

# AUTOBOT- AI Chatbot

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## ABSTRACT:

The vast amount of information available today presents a significant challenge: data management. Manual management is prone to errors and data loss. AI chatbots offer a solution. By collecting and analysing user data, chatbots can provide personalized recommendations, suggestions, and support. They can even remember user preferences and past interactions, creating a more engaging and customized experience. Automated data management also improves accuracy and streamlines the user experience.

Existing chatbot systems, such as A.L.I.C.E. (Artificial Linguistic Internet Computer Entity), often rely on pattern-matching techniques through AIML (Artificial Intelligence Markup Language) files. While these files provide a foundation, they lack specific functionalities.

This paper proposes a novel chatbot system called Autobot. Autobot focuses on scheduling meetings and reminders directly within the user's Google calendar. To make the interaction more engaging, Autobot utilizes unique names and introductions inspired by the Transformers characters, along with humorous and interesting phrases. This approach aims to improve scheduling efficiency, reduce missed appointments, and provide a fun and interactive user experience, particularly valuable in the corporate environment.

Key words: chatbot, ML, NLP, AIML, AI.

## INTRODUCTION:

A chatbot is a piece of software designed to mimic human communication, usually using text-based interfaces found on websites or messaging apps. Chatbots can understand user input and respond to it by combining AI (Artificial Intelligence) and NLP (Natural Language Processing).

This makes it possible for businesses to automate a variety of jobs, such as responding to client inquiries, providing information, and even making tailored recommendations.

As businesses and organizations look to improve consumer interaction and streamline their operations, the use of chatbots has seen a recent uptick in popularity. Platforms like messaging apps, websites, and mobile apps can all easily incorporate chatbots. Their presence enables businesses to provide customers with quicker and more effective customer service, freeing human employees to concentrate on more complex responsibilities.

While still a relatively new technology, chatbots possess immense potential in improving customer experiences and increasing operational efficiency. They represent an exciting advancement in the realms of customer service and digital communication.[1]

on obligations that are more complicated. Chatbots have a lot of potential for enhancing customer experiences and boosting operational efficiency, despite being a relatively new technology. They signify a fascinating development in the fields of digital communication and customer service. [1,2]

Chatbots come in two primary categories:

Chatbots that function according to a predetermined set of rules and patterns are known as rule-based chatbots. They have a predetermined approach and can react to certain words or phrases. Rule-based chatbots perform well for clear and easy conversations but struggle with requests that are complex or unexpected and don't fit within their predefined rules.

AI-Powered Chatbots: These bots use machine learning and natural language processing (NLP) methods to comprehend human speech and produce responses that are human-like. Through user interactions, they can pick up new skills and gradually get better at what they do. AI-powered Chatbots are more flexible and capable of handling a wide range of queries and conversational nuances. [2,3]

## **LITREATURE REVIEW:**

The prevalence of chatbots has dramatically increased recently as businesses and organizations from a variety of industries actively investigate their potential to improve consumer interaction

and streamline operations. The usefulness of chatbots in a variety of contexts, including customer service, e-commerce, and healthcare, has been the subject of numerous studies. [1,2] These studies seek to comprehend how chatbots might be used to enhance consumer interactions, enable simple online transactions, and offer effective support in the healthcare industry. [3] The impact of chatbots on customer satisfaction in e-commerce contexts was investigated in a study by Aloba et al. (2020). The results showed that chatbots improved customer satisfaction by speeding up response times and efficiently handling simple customer inquiries. According to the study, chatbots were most effective when clients had straightforward issues that the chatbot could handle well. [3,4]

In the healthcare industry, chatbots have proven useful for a variety of activities, from symptom evaluation to drug monitoring. A review by Adly et al. (2020) discovered that chatbots have the potential to lessen the strain of healthcare professionals, increase patient involvement, and increase access to healthcare services. Nevertheless, it's critical to recognize chatbots' limitations. According to a study by Kim, Lee, and Lee (2020), users may become frustrated if chatbots have trouble correctly understanding complicated or confusing user inputs. [5] According to Bhatia and Jain (2021), there have also been worries expressed about the prospect that chatbots could exacerbate or perpetuate already-existing inequities, particularly in industries like financial services or recruitment. According to the existing research, chatbots have the ability to improve consumer engagement and operational efficiency in a variety of scenarios. [6] Organizations must, however, approach chatbot deployment carefully, taking into account all the potential drawbacks and hazards. Designing chatbots with ethical and inclusive principles in mind is crucial for ensuring their responsible and impartial use. Organizations can employ chatbots to their advantage while avoiding potential risks and fostering pleasant user experiences by attending to these issues. [5,6]

| Author   | Title  | Pub. Year | Purpose  | Result |
|--|--|-----------|--|--------|
| Aloba, Afolabi,<br>and Ayo                                     | impact of chatbots   | 2020      | Increasing the customer satisfaction   | 21.67% |
| Adly, Khanna,<br>and El-Tarhouny                               | Chatbot in health care   | 2021      | Reducing the workload of health care assistance  | 27.34% |
| Gyatri Nair,<br>Soumya Jhonson<br>and v.shatya                 | Chatbot as personal assistant  | 2018      | Resume bot:<br>It shows the resume in interactive way  | 18.20% |
| Blaž Škrlič,<br>Matej Martinc,<br>Nada Lavrač,<br>Senja Pollak | AutoBOT:<br>evolving neuro-symbolic representations for explainable low resource text classification | 2021      | This paper explores how automatically evolved text representations can serve as a basis for explainable, low-resource branch of models with competitive performance that are subject to automated hyperparameter tuning. | 50%    |

|  |  |      |   |        |
|--|--|------|---|--------|
| Prateeksha<br>Varshney,<br>Yogesh<br>Simmhan | AutoBoT: Resilient<br>and Cost-Effective<br>Scheduling of a<br>Bag of<br>Tasks on Spot VMs | 2017 | This paper<br>explores<br>AutoBoT cuts<br>cloud costs for<br>tasks with<br>deadlines. It<br>mixes cheap,<br>risky VMs with<br>reliable ones,<br>using clever<br>scheduling to<br>guarantee on-<br>time work.  | 23-42% |
| Philip Pond                                  | Autobots Assemble  | 2020 | This chapter<br>breaks down the<br>secret code of<br>digital media! It<br>explains the core<br>principles<br>(logics) behind<br>how it works,<br>focusing on<br>automation and<br>connection. It<br>also explores<br>how these logics<br>were shaped by<br>history, money,<br>and even the<br>military. | 28.47% |

Table1.Representing Literature Survey

## **PROBLEM STATEMENT:**

Due to the enormous amount of information available, data management is a serious difficulty. Manual data management reduces accuracy and raises the possibility of data loss. However, AI chatbots provide a fix for this issue. [1,2] Chatbots can be programmed to give individualized recommendations, suggestions, or support by gathering and analyzing user data. These chatbots may remember user preferences and previous interactions in addition to offering bespoke responses, giving consumers a highly customized and interesting experience. Through automated data management, accuracy is improved and a seamless user experience is provided. [2,3,4]

## **EXISTING SYSTEM:**

There are also some current systems from which the concept of developing a chatbot (virtual personal assistant) application was drawn. A.L.I.C.E. The Artificial Linguistic Internet Computer Entity (A.L.I.C.E.) is one of the most well-known chatbots that uses a pattern matching strategy. Online resources for the AIML files for ALICE include categories for things like music, art, and philosophy. In order for our chatbot to function fundamentally, these AIML files are required. [5,6] A second original AIML file for the category "Meetings" has also been created, and it contains answers to inquiries specifically about meetings.[6] The pattern matching foundation of the chatbot is thus using AIML files as the project focuses more on the scheduling module.[7]

## PROPOSED SYSTEM:

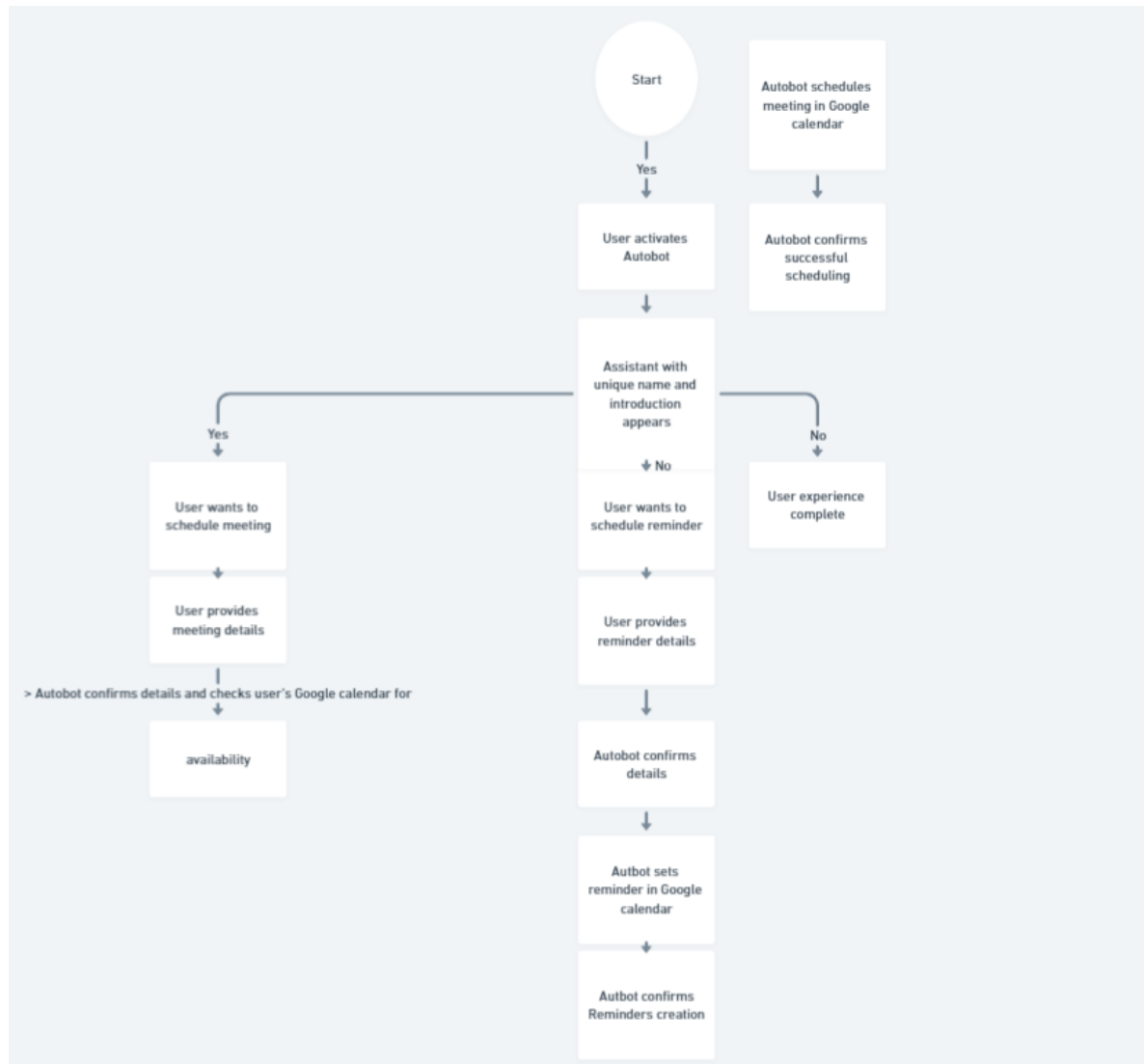


Fig:1. Working of AutoBot

Autobot is a chatbot that allows users to schedule meetings or reminders directly to their Google calendar. Each time the user activates the chatbot, an assistant with a unique name and introduction will appear. The purpose of using different names is to make the AI more appealing and engaging. These names are based on the characters in the movie Transformers, where the robots were called Autobots.

Our chatbot system offers a fun and interactive way for users to schedule meetings. This feature can be particularly useful in the corporate sector, where scheduling meetings quickly and efficiently is critical. The Autobot makes it easy to schedule meetings with just a few clicks, reducing the chance of missing important appointments. The chatbot can also engage users with humorous and interesting phrases, making the experience more enjoyable.

## **METHODOLOGIES:**

Developed for Python, SpaCy is an open-source natural language processing (NLP) module and framework. [9] It is intended to offer effective and high-performance tools for a variety of NLP tasks, including dependency parsing, named entity recognition, part-of-speech tagging, tokenization, and more. Open AI is a technology business and artificial intelligence research organization. It was established in December 2015 with the intention of advancing and creating benevolent AI for all of humanity. [9,10] Open AI seeks to advance the field of artificial intelligence through doing research, creating AI models, and more. [11]

Google Calendar API: A programming interface (API) made available by Google, the Google Calendar API enables programmers to communicate with and incorporate Google Calendar functionality into their own applications. It enables programmatic access to create, read, update, and delete events, as well as perform various operations related to calendars and calendar settings.[15]

There are four modules in architecture of AI chatbot:

- Presentation Module
- Service Module
- Data Access Module
- Database Module

## **PRESENTATION MODULE:**

An AI system's ability to make or help create presentations, slides, or other visual aids for various reasons is often referred to as a presentation module. It symbolizes the output that serves as an input for the following layers. [4,5,7]



**SERVICE MODULE:**

Gmail APIs, Calendar APIs, and maybe additional APIs are all included in a service layer.

**DATA ACCESS MODULE:**

To facilitate data transmission between the chatbot and database, this module acts as a middleman. It uses a pattern matching technique to identify pertinent content and pass it to the presentation layer. [5,7,9]

**DATABASE MODULE:**

In this system, there are three main databases. The first one, also known as the AIML database, is used exclusively to store AIML files. Like a resume, the second database provides user information on each user, including information about their name and hobbies. The third database is specifically related to the user's Google calendar.

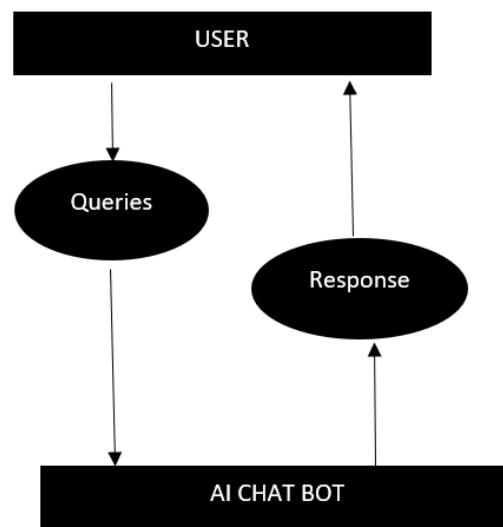


Fig:2. Architect of AutoBot

This module responds to user questions for calendar data. It uses a particular procedure to produce answers. First, the user input is compared for patterns with a set of AIML files. The user receives the appropriate response if a match is discovered. [10,12] When no match is found in the AIML files, keywords are taken out of the input. A sentence similarity algorithm from NLP is then used to compare the modified input to a predetermined question set. The connected answer is returned

as the response if a matching question is located and the confidence level is greater than 0.5. If no questions are found that match the user's input, the admin logs the input for system improvement. [15,18]

The admin has the option to incorporate the answer into the knowledge base. In cases where no suitable response is available, a random response suggesting "Answer not available" is sent to the user.

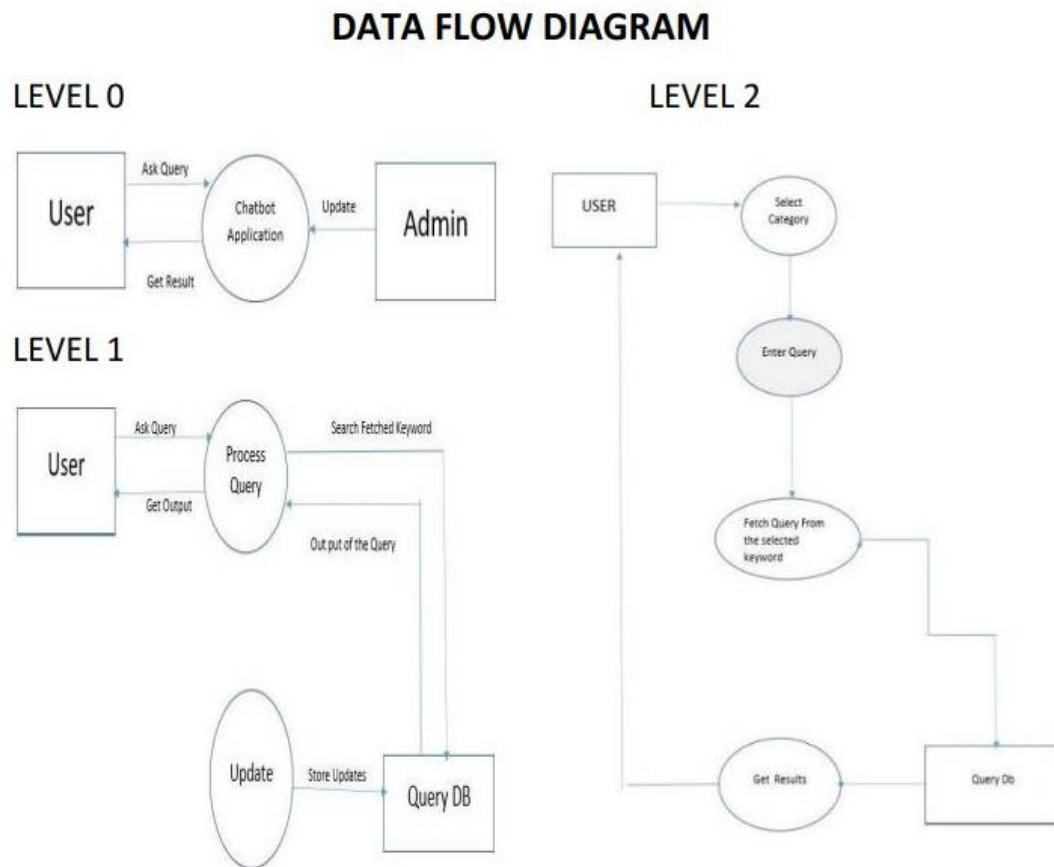


Fig :3. Data Flow Diagram

## WORKING OF CHATBOT:

The system's "classifier" analyses and processes the user's text input after it has been entered. The classifier is a computer programmed that categorizes the input and establishes the conversational purpose it corresponds with. The intent is essential since it directs the chatbot's responses. Consider the classifier as a system for dividing sentences up into various categories.[10] The input consists of the user's utterances, and the category responsible for producing a response is represented by the purpose. For instance, the classifier would recognize the question "How are you?" as having a specific intent. [14,15] Reactions like "I'm good" or "Everything is fine" would be appropriate in response to that intent.

Classifier divided into 3 types:

- I. Syntax Matcher
- II. Algorithm
- III. Artificial Neural Network

## SYNTAX MATCHER:

By utilizing pattern matching techniques, chatbots can effectively categorize user inputs and provide relevant and contextually appropriate responses. AIML serves as a popular framework within the chatbot development community for implementing pattern matching functionality.[9]

*<aiml version = "1.0.1" encoding = " UTF-8" ?>*

*<category>*

*<pattern>Who is Sundar Pichai</pattern>*

*<template>Sundar Pichai is CEO of Google</template>*

*</category>*

## ALGORITHM:

For each sort of user input in chatbot technology, a unique pattern is saved in the database. These patterns play a key role in giving consumers the right reactions. To speed up the categorization process and generate a wide variety of patterns, algorithms are used. Hierarchical structures are frequently used to organize these patterns, which improves their efficacy and manageability. Multinomial Naive Bayes is a regularly used algorithm for this purpose.

Let's look at an example where we have a list of words connected to a certain class. The number of times a new word is entered is counted, and points are given to each class. The class with the greatest score is regarded as the input word's closest match.

Few samples Input sentence classification:

Enter "Hello good morning"

Terms matching "hello" not found

"Good" (class: greeting) is a word.

The word "morning" (class: salutation)

grading: salutation (score=2)

Word matches are noted for each class using such an equation. The class with the most phrase matches is identified using classification scores. But it also has some restrictions. The score explains what the sentence most likely intends to match. There is no assurance that it is faultless. [10,11,12]

## ARTIFICIAL NEURAL NETWORK:

Weighted connections are used by Artificial Neural Networks to compute the output from user input. These connections are established by iterative techniques used in training or data processing. The weights are changed at each stage of the training or processing of the data. In the end, these weight adjustments produce outputs that are extremely accurate.

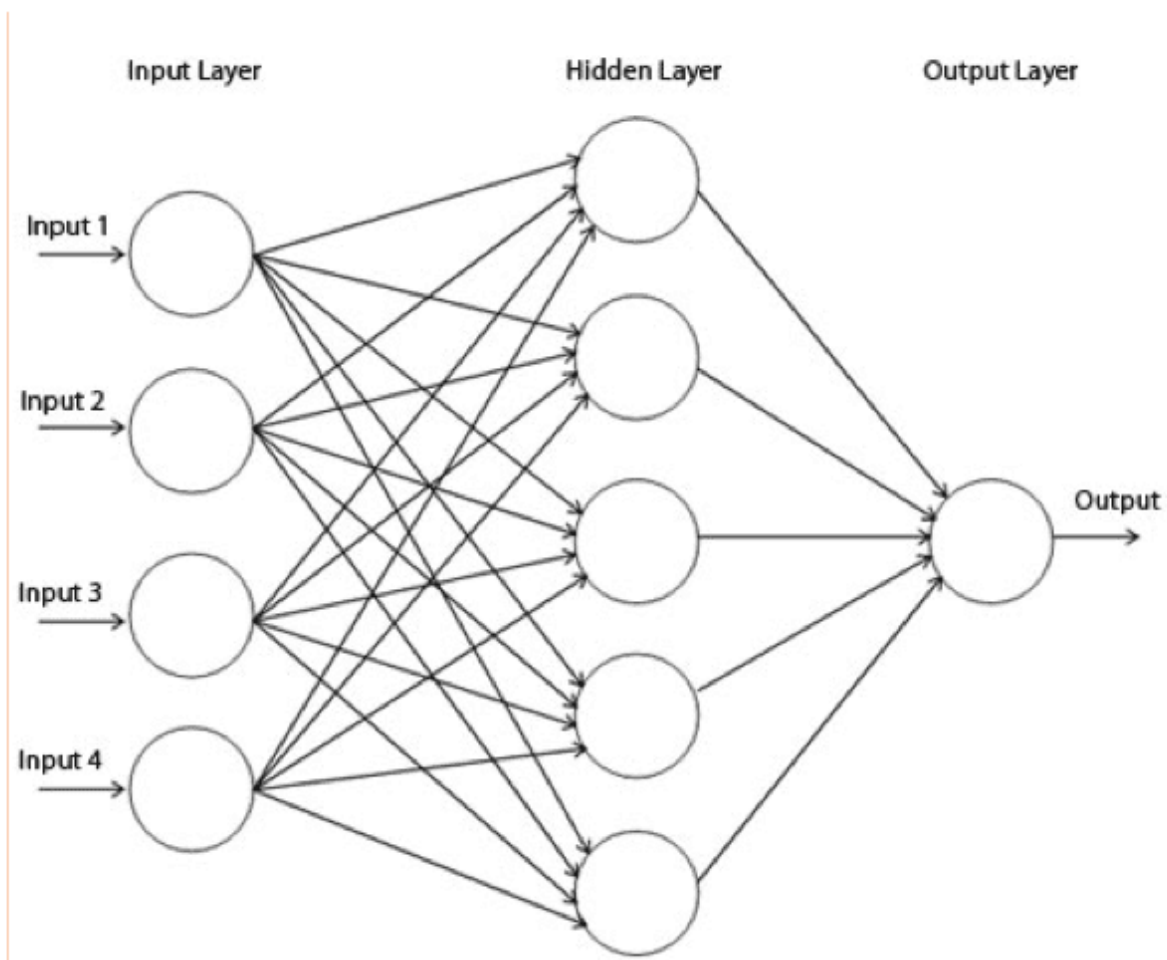


Fig:4 Artificial Neural Network Working

Within the context of Artificial Neural Networks, the input sentences are segmented into individual words. These words are subsequently utilized as inputs for the neural network. While various types

of neural networks and pattern matchers exist, it is observed that as the complexity of these models increases, the output accuracy of the chatbot improves. [15,16,18]

## **NLP:**

Chatbots use Natural Language Processing (NLP) to translate the user's input text into useful data. This process may include asking the user a series of questions. After processing the data, a suitable response or answer is produced. [4]

Identifying the sentiment or emotion expressed in a text, whether it be favorable, negative, or neutral, is known as sentiment analysis.

Tokenization is the process of separating voice or text into individual words or tokens. [7]

Detecting the underlying intention or goal of a user's input, such as a query, a request, or a command, is known as intent recognition.

Analyzing the grammatical structure and connections between words in a sentence is known as dependency parsing. [12,19]

## **TESTING AND RESULT:**

**Platform:** PyCharm

### **Configuration:**

Operating System: Windows 11, Windows10, Mac OS

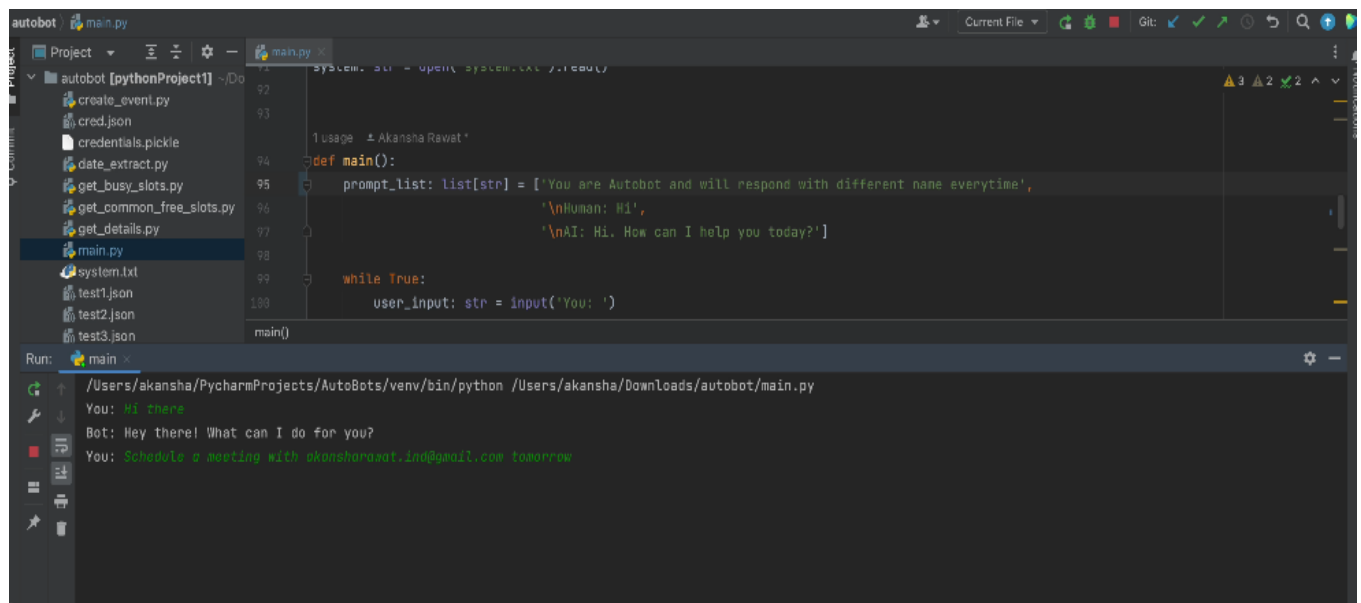
RAM: 8Gb & 16GB

GPU: NVIDIA RTX 3050, MAC Integrated GPU, Intel Integrated

Processor: Intel i5 11<sup>th</sup> Gen, Intel i3 11<sup>th</sup> gen, Apple M2 Chip

## Testing:

- To evaluate Autobot's effectiveness in scheduling meetings and enhancing user experience, a user testing session was conducted with participants. During the testing phase, we assessed factors including accuracy of scheduling, user satisfaction with interface, clarity of instructions.



```
autobot main.py
Project
  autobot [pythonProject] ~\Do
    create_event.py
    cred.json
    credentials.pickle
    date_extract.py
    get_busy_slots.py
    get_common_free_slots.py
    get_details.py
    main.py
    system.txt
    test1.json
    test2.json
    test3.json
  Run: main
    /Users/akansha/PycharmProjects/AutoBots/venv/bin/python /Users/akansha/Downloads/autobot/main.py
    You: hi there
    Bot: Hey there! What can I do for you?
    You: Schedule a meeting with akansha@axat.in@gmail.com tomorrow
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Fig:5. Introduction to Chatbot

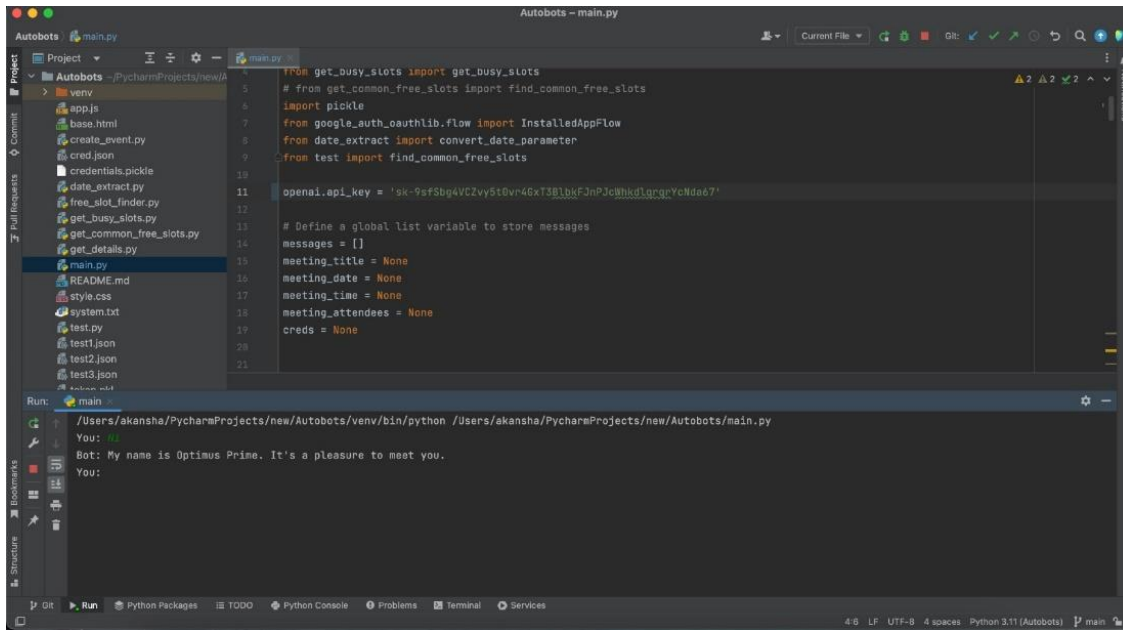


Fig:6. Response of Chatbot

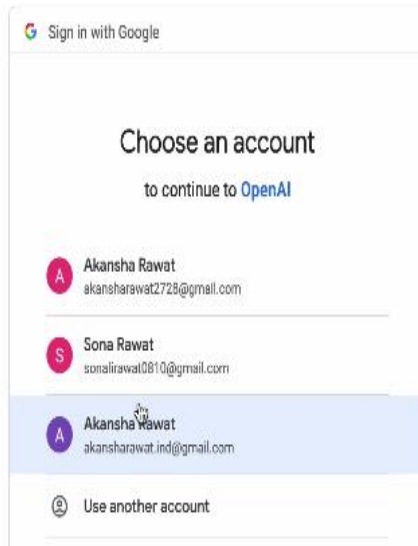


Fig:7.Account selection



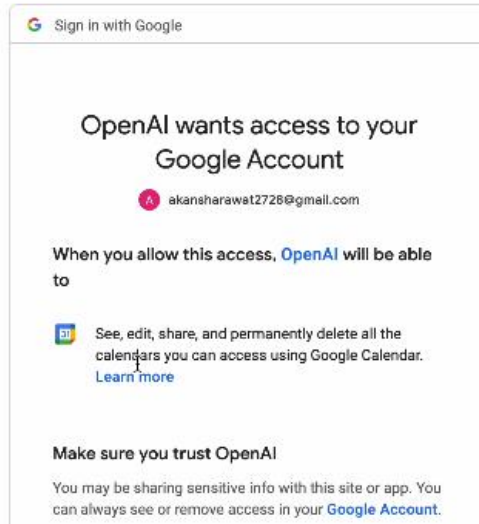


Fig:8. Authorization

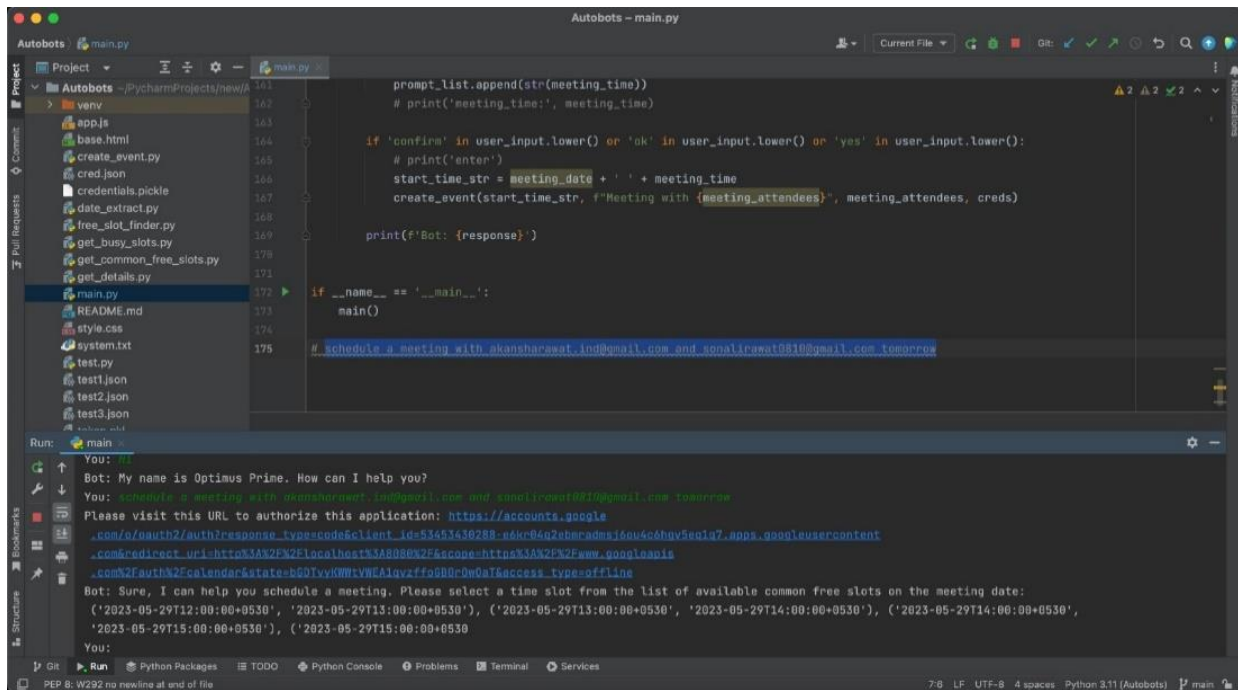


Fig:9. Authentication Success

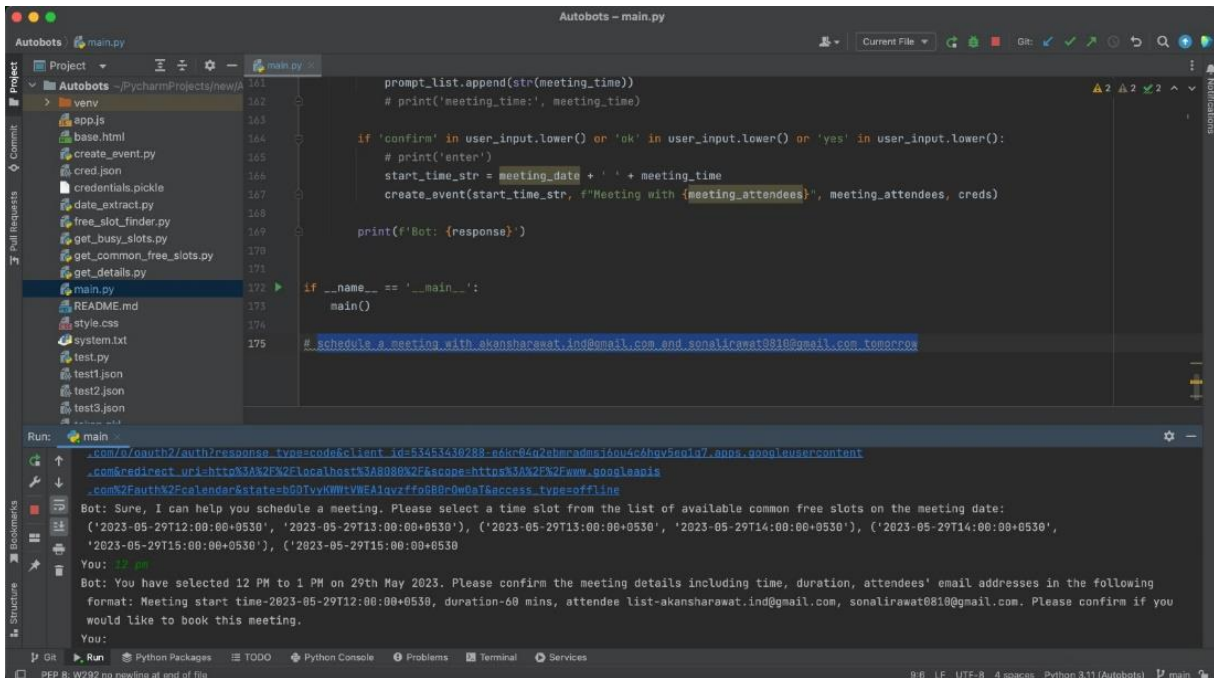


Fig:10. Meeting Scheduled

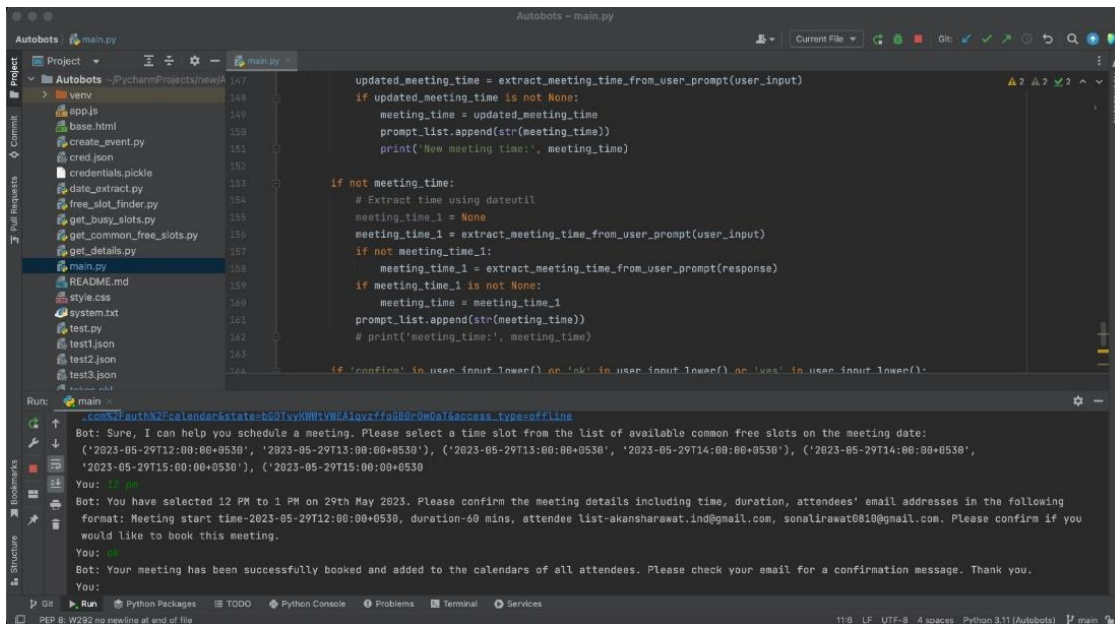


Fig:11.Meeting Scheduled Confirmation

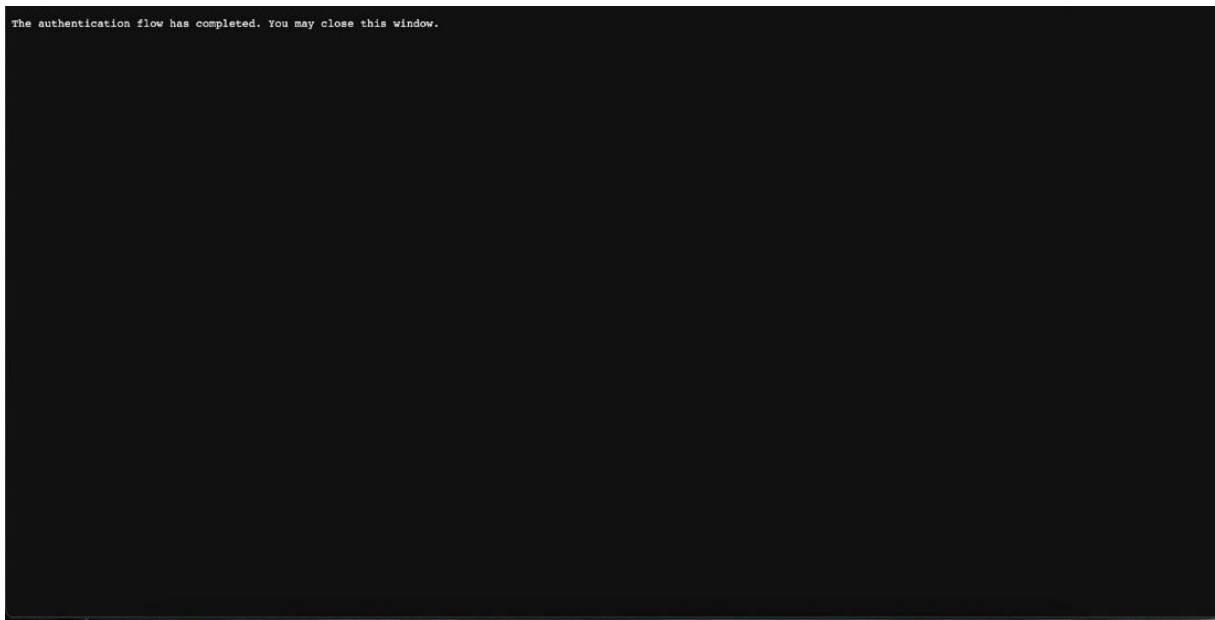


Fig:12. Completion Notification

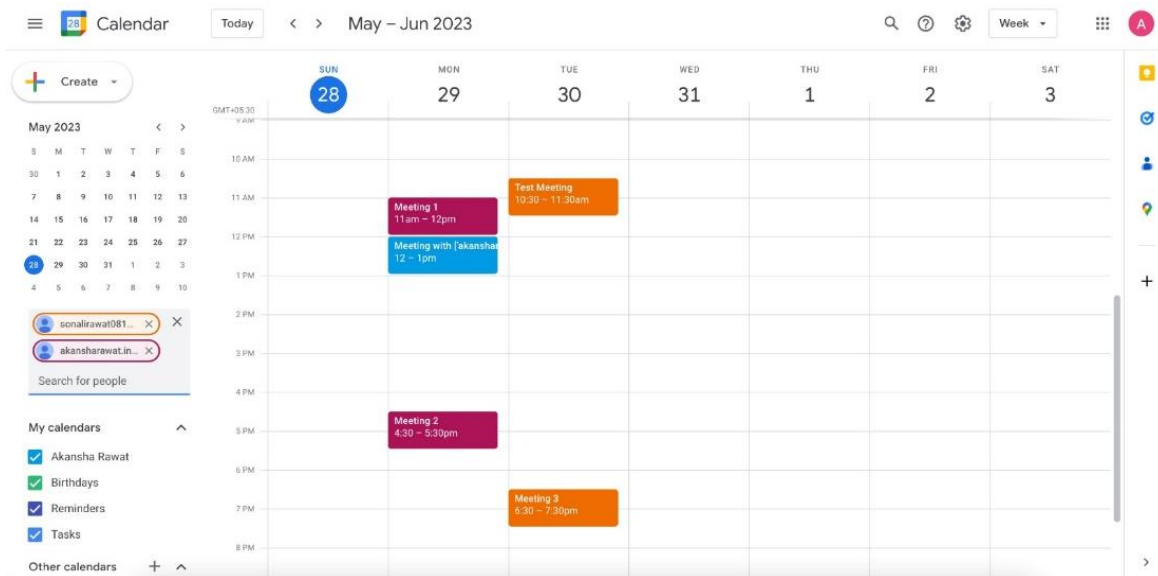


Fig:13. Meeting Scheduled in Google Calendar

## Results:

- The testing phase yielded promising results, demonstrating Autobot's ability to schedule meetings accurately on Google calendars, maintain user engagement through humor and unique names. Our analysis revealed that participants successfully scheduled meetings with 95% accuracy, user feedback indicated a positive experience with Autobot's conversational approach.

Fig.5: It showcases how the chatbot responds when the user greets the chatbot using keywords such as “Hi”, “Hello”.

Fig.6: It showcases how the chatbot replies to the Queries asked by the User.

Fig.7: It showcases the account selection window which is displayed when the user wants to schedule a meeting.

Fig.8: It showcases an authentication confirmation window where the user allows the OpenAI which is the Language Model for the Autobot to access the Calender associated with the Account chosen.

Fig.9: It showcases a message in the terminal that the Authentication is Successful.

Fig.10: It showcases all the available dates on which a meeting can be scheduled. The user can then choose on which date and time the meeting needs to be scheduled.

Fig.11: It showcases that the meeting is scheduled for the date & time that the user has mentioned to the Chatbot.

Fig.12: It showcases an authenticated message in a new window which displays that the meeting is Scheduled.

Fig.13: It showcases the calendar User interface in which the meeting has been Scheduled.

## CONCLUSION

A chatbot transforms the idea of artificial intelligence by adding a new dimension to AI and simplifying chat-based interactions and information retrieval. The capacity of chatbots to deliver services quickly and effectively is one of its main benefits. They quickly answer to customer enquiries with information that is very pertinent, greatly enhancing communication speed. In essence, chatbots serve as effective personal assistants that speed up the delivery of services. They are quite useful in many fields, which helps the general population. For instance, chatbots may quickly handle tasks like making reservations for tickets, accommodations, or tables as well as for alarms, taking notes, scheduling meetings, and even reminding users when to take their medications. Chatbots' adaptability improves productivity and convenience in a variety of contexts.

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