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## **ABSTRACT**

Everyone who writes code experiences a phase where there are too many errors, which aggravates the developers and reduces the project's productivity. Lack of error-solving abilities brought on by insufficient programming expertise is the fundamental demotivator for a beginner programmer.

For most beginning programmers, it may be difficult to locate and resolve issues.

As a result, we have chosen to deploy a chatbot to address this problem because it will provide the best solution given the faults.

The majority of programming errors were predefined for newbies, while the remainder were instructions on where to get resources and how to display them to users.

This leads to unfinished projects and incomplete work duties. With competent help, one can understand and resolve this issue with ease. A thorough understanding of all compile-time errors will raise a person's coding productivity and motivation, both of which are important for maintaining consistency as a programmer.

The major goal of this project is to assist inexperienced programmers in fixing issues that arise during their programming sessions by creating an interactive chatbot that aids the user in fixing software errors.

## **1 INTRODUCTION**

More individuals will be able to use and build chatbots as a result of explanations of what they are, what to use them for, and how to make them. This will hasten the growth of the chatbot ecosystem. Technology innovation and the development of new solutions can assist in automating and simplifying more activities, allowing individuals to concentrate on more fascinating problems and complete more tasks. Chatbots have the ability to streamline and automate a variety of current tasks, accelerating the development of technology as a whole. A chatbot is a computer software created to mimic human communication, frequently using text or voice interactions, with the intention of giving users support or information. Artificial intelligence (AI) and natural language processing (NLP) technologies are used by chatbots to interpret customer enquiries and provide intuitive, natural responses. Chatbots can be designed to carry out a wide range of functions, including organising appointments, responding to commonly asked queries, offering customer service, and even processing orders. To improve user experiences and automate particular procedures, they can be linked into a variety of platforms, including chat apps, websites, or mobile applications. Chatbots' capacity to respond to users instantly and individually, without the need for human intervention, is one of their main advantages. Also, they may work around the clock, which can save firms time and money. Currently, chatbots are used in a wide range of industries and applications, ranging from healthcare and entertainment are included, as well as education and e-commerce. As a result, chatbots can offer consumers enjoyment as well as support in a variety of fields. This is the case with chatbots like Mitsuku and Jessie Humani, which focus on "small talk" and may help users feel more connected to others. In fact, users seem to find chatbots to be more interesting than a website's static Frequently Asked Questions (FAQ) page. When compared to human customer care services, chatbots are more productive and less expensive because they can assist several consumers at once. Chatbots can be used to amuse and comfort end users in addition to offering support and help to clients. Yet, there are several levels of embodiment, including how chatbots resemble humans and disclosure.

Users' involvement with and confidence in chatbots seem to be impacted by how and when the nature of the chatbot is exposed to the user. Users' involvement with and trust in chatbots seem to be impacted when the nature of the chatbot is known to them.

**TYPES OF CHATBOT**

There are different kinds of chatbots, and they can be divided into groups based on the features they offer and the way they were created. Here are a few popular varieties of chatbots:

Chatbots that are built utilizing predetermined rules and scripts to control their behavior and answers are known as rule-based chatbots. They are rather basic and can only respond to certain questions for which they have been trained.

AI-powered chatbots: These chatbots employ machine learning and artificial intelligence to adapt to user input and get better over time. Complex queries can be handled, and more individualized interactions can be had.

Virtual assistants: These chatbots are created to help users with particular jobs or issues. They frequently connect with other programmes and can carry out operations such making a purchase or creating a reservation.

Chatbots for social media: These bots are made to communicate with users on sites like Facebook and Twitter. They can answer frequently asked questions or offer client assistance.

Voice-activated chatbots: These chatbots communicate with users by using voice recognition technology. They are frequently found in virtual assistants or smart home gadgets like Google Home or Alexa.

Gaming chatbots: These bots were created with gaming in mind. They can be applied to make games more interactive or to give players hints, techniques, and advice.

Chatbots for education: These bots are made to support learning and problem-solving for students. Students can receive individualized comments and support from them, increasing the interaction in the learning process.

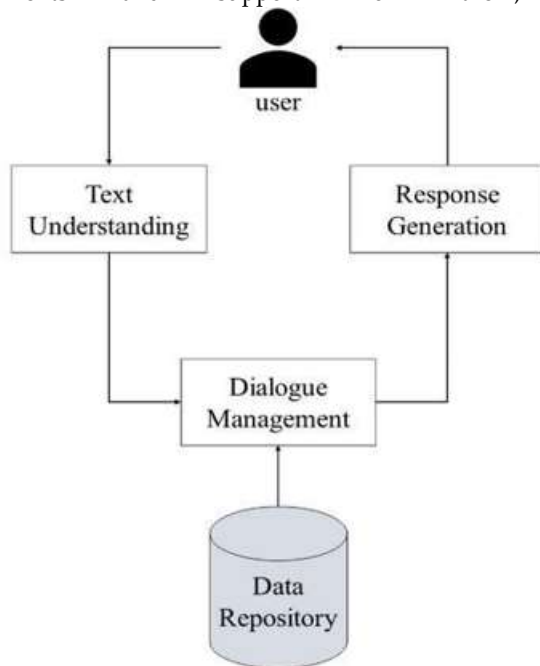


Fig: Chatbot Architecture

**2. LITERATURE SURVEY AND RELATED WORK**

Using the information we acquired from the literature review, we outline the key characteristics of chatbots in this section. deployment strategies, publicly accessible databases utilized in earlier data-driven approaches to chatbot implementation, the primary metrics for gauging chatbot performance, and the use of chatbots across various industries.

SOURCES:

[1]N. Thomas (2015) A chatbot for e-commerce that uses AIML and LSA: In this study, he focused on avoiding random, inaccurate responses and using LSA to provide accurate responses to consumers.

[2] Lue Lin, Rafael Banchs, and Luis Fdo D'Haro [2016] Rafael Banchs and the Web-based Framework for Collecting of Human Chatbot



Interactions The chatbot design, which is a work on the web-based framework, is presented in the paper. The Web Chat was a crowdsourced endeavor that could gather and annotate human chatbot encounters. It was proposed by Lue Line, Luis Fernando D'Haro, and Rafael E.Banchs in the HAI journal.

[3]Asaad Balla Falemula Babiker [2017]; Teddy Surya Gunawan; Nanang Ismail Intelligent Telegram Chatbot Creation Using Natural Language Processing The goal of this article is to use TelegramAPI and natural language processing to build a chatbot that mimics a human. First, Python text processing using the Telegram API was created.

[4] Anusha D. Kulkarni and Akash Balachandar [2018] Recruiting Chatbots, International Research Journal of Engineering and Technology, Volume 5, Issue 8, August 2018.

Intelligent Chatbot for Simple Web-Analytics Insights [5] Ravi, R. A conference on advances in computing, communications, and informatics was held in 2018 (ICACCI) (pp.2193-2195). IEEE

[6] Drs. Daniel Kelly and Kevin Curran [2019] EEE521 final year project report from the school of computer, engineering, and intelligent systems, "Task-based Interaction Chatbot"

## IMPLEMENTATION STUDY

### IMPORT LIBRARIES:

#### TENSORFLOW:

A free and open-source software library called TensorFlow is used for differentiable programming and data flow across a variety of activities. It is a symbolic math library that is also utilized by neural network applications in machine learning. Google uses it for both research and production. The Google Brain team created TensorFlow for usage within Google. On November 9, 2015, it was made available under the Apache 2.0 open-source license.

#### NUMPY:

A general-purpose array processing package is called Numpy. It offers a multidimensional array object with outstanding speed as well as capabilities for interacting with these arrays. It is the cornerstone Python module for scientific computing. It has a number of characteristics, including the following crucial ones:

1. A strong object for an N-dimensional array
2. Advanced (broadcasting) features
3. C/C++ integration tools also Fortran code
4. Practical knowledge of linear algebra, the Fourier transform, and random numbers

In addition to its apparent scientific applications, Numpy is a powerful multi-dimensional data container. Numpy's ability to establish any data-types makes it possible for Numpy to quickly and easily interact with a wide range of databases.

#### PANDAS

With its potent data structures, Pandas, an open-source Python library, offers high-performance data manipulation and analysis tools. Python was mostly utilized for data preprocessing and munging. It did not make much of an impact on data analysis. Pandas figured out the solution. Regardless of the source of the data input, we may complete the five standard processes of data processing and analysis using Pandas: prepare, modify, model, and analyze. Pandas and Python are both used in many different academic and professional sectors, such as finance, economics, statistics, analytics, etc.



#### SCIKIT-LEARN

With a standardized Python interface, Scikit-learn offers a variety of supervised and unsupervised learning techniques. It is distributed under several Linux distributions and is licensed under a permissive simplified BSD licence, enabling both academic and commercial use.

#### BS4(BEAUTIFUL-SOUP)

A Python package called BeautifulSoup can extract data from XML and HTML files. It provides natural means of traversing, searching, and altering the parse tree in conjunction with your preferred parser. Programmers frequently end up saving hours or even days of effort.

#### FLASK:

A Python package called Flask serves as a web framework that makes it simple to create web apps. Its core is compact and simple to expand; it's a microframework that doesn't have any features like an ORM (Object Relational Management).

### 3 PROPOSED WORK AND ALGORITHM

This is an automated chatbot designed to respond to users' frequently asked questions. Earlier, natural language processing techniques were used to design this robot, but its accuracy of providing the correct answer was lower. Now, however, due to Deep Learning algorithms, its accuracy of providing the correct answer has increased. Accordingly, in this project, we are building a CHATBOT application using Python deep learning. To put this strategy into practice, we first train deep learning models with training data (all potential answers to questions), and whenever a user asks a question, the application will use this test question on the trained model to predict the precise answer for that question. Formerly, firms would employ people to respond to customer inquiries, but with the help of our programme, we can do it without using any labor force. Software that uses artificial intelligence to chat with people is known as a chatbot. Chatbots are typically employed to answer to users fast. Automated conversational interfaces, also known as "Chabots," provide users a new method to communicate with computers. Typically, utilizing a search engine or filling out a form is required to get a software application to answer a query. Users can easily ask queries to a Chabot in the same way they would to a human. There are numerous well-known voice-based chatbots on the market right now, including Siri, Amazon, and Google Assistant. Chatbots are currently being embraced by computer chat systems at a rapid rate. Python deep learning neural networks and NLTK (natural language processing kit) are being used to carry out this research. Language Processing API) to process text data used for training and testing.

#### BENEFITS OF THE PROPOSED SYSTEM

1. Enhanced capabilities: The suggested chatbot system may have improved capabilities that enable it to carry out a larger range of tasks and offer more thorough responses.
2. Personalization: The suggested chatbots can be configured to adapt their responses to each user's preferences or history of interactions, which boosts user engagement and satisfaction.
3. Better handling of complex questions: The proposed chatbot system might be better able to manage inquiries that are complex or don't follow the scripted answers.
4. More accurate responses: A proposed chatbot system may respond to user inputs more accurately and comprehend it better with improved machine learning capabilities.
5. Adaptability: A proposed chatbot system may be built to learn from and adjust to new data and user behaviours, enhancing its capacity to give pertinent and timely information. current reactions.
6. Less reliance on pre-existing data: A proposed chatbot system may be less dependent on pre-existing data sets with increased machine learning skills, enhancing its capacity to offer pertinent and current responses.
7. Increased emotional intelligence: The suggested chatbot system may be built to identify and react properly to users' emotions, boosting user engagement and pleasure.

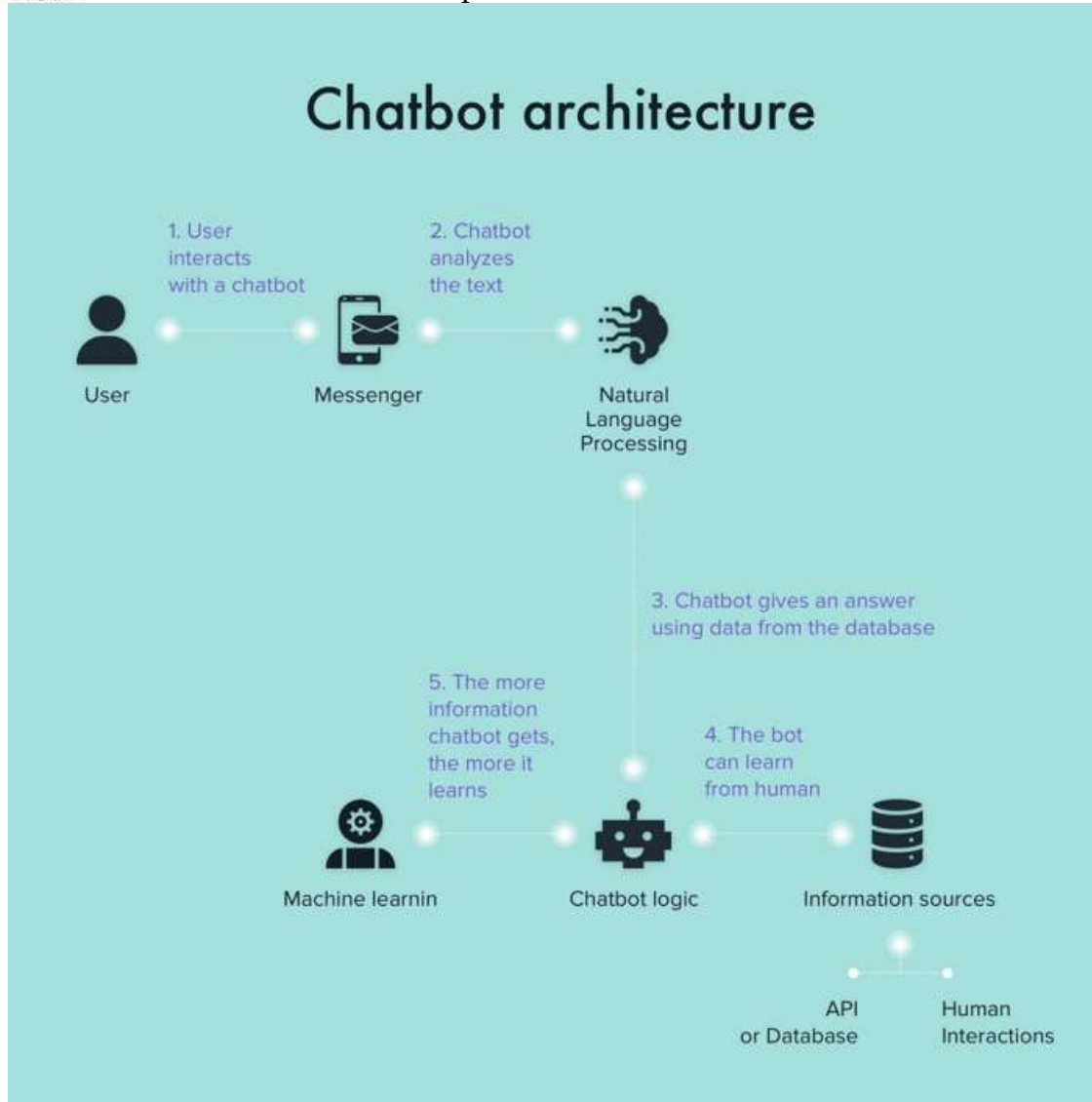


Fig: Proposed Chatbot Architecture

#### 4 METHODOLOGIES

An effective tool for enhancing a chatbot's functionality is machine learning. These are some broad guidelines for integrating machine learning into a Python-based chatbot.

##### NLP(NATURAL LANGUAGE PROCESSING) (NATURAL LANGUAGE PROCESSING)

1. NLP (Natural Language Processing) trains data using machine learning techniques. Several techniques, such as supervised learning, unsupervised learning, and semi-supervised learning, are used in NLP to train data.

2. Supervised learning is the process of developing a model from labeled data, where each input has a corresponding label for the result. For instance, a collection of user inputs would be labeled with the appropriate intents and entities in a chatbot setting. This labeled data is then used by the machine learning algorithm to discover relationships and patterns between inputs and outputs, enabling it to make precise predictions. on fresh, new information.

3. In contrast, unsupervised learning includes training a model on unlabeled data without any predetermined output labels.



Unsupervised learning aims to find structures and patterns in the data that may be utilized to classify comparable inputs. Unsupervised learning may be used in a chatbot setting to group comparable user inputs based on their semantic similarity or shared subjects.

4. Semi-supervised learning, which combines supervised and unsupervised learning, uses both labeled and unlabeled data, but only a limited quantity of each. This method can be especially helpful when it is difficult or expensive to gather huge amounts of labeled data.

5. Following training, the model can be tested to gauge its performance on a different set of data. By contrasting the projected outputs with the actual outputs in the test data, the performance of the model is evaluated. The model is modified and retrained repeatedly throughout this process until it reaches the appropriate degree of accuracy on the test data.

#### A CHATBOT BASED ON NLP AND IT'S THREE PILLARS

People speak and hear using their mouths, hear and type with their ears, and read with their eyes to communicate. The UI of a chatbot must be compatible with how people communicate and exchange information. We refer to that as a dialogue system, sometimes known as a conversational agent. There are no fixed elements of the dialogue system. Nevertheless, for a dialogue system to actually a dialogue system, it must be able to both accept and produce output. They can take on a variety of forms in addition to that. Based on Modality, you can distinguish between them (text-based, speech-based, graphical or mixed) Device Design (command-based, menu-driven and - of course - natural language) Initiative (system, user, or mixed) (system, user, or mixed).

#### UNDERSTANDING NATURAL LANGUAGE

As a result, you are already aware of the importance of NLU as a subfield of NLP and are familiar with its principles. Yet, it's crucial to note that the most glaring flaw in current NLP-based chatbots is their inability to understand what the user is saying. Simply put, human languages are far too complex. They have huge vocabulary sizes in addition to having various meanings, many of which are utterly unrelated. a robot Most people won't mind if your reaction is a little reserved if it shows that you understand the users and meet their needs. The reverse of this does not apply. Someone won't care if a bot has the best small-talk abilities if it can't effectively interpret natural input. Not in the least!

#### GENERATION OF NATURAL LANGUAGE

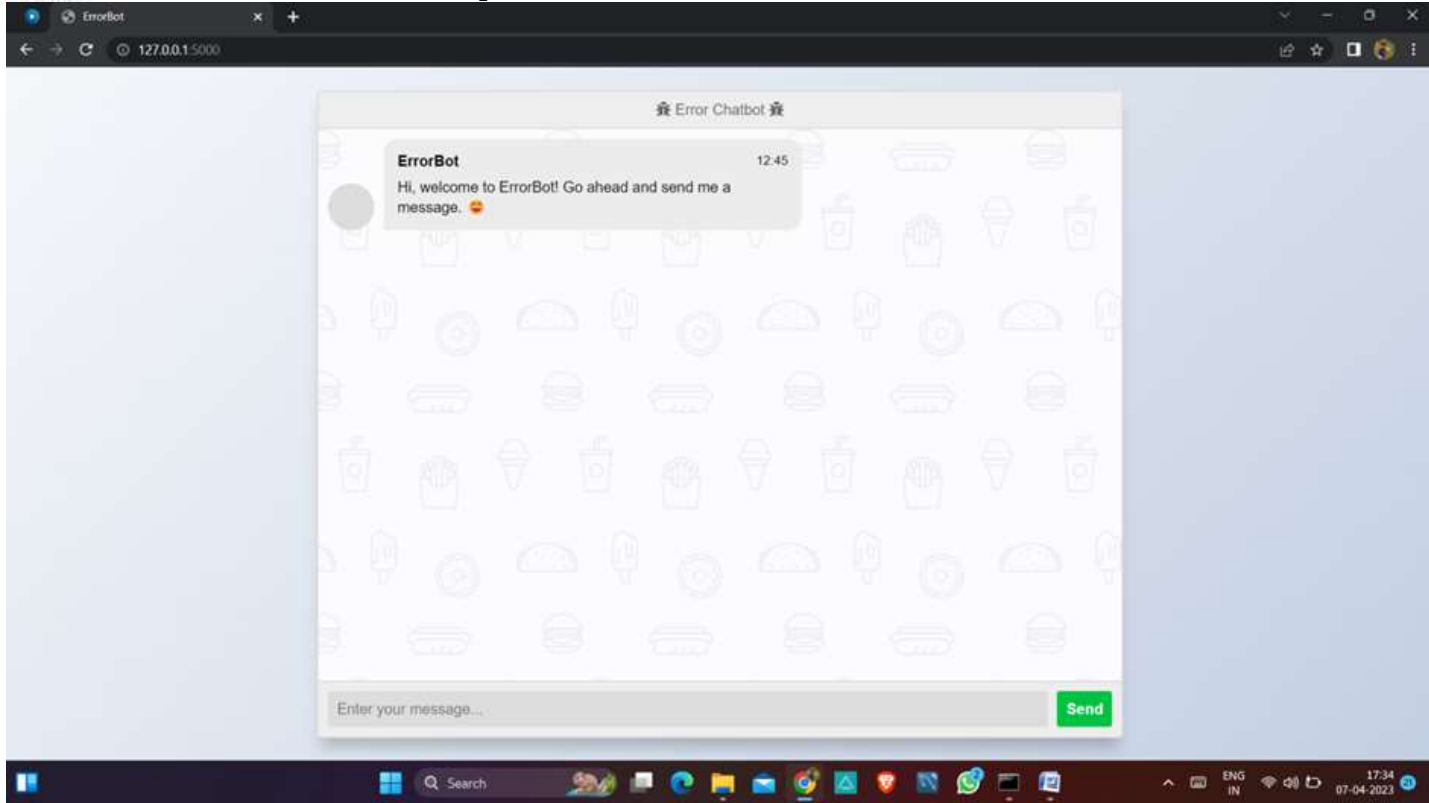
The NLP chatbot will determine an acceptable response and "translate" it back to natural language after properly parsing and comprehending the user's input.

The response obviously doesn't just arise out of nowhere.

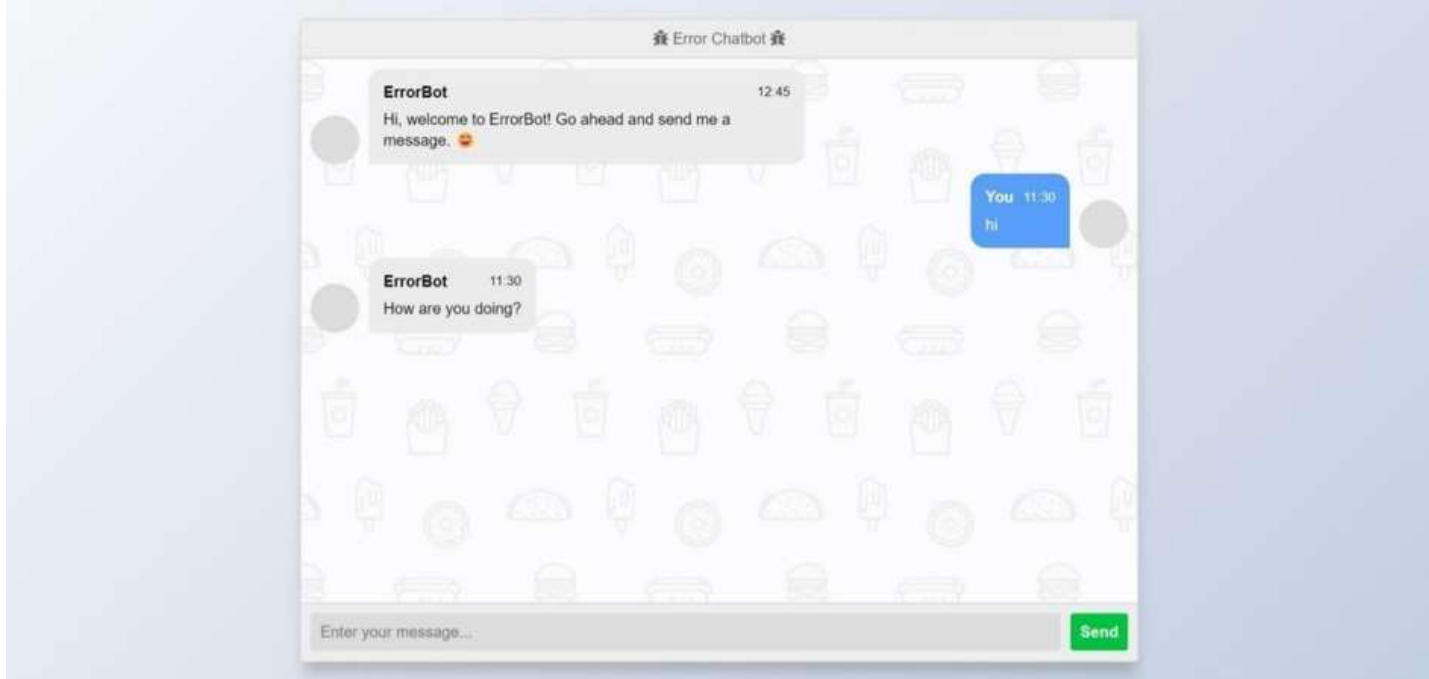
The content's format needs to be specified for the NLP to produce a human-friendly narrative, whether through rules-based workflows, templates, or intent-driven techniques. To put it another way, the bot needs a tool to use. in order to produce that result.

#### RESULTS AND DISCUSSION SCREENSHOTS

##### INTERFACE OF CHATBOT



### INTERACTION WITH CHATBOT

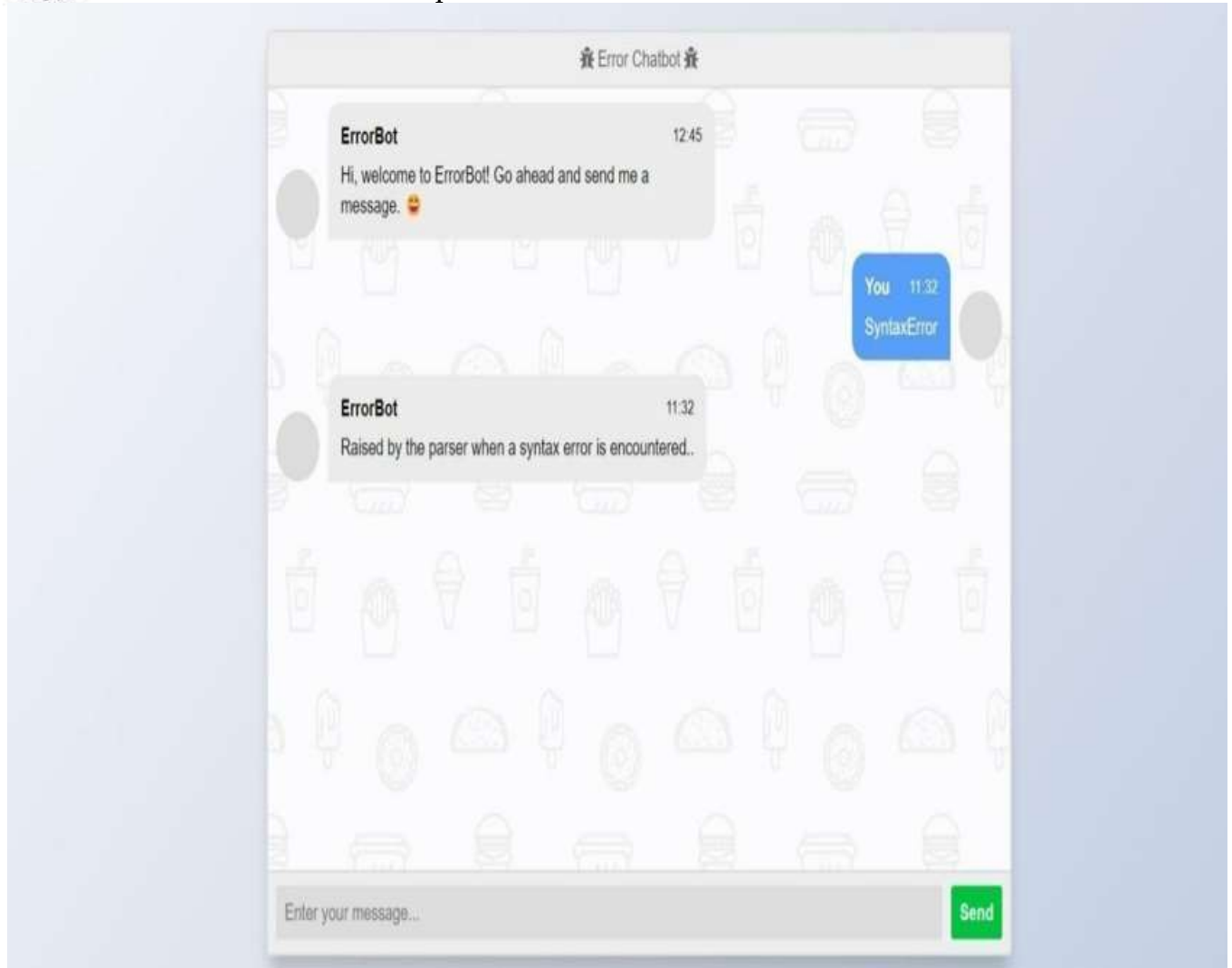




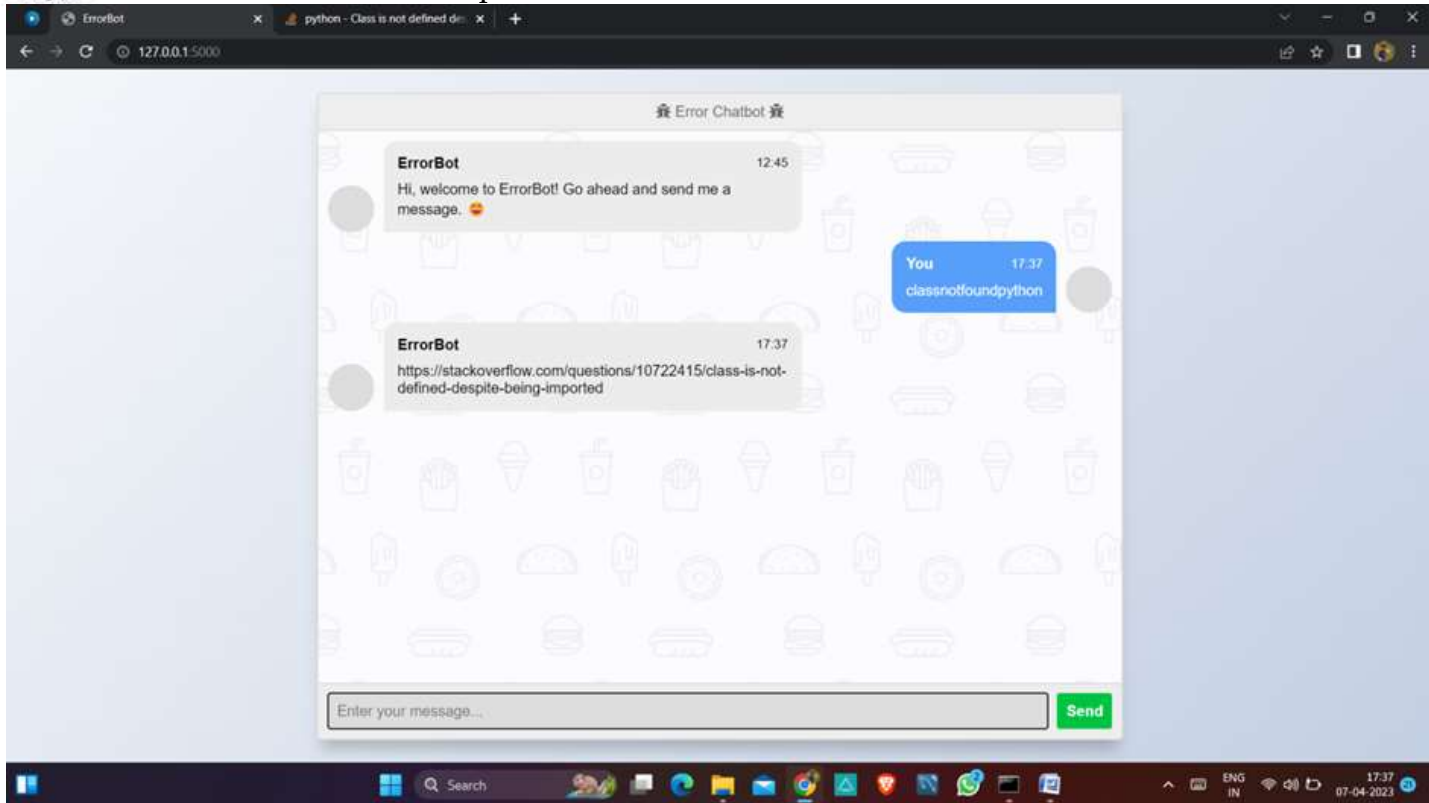
### PLACING THE ERROR SYNTAX BY THE USER PREDEFINED

### ERRORS

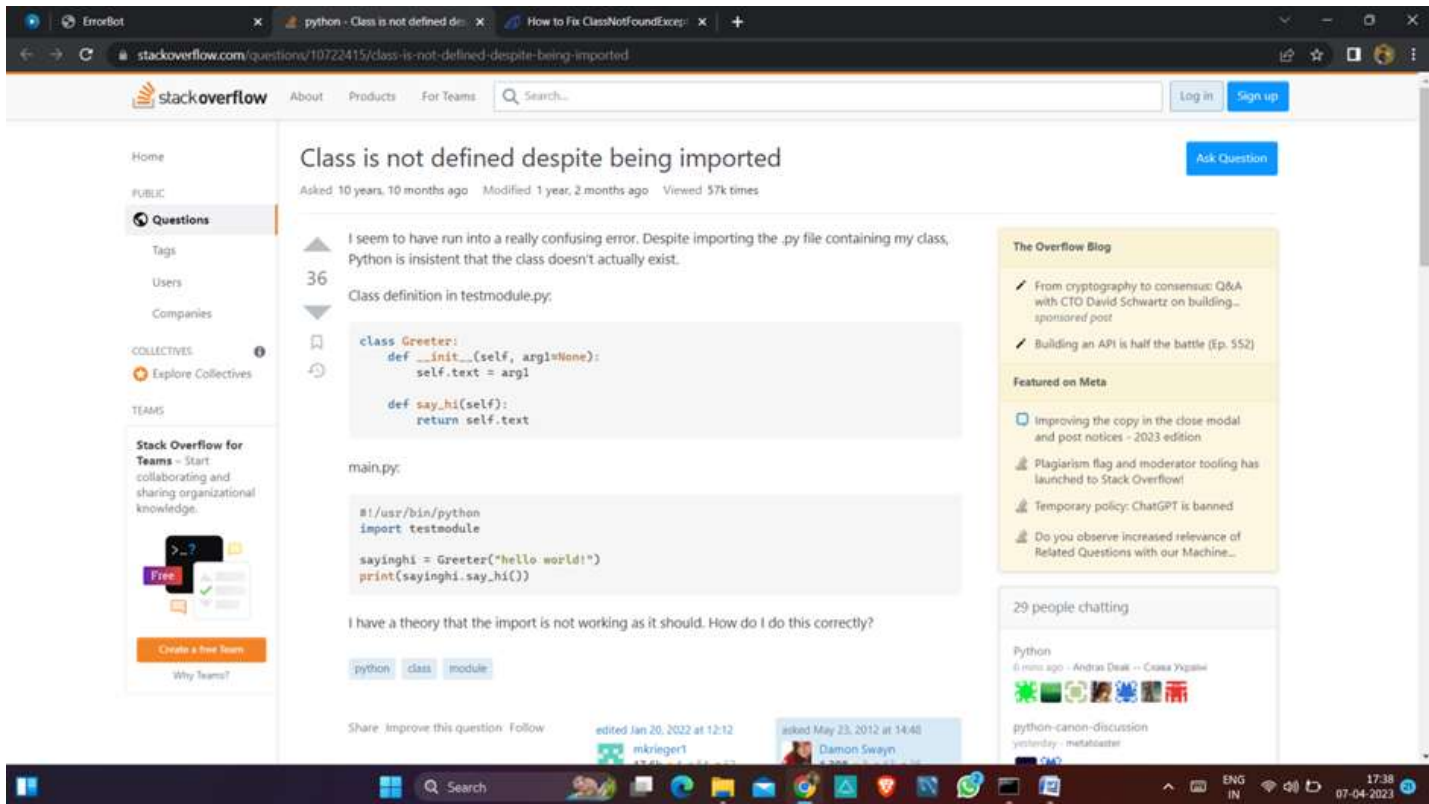




## USER ERRORS



### RETRIVING THE ERROR SOLUTION FROM GOOGLE DIRECTLY





## 6. CONCLUSION AND FUTURE WORK

The principles of what chatbots are were presented in this paper. It provided an overview of concepts, items, and platforms that are currently available as well as those from the past. There has been extensive research done on the constraints, use cases, and current interest in chatbots. With the development of a sample chatbot, many implementation strategies for chatbots and conversational interfaces have been discussed, including interaction and user experience design as well as a generic, reusable chatbot software architecture. The objective was to provide an overview of what chatbots are, their use cases, and how to develop them, however not all topics could be covered in the context of this work. This information could aid in examining further chatbot usage possibilities and enable greater developers can include chatbots into fresh scenarios, enhancing overall human-machine interaction. updating the database.

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