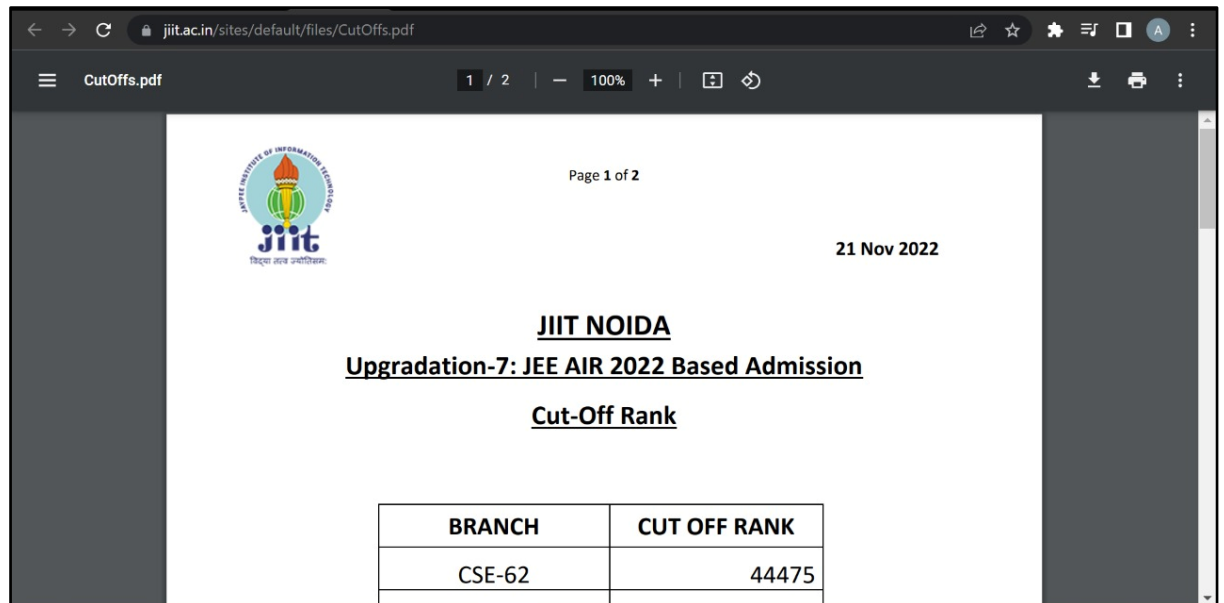## 4.5 Asking about admission:

If the user is interested in taking admission in JIIT, the bot will help the user by providing the link to admission page and the cut-off.

The user is taken to admissions page.

The user is also provided a link which contains a pdf of the cut-off list.


4.5 Mental Health:

If the user/student is going through a tough time in their life and are feeling sad or depressed they can talk to our chatbot. The chatbot will provide them with assurance and will also suggest seeing a therapist. The chatbot will also try to talk them out of suicide.
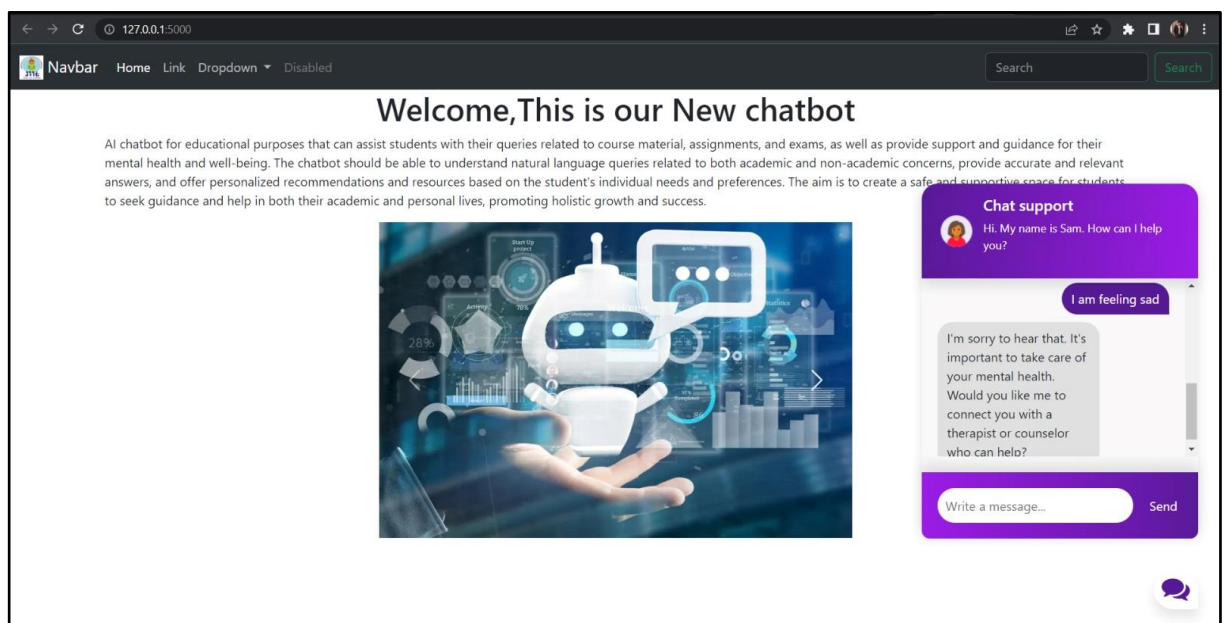
4.6 <u>Enquire about events or fests:</u>

If the user is curious about the cultural events happening in the college, they can ask about that too and the bot will provide them with the required information.
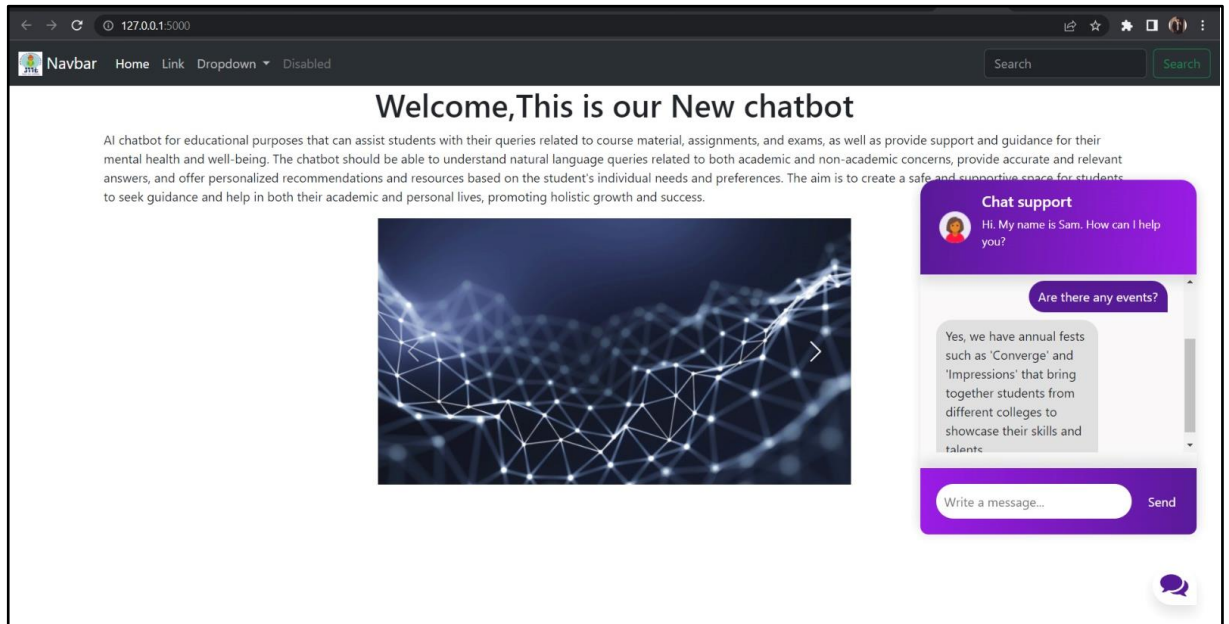
4.6 <u>Just for Fun:</u>

If the user is in a jolly mood or in some fun mood they can ask for a joke or a random fun fact, and SAM will provide them with a hilarious joke or with a random but informative fact.
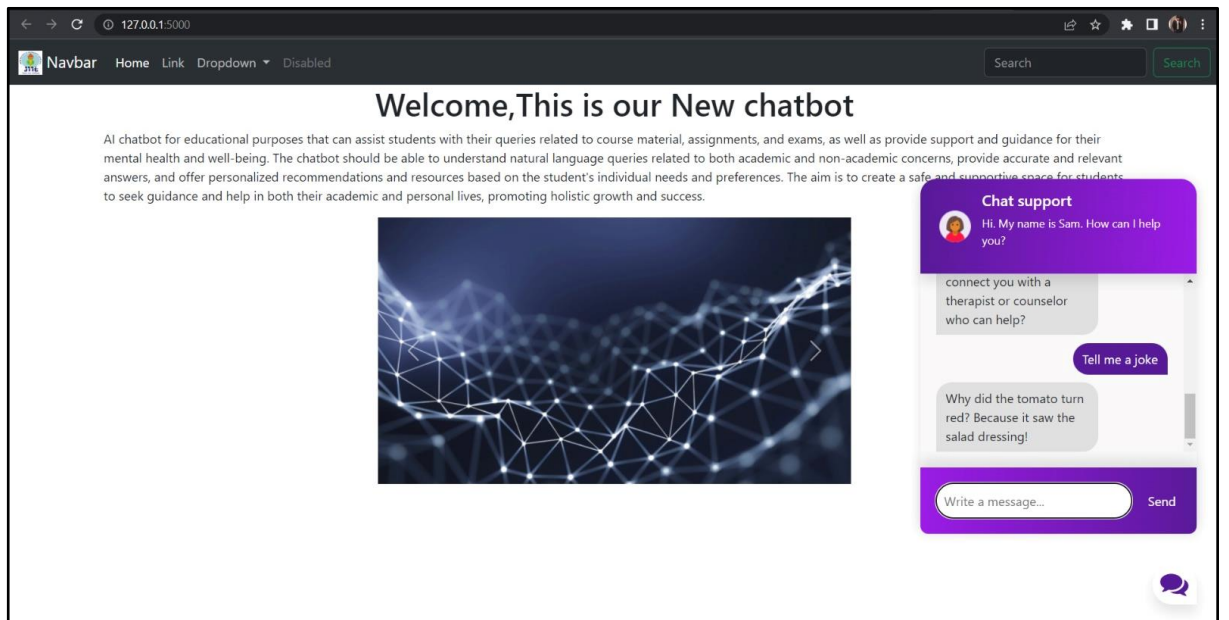
CONCLUSION OF THE REPORT AND FUTURE SCOPE

In conclusion, SAM - the revolutionary AI chatbot, has been created to assist the curious and eager individuals looking to enroll in JIIT College. With SAM's expert guidance, the admission process has become a seamless and hassle-free experience, resulting in a surge of traffic to the college's official website.

Looking towards the future, the contemporary consumer demands a personalized and top-tier customer experience. It can be a daunting task to cater to the ever-changing needs of the modern customer. However, there is one solution that ticks all the boxes - a chatbot. With SAM by your side, your organization can effortlessly provide exceptional support and conflict resolution, round-the-clock and simultaneously for countless customers.

Did you know that 90% of consumers expect an online platform for customer service? As a pivotal aspect of business growth, the demand for AI-powered chatbots will only continue to escalate. Hence, there's no better time than now to integrate a chatbot solution to keep up with the competition and stand out as an industry leader. Embrace SAM, and unlock the endless possibilities of the future!

REFERENCES

1. Boris Ruf1, Matteo Sammarco1, Marcin Detyniecki, "Contract Statements Knowledge Service for Chatbots", 2019. [Online]. Available: https://arxiv.org/pdf/1910.04424.pdf. [Accessed Wednesday November 2022].

2. "Home page," [Online]. Available: https://monkeylearn.com/natural-language-processing/ [Accessed Wednesday November 2022].

3. J. Pragaash Ponnusamy, Alireza Roshan Ghias, Chenlei Guo, Ruhi Sarikaya, "Feedback-Based Self-Learning in Large-Scale Conversational AI Agents", 2019. [Online]. Available: https://arxiv.org/pdf/1911.02557.pdf [Accessed Wednesday December 2022].

4. Suzana Ilic, "Designing dialogue systems: A mean, grumpy, sarcastic chatbot in the browser", Thursday November 2022. [Online]. Available: https://arxiv.org/pdf/1909.09531.pdf. [Accessed Wednesday November 2022].

5. Joanna Jablonski, "Natural Language Processing With Python's NLTK Package", [Online]. Available: https://realpython.com/nltk-nlp-python/ [Accessed Monday April 2023].

6. "Implementing Web Scraping in Python with BeautifulSoup", [Online].
   Available: https://www.geeksforgeeks.org/implementing-web-scraping-python-beautiful-soup/ [Accessed Sunday April 2023]

THANK YOU