DAYANANDA SAGAR UNIVERSITY

KUDLU GATE, BANGALORE – 560068

Bachelor of Technology
in
COMPUTER SCIENCE AND ENGINEERING

Major Project Report

MULTI PURPOSE CHATBOT

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(2021-2022)

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CERTIFICATE

This is to certify that the project work titled **"MULTI PURPOSE CHATBOT"** is carried out by **Kritin Y Reddy (ENG18CS0141), Moksha P Jain (ENG18CS0172), Shobha R (ENG18CS0264), Simran Kiran (ENG18CS0275), Syeda Zuwaina (ENG18CS0295),** bonafide students of Bachelor of Technology in Computer Science and Engineering at the School of Engineering, Dayananda Sagar University, Bangalore in partial fulfillment for the award of degree in Bachelor of Technology in Computer Science and Engineering, during the year **2021-2022**.

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DECLARATION

We, **Kritin Y Reddy (ENG18CS0141), Moksha P Jain (ENG18CS0172), Shobha R (ENG18CS0264), Simran Kiran (ENG18CS0275), Syeda Zuwaina (ENG18CS0295),** are students of the seventh semester B.Tech in **Computer Science and Engineering**, at School of Engineering, **Dayananda Sagar University**, hereby declare that the project titled **"Multi Purpose Chatbot"** has been carried out by us and submitted inpartial fulfilment for the award of degree in **Bachelor of Technology in Computer Science and Engineering** during the academic year **2021-2022**.

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ABSTRACT

A chatbot is a computer software program that conducts a conversation via auditory or textual methods. This software is used to perform tasks such as quickly responding to users, informing them, helping to purchase products and providing better service to customers.

Chabot's are programs that work on Artificial Intelligence (AI) & Machine LearningPlatform. Chatbot has become more popular in business groups right now as it can reduce customer service costs and handles multiple users at a time. But yet to accomplish many tasksthere is a need to make Chabot's as efficient as possible.

In this project, we provide the design of a chatbot, which provides a genuine and accurate answer for any query using Artificial Intelligence Markup Language (AIML) and Latent Semantic Analysis (LSA) with python platform. The use of Chabot's evolved rapidly in numerous fields in recent years, including Marketing, Supporting Systems, Education, Health Care, Cultural Heritage, and Entertainment.

At the most basic level, a chatbot is a computer program that simulates and processes human conversation, allowing humans to interact with digital devices as if they were communicating with a real person. The aim of our project is to use python3 and NLP to develop a Multi Purpose chatbot. We use NLP to analyze the user's message, classify it into a broader category and reply with a suitable message or the required information or task specified. So the aim of project was to develop a multipurpose chatbot.

CHAPTER 1

INTRODUCTION

CHAPTER 1 INTRODUCTION

A chatbot is a computer software program that conducts a conversation via auditory or textual methods. This software is used to perform tasks such as quickly responding to users, informing them, helping to purchase products and providing better service to customers. Chatbots are programs that work on Artificial Intelligence (AI) & Machine Learning Platform. Chatbot has become more popular in business groups right now as it can reduce customer service costs and handles multiple users at a time. But yet to accomplish many tasks there is a need to make chatbotsas efficient as possible. In this project, we provide the design of a chatbot, which provides a genuine and accurate answer for any query using Artificial Intelligence Markup Language (AIML) and Latent Semantic Analysis (LSA) with python platform.

Chatbot are often described as software which will chat with people using deep learning. These software's are accustomed to perform tasks like quickly responding to users, informing them, helping to urge products and providing better service to customers. During this paper, we presentthe rule and thus the essential concepts of AI based chatbots and related concepts also as their applications in various sectors like telecommunication, banking, health, customer call centers and e-commerce. Additionally, to the current, Chatbots are helpful within the donation and telecommunication services.

1.1   Intended Audience and Reading Suggestions:

The main aim of this project was to build a multipurpose chatbot which can be used to chat with user and performing daily tasks like:

- Send Email

- Google Search

- Wikipedia Search

- Covid-19 Updates Open Tabs in Chrome

- Remember Tasks

- Takes Screenshots

- Play Songs

- Weather Updates

- News Updates

- Jokes

- Search Maps

- Screen Recording

- Start Google Meetings

- Send What's App Messages

- Open Social Media Websites

1.2 Scope

- The scope of this project is to build a Multi Purpose chatbot using NLP and Haar Cascading to give desired results for user queries. It is a personal assistant chatbot, capable of performing many tasks same as Google Assistant plus more extra features.

- Users are satisfied by the ease of use, accuracy and functionality of the chatbot and highlyrecommend it. Users can use the chatbot frequently and rely on it.

CHAPTER 2

PROBLEM DEFINITION

CHAPTER 2 PROBLEM DEFINITION

The proposed project is a multipurpose chatbot made using Haar cascade algorithm and Artificial Intelligence Markup Language AIML, who can chat with users and help in performing daily tasks. The main feature of this project is the speech to text recognition. It uses NLP to analyze the user's message, classify it into a broader category and then reply with a suitable message or the required information. It is hosted on desktop using User Interface as tkinter.

The best Chatbots are the ones that can serve multiple purposes and handle the interleaving of different tasks, such as answering a user's questions in the middle of performing another task. However, building such a chatbot is non-trivial due to two main challenges are Tracking Conversation Context and Maintaining Conversation Context. The first challenge is to keep track of a conversation context (task status and flows) and maintain such a context. In addition to tracking a conversation context, a capable chatbot must maintain the context properly so it can resume a task flow after each interruption. To resume a context, a chatbot must inform users where they are so the users are aware and can continue with the resumed task flow.

CHAPTER 3

LITERATURE REVIEW

CHAPTER 3 LITERATURE REVIEW

Paper 1: Implementation of a Chatbot System using AI and NLP

In this paper the chatbot is designed by using different modules like Context identification, personal query response system, AIML response system, query analysis and response system, context reset. And the Information extraction from the input text was performed by extracting keywords using WordNet. Its architecture integrates a language model and computational algorithm to emulate information online communication between a human and a computer using natural language.

Paper 2: Task-based Interaction Chatbot

In this paper, the front end of the chatbot is accountable for enabling communication between the bot and the user. The NLU utilizes Artificial intelligence methods to identify the intent and context of the user input using Dialog Flow API. An appropriate response is generated from the users' intent. The knowledge base defines the chatbot's knowledge, which is created within the NLU and supported by the back-end using MySQL, the back-end applies the domain's corpus to produce the knowledge base. Input can be supplied to the chatbot in the form of text or speech. The dialog management system, NLU, which determines an appropriate response and amends the chatbots state accordingly to carry out the required action.

Paper 3: Sounding Board: A User-Centric and Content-Driven Social Chatbot

In this paper, the Natural language understanding (NLU) module analyses the user's speech to produce a representation of the current event. Dialogue manager (DM) module executes the dialogue's policy while considering user engagement, maintaining dialogue coherence, and enhancing the user experience. DM also has access to the rich content collection that is updated daily. Natural language generation (NLG) module builds the response using the content selected by the DM.

Paper 4: Learning from Dialogue after Deployment: Feed Yourself, Chatbot!

This paper is about a self-feeding chatbot which engages in dialogue, it estimates user satisfaction to know when to ask for feedback. From the satisfied responses and feedback responses, new training examples are extracted for the DIALOGUE and FEEDBACK tasks, respectively, both of which improve the model's dialogue abilities further. A dialogue agent imitates human responses when the human is satisfied and it asks for feedback when the speaking partner is not satisfied. The dialogue agent in the suggested setting performs three tasks: the primary DIALOGUE task – carrying on a coherent and engaging conversation, the auxiliary FEEDBACK task – predicting the feedback that will be given by the speaking partner when the agent believes it has made a mistake and asks for help and the auxiliary SATISFACTION task – predicting whether or not a speaking partner is satisfied with the quality of the current conversation.

Paper 5: A Chatbot for Medical Purpose using Deep Learning

In this paper, neural network is used as a sequence of algorithms to build relationship between data and mimics as human brain. It also uses other modules like Tensorflow, Speech recognition which enables a program to process human audio into a written format, Natural Language Toolkit (NLTK) libraries which contains packages to make chatbot understand human audio and reply to it with an accurate response, flask module to develop web application for it and keras API for creating layers in the neural network.

Paper 6: A Medical ChatBot

In this paper the chatbot was designed using Support Vector Machine Algorithm and NLP. The system is built for medical institutes or hospitals to help the users to freely ask medical dosage related queries by voice. System gets output for the medicine API and speaks out and displays all medicine names. NLP is used for communicating with users in their terms. So, by using SVM algorithms and disease symptoms systems can predict disease. Users can get related answers displayed on an android app and refer to this answer for analysis.

Paper 7: Development of an E-Commerce Chatbot for a University Shopping Mall.

In this paper an E-commerce chatbot is built for a university shopping mall. The machine learning section includes NLP and python. The chatbot interface is built using AI agent HEBRON and React as a front end. The page will be developed using JavaScript for the front-end and MySQL for the database backend. The chatbot is accessible via portable mobile devices or computers, which students can log in to anywhere and anytime on campus, thereby providing a 24-hour online service.

Paper 8: Review on Mood Detection using Image Processing and Chatbot using Artificial Intelligence

The algorithm and technologies used in this paper are Haar cascade algorithm and artificial intelligence. The mood will be detected from the facial expression images captured by webcam using Haar Cascade image processing algorithm. The algorithm traces the whole face covered in the captured image and detects the expression. There were several positive and negative images considered and feature selection was held along with the preparation of classifiers using Ad boost and integral images.

Paper 9: Chatbot System for Healthcare using Artificial Intelligence

The chatbot system in this paper is based on the hospital management system which is built with the help of artificial intelligence and machine learning, our system. Each user has to login to the system to use it, providing a chatbot for hospitals which will perform operations like appointment booking, surgeon information, doctor presence etc. Through chatbots one can communicate with text or voice interface and get replies through artificial intelligence. It uses Advanced Encryption Standard (AES), hashing and mapping. The algorithm described by AES is a symmetric-key algorithm, meaning the same key is used for both encrypting and decrypting the data. Hashing is a technique or process of mapping keys, values into the hash table by using a hash function.

Paper 10: Intelligent Chatbot using Deep Learning

In this paper the chatbot is built using deep neural network architecture, Recurrent Neural Network .In Recurrent Neural Network, the sequential information is stored in memory and utilized for further processing which makes RNN suitable for sequential data or time series data where dependency exists in sequence and Long-Short-Term-Memory(LSTM) is a special type of Recurrent Neural Network cell, which solves the data bottleneck for longer sequences. It also uses Google's Neural Machine Translation and Sequence 2 Sequence architecture. Google's Neural Machine Translation (GNMT) is primarily used for machine translation and for building dialogue generators. GNMT also has a rich Seq2Seq module with many additional features for dialogue generation. Seq2Seq is an industry standard choice for dialogue generation and many NLP tasks.

CHAPTER 4

PROJECT DESCRIPTION

CHAPTER 4 PROJECT DESCRIPTION

4.1 PROPOSED DESIGN

The proposed system introduces a chatbot which is nothing but a computer program. The conversation via auditory or textual methods is conducted by the computer program called as chatbot. The bot chats with a person in such a way that it never makes the person understand thatit's actually the computer with which he is chatting. There will be an interface for jokes, math calculations, file creation, google maps directions, send emails, send WhatsApp messages etc.

The algorithm and technologies which were used in the proposed system will be Haar cascade algorithm and Artificial Intelligence Markup Language (AIML). The image processing for face detection is done on images captured via webcam using an algorithm named Haar cascade algorithm. The algorithm traces the whole face covered in the captured image and detects the face. The captured images are cropped, resized and stored in a folder which is then converted tograyscale and haar cascade model is trained based on the images captured. There are about 100 images captured. After the model is trained, the Local Binary Pattern Histogram algorithm to recognize the face of a person. The basic theory of this algorithm, is based on the creation and comparison of histograms. When the user tries to login to the system, the system recognizes theindividual based on the stored images. After the face is successfully registered in the system, theindividual can choose an avatar.

4.2 ASSUMPTIONS AND DEPENDENCIES

Chatbot creations helps to answer every single question is not possible to implement with currenttechnology and within the duration of the project, so the system will be able to answer questions about limited topics.

•	The system will only support questions in standard English.

•	User doesn't make grammatical errors while interacting with the chatbot.

CHAPTER 5

REQUIREMENTS

CHAPTER 5 REQUIREMENTS

5.1 FUNCTIONAL REQUIREMENTS

- Creating a development environment setup.

- Download all the modules and libraries.

- Use Haar Cascading algorithm for face registration

- Train the model and further for face detection

- Input string given is compared with the chatbot database or the json file

- Predict the response/task is done using NLP algorithms

5.2 NON-FUNCTIONAL REQUIREMENTS

- Availability- The probability that system will be in an operable and committable state at the start of a mission when the mission is called for at a random time.

- Correctness - Accuracy during Prediction is very important. The system should provideaccurate results based on the data.

- Maintainability- During Prediction some errors might occur but the system should be capable of being retained, restored to a serviceable operation.

- Usability-The system should be used effectively to achieve objectives with effectiveness and efficiency for proper use.

5.3 HARDWARE REQUIREMENTS

- 4 GB RAM and above

- 10 GB internal storage and above

- Intel core i3 processor

5.4 SOFTWARE REQUIREMENTS

- Operating System - Windows 10

- Programming Language -Python3

- Tool used -Visual Studio Code.

- Libraries used -OpenCV, SpeechRecognition , pyttsx3, pynput, pyscreenshoot etc.

CHAPTER 6

METHODOLOGY

CHAPTER 6 METHODOLOGY

6.1 HAAR CASCADE

Haar Cascading is a machine learning method that involves drilling a classifier from a large number of positive and negative pictures. The classifiers used for object detection are Haar feature-based cascade classifiers. This classifier follows a machine learning approach in which a cascade operation is instilled from the photographs to find things in additional photos. The detection of faces and facial emotions in images is also successful. The exercise is completed by presenting the classifier with positive and negative images. The properties are then extracted from the image. Each feature is a distinct value obtained by subtracting the sum of pixels in the white rectangle from the total of pixels in the black rectangle. It does this by detecting the faces of different people in various settings. The Haar-like feature of any size can be calculated in constant time because of integral images.

6.2 LOCAL BINARY PATTERN

Local Binary Pattern is a type of visual pattern used in computer vision for categorization. LBP is a special example of Texture Spectrum impersonation. It has since been discovered to be a significant element in texture classification. Individual pictures are evaluated as a structure of micro-patterns using LBP operators. The LBP histogram is then counted over the face, revealing just the circumstances of micro-patterns. The documentation figure is created by dividing face photos into 'm' minor non-overlapping regions, such as R0, R1,...,Rm. The pixels are labelled by thresholding the 3 3 neighborhoods in reference to the central pixel value in the original LBP. In a particular numerical scale, the common features, such as edges, lines, points, can be represented by a value. Therefore, it is possible to recognize objects in an image using a set of values extracted a priori.

6.3 NATURAL LANGUAGE PROCESSING

Natural language processing (NLP) is a five-step process. Lexical analysis is performed initiallyon the unstructured material. Word structures are examined and identified. Tokens are created from the entire input text. The tokens are then sent to syntax analysis, where they are assessed forgrammar and structured in such a way that the relationship between the words is clear. After that,the data is subjected to semantic analysis. This stage extracts the meaning of words or tokens. The job domain object and the mapping syntactic structure are in charge of extracting meaning from input. The next step is discourse integration, in which the meaning of a statement is attempted to be derived using the meaning of the prior sentence. The pragmatic analysis is the last step. The main focus of thisstudy ison what was stated and how it was reinterpreted to determine what it actually meant. Afterall of these processes, the machine understands the meaning of the sentence and uses it to find ananswer to the user's inquiry, which it then feeds to Natural language generation (NLG) for final output production. Many chatbots employ natural language processing (NLP) to communicate with humans effectively.

6.4 GRAPHICAL USER INTERFACE (GUI)

It has a simple GUI where multiple users can connect. The first step is to register the face by clicking the "register face" option. It will then get redirected to another interface where the user can enter user details like user name and gender. After entering the details the user can click the "add face" button. The next interface will allow the user to choose an avatar. After selecting an avatar, the user account will be successfully activated.

The chatbot can be used to perform different tasks like tell jokes, perform math calculations, filecreation, google maps directions, send emails, send whatsapp messages etc. The user can either type or speak with the chatbot as it has the feature of speech recognition.

The first step is to create an environmental setup and download all the modules and libraries. Followed by taking input from the user via text/voice. Input string is compared with the chatbot query or the responsePredict the response/output using NLP and query. Perform the given task or give appropriate response to user.

6.5   MODULES IN THE PROJECT

- **Json files**: There are 3 json files defined, in the first one we have queries and a bunch of responses to those queries. For example if the query is "how are you", the responses could be "I'm good" or "I'm doing well", etc. The second json file is used to store dictionary data. The third json file defines the url/links for various websites.

- **Audios**: There are different audio files used for tasks like timer, tossing a coin, rolling of diceetc.

- **Web Scraping**: Data is retrieved from wikipedia, and other search engines to download imagesetc, hence fulfilling the users requests. Information about covid19 like total cases, deaths, recovery, symptoms, prevention can be accessed. Weather data can be analyzed, google maps can be accessed to give directions to the users destination. Users can play youtube videos, send emails and whatsapp messages.

- **Userdata**: The users name, gender, photo and avatar chosen is stored.

- **Timer**: The timer is used to set a timer.

- **Normal Chat**: Normal chat displays current time and date, displays a greeting message depending on thetime. Users queries access the responses from the json files and are displayed. Google translate can also be used to translate users' messages.

- **Filehandler**: Filehandler is used to create files (word document, excel sheets, PowerPoint slides, html file,python files etc.) and store in a new directory.

- **Dictionary**: Dictionary is used to search for the given word in the json files and return the meaning of theword.

- **Appcontrol**: Appcontrol is used to store keyboard shortcuts that can be used to control the chatbot.

- **Todo list** : Todo list is used to create a todo list for the user to store their important tasks.
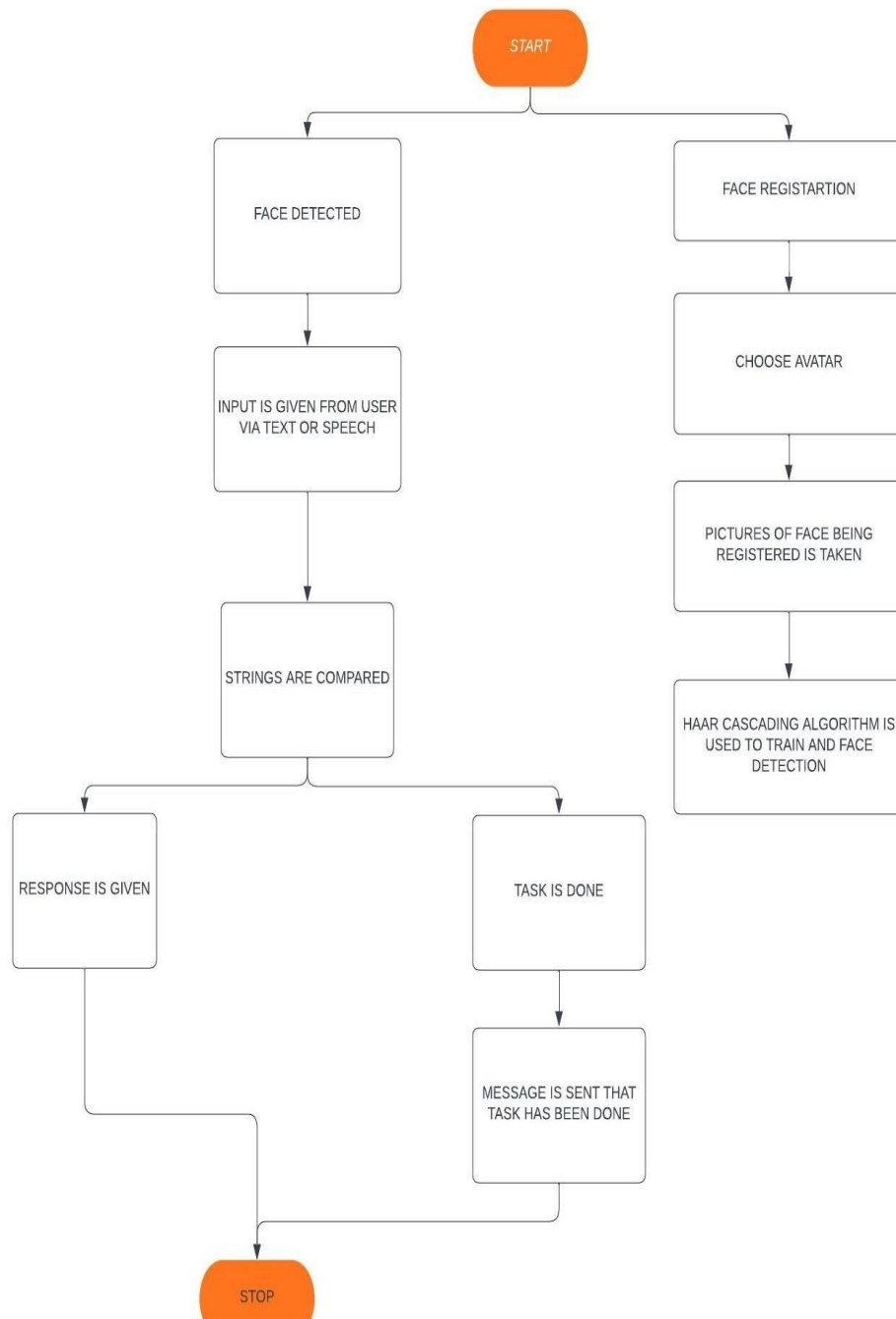
6.6 FLOW CHART

Fig 6.6 Flow chart

CHAPTER 7

TESTING AND RESULTS
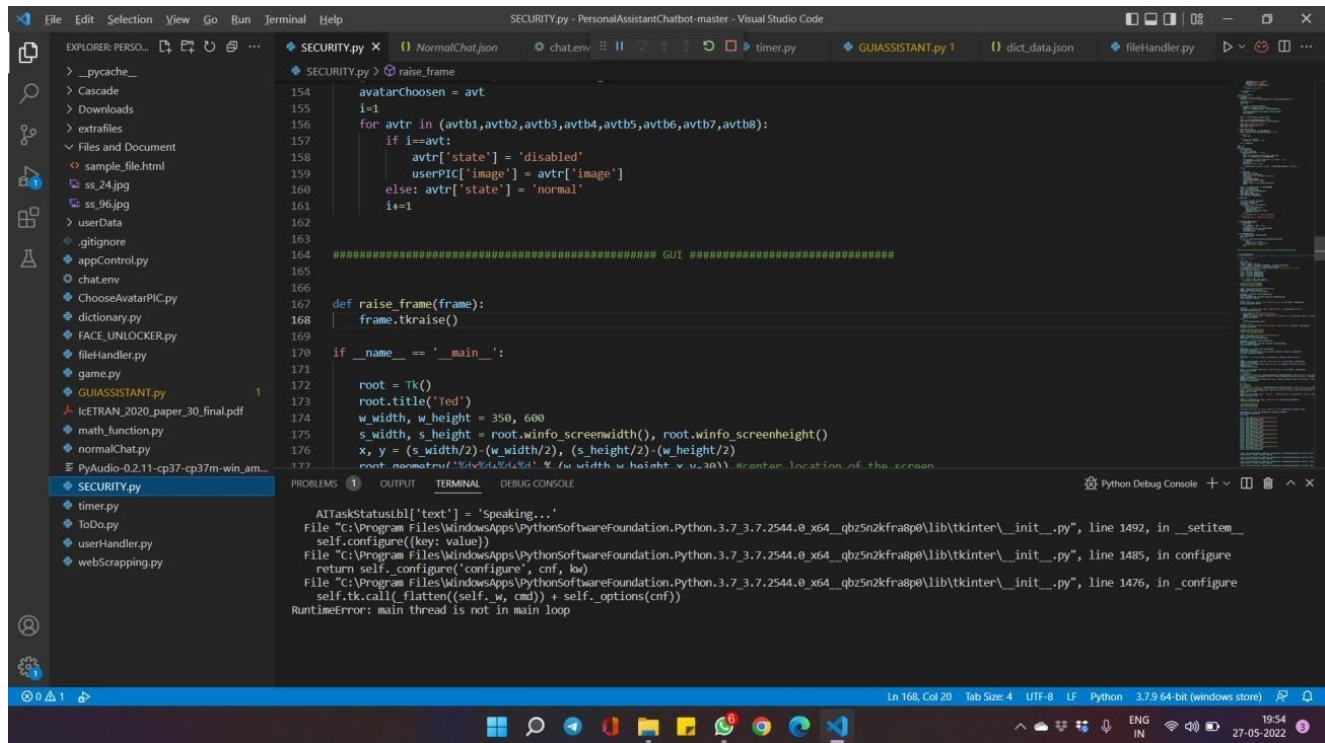
CHAPTER 7 TESTING AND RESULTS
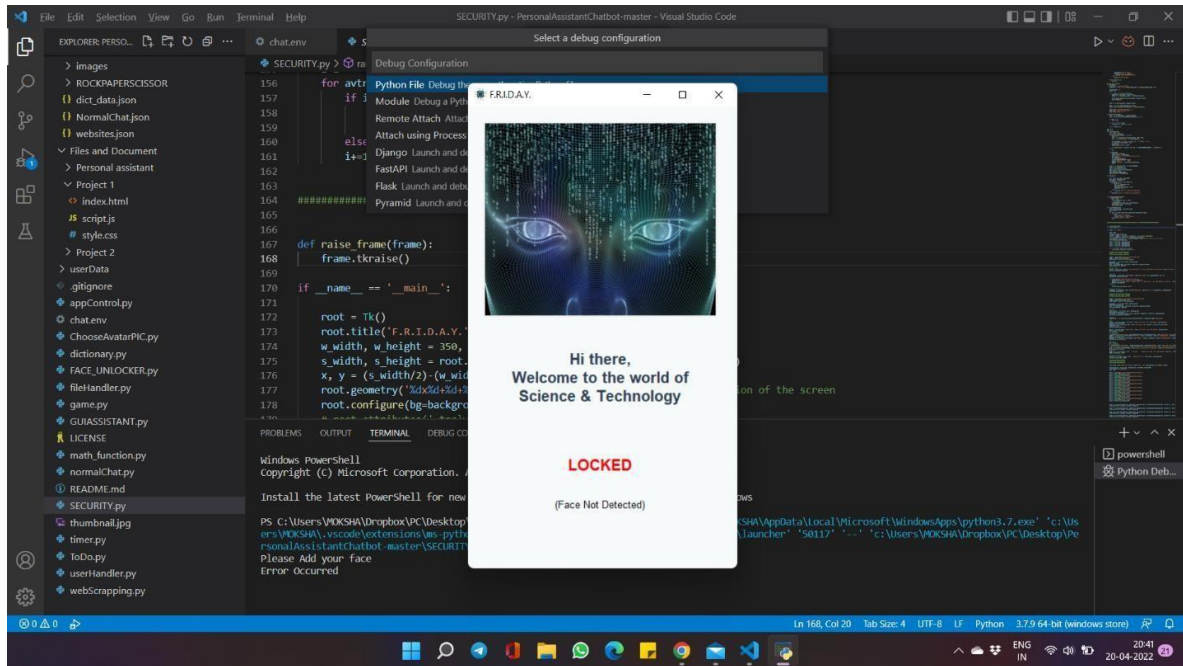

Fig 7.1 Running the code
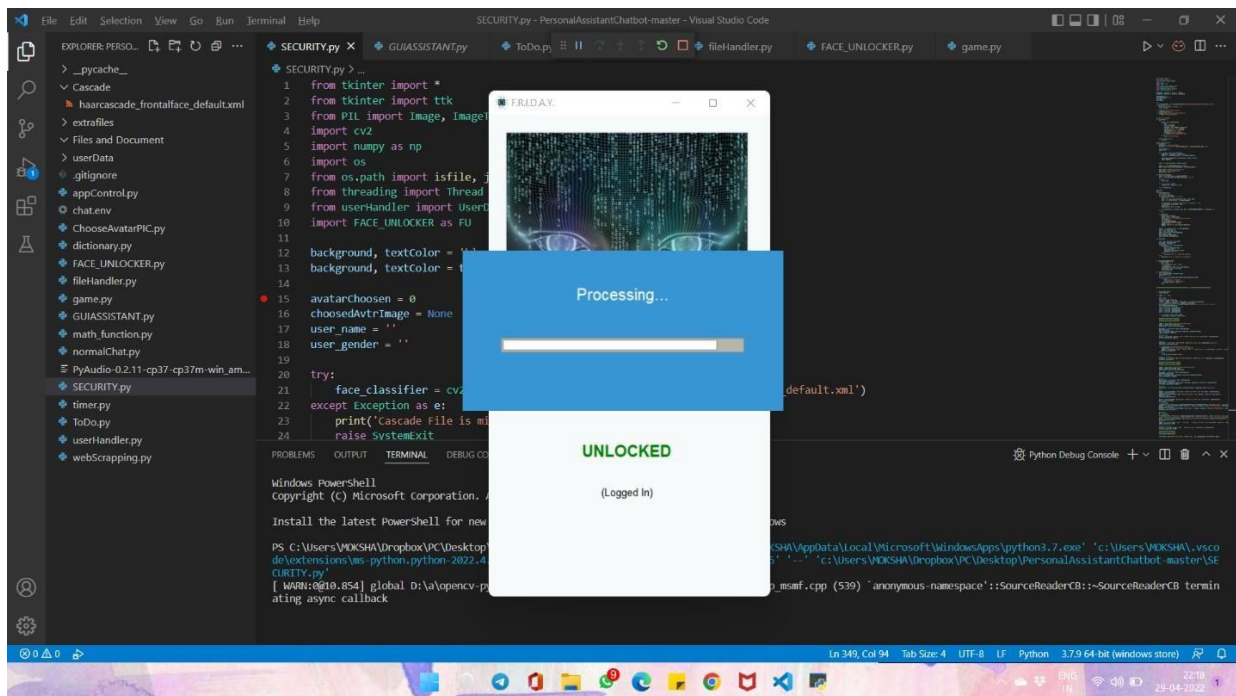
Fig 7.2 GUI Lock screen

Fig 7.3 Screen Unlocked using face recognition

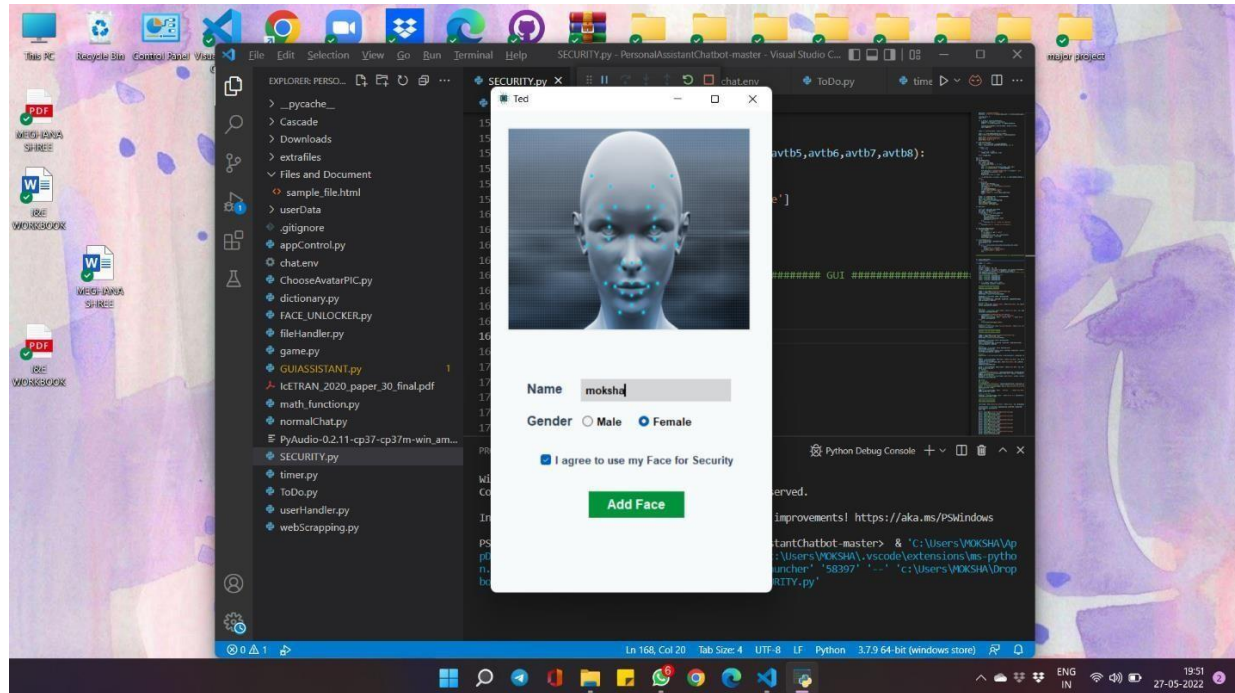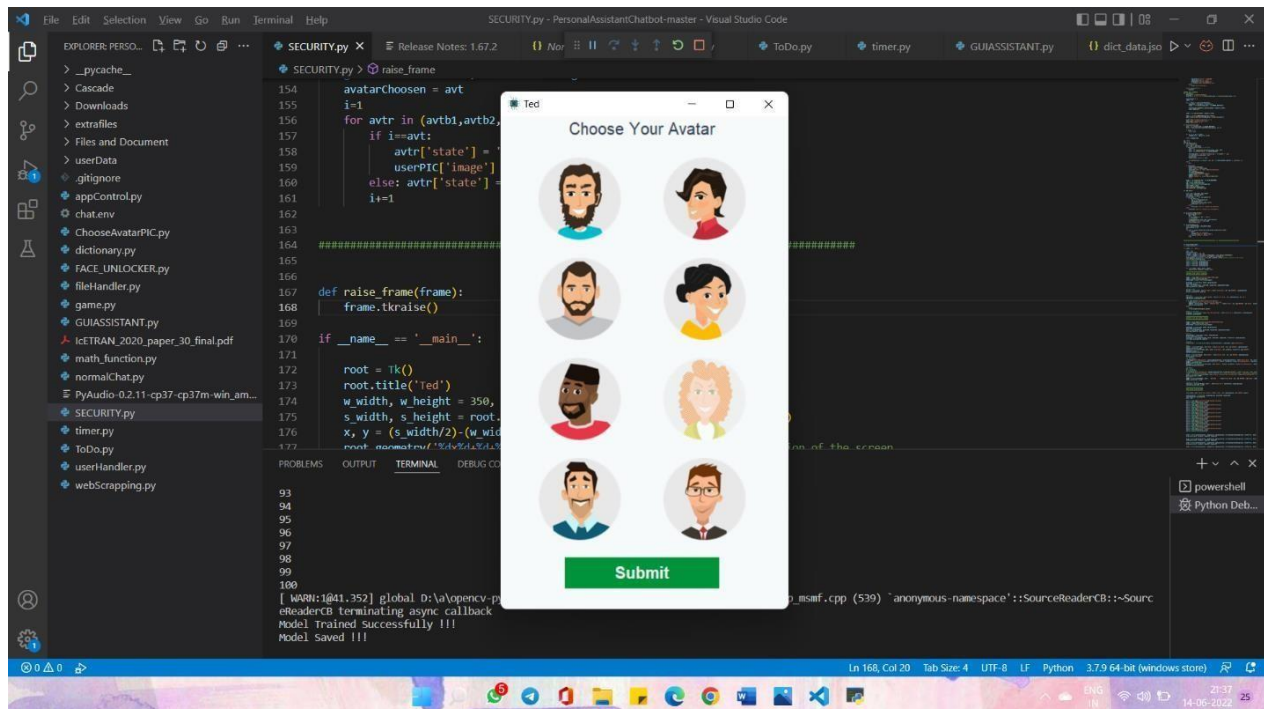**Fig7.4 Login details**
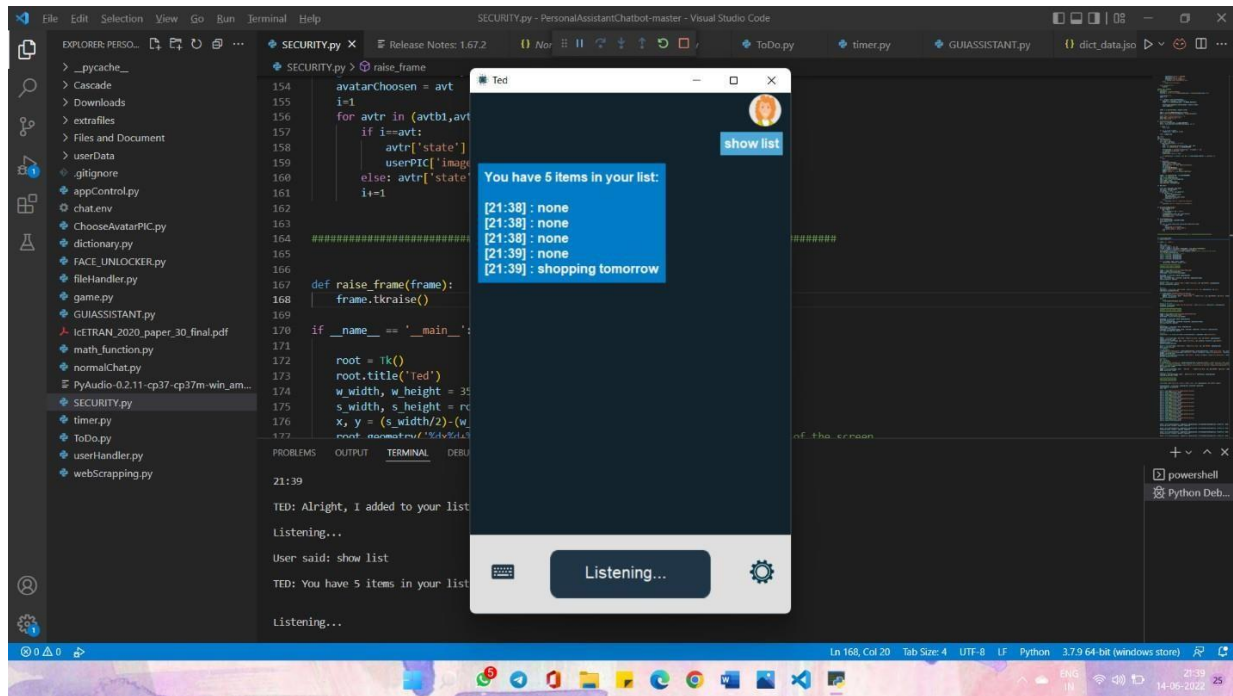

Fig 7.5 Choose Avatar

Fig 7.6 Displaying items in the list
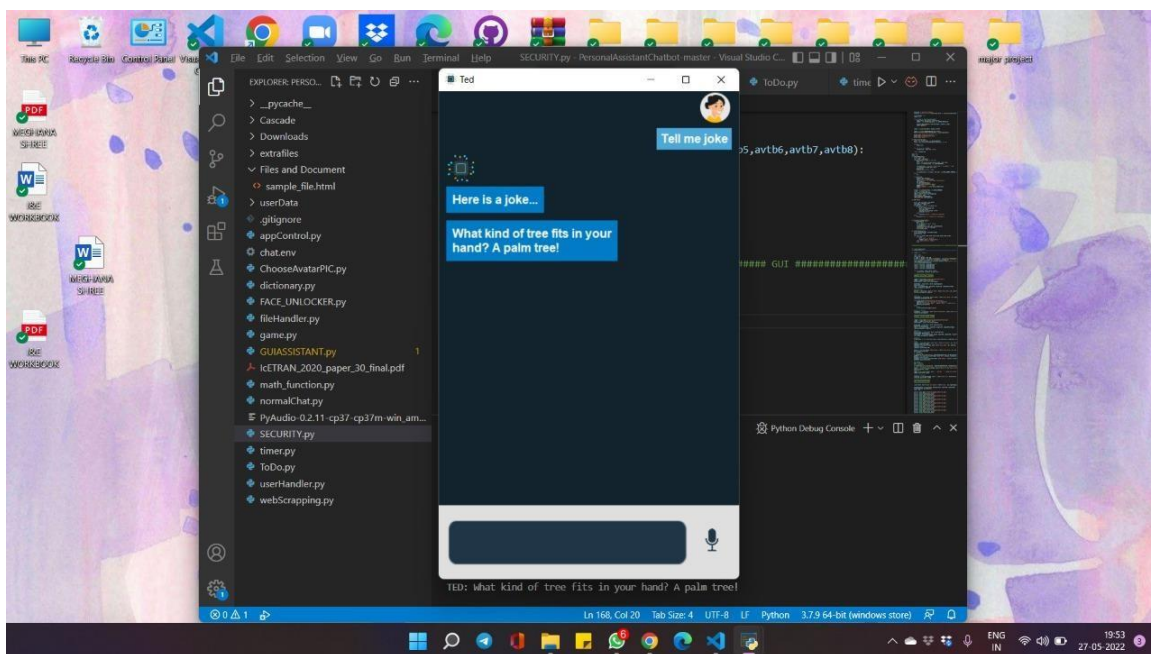

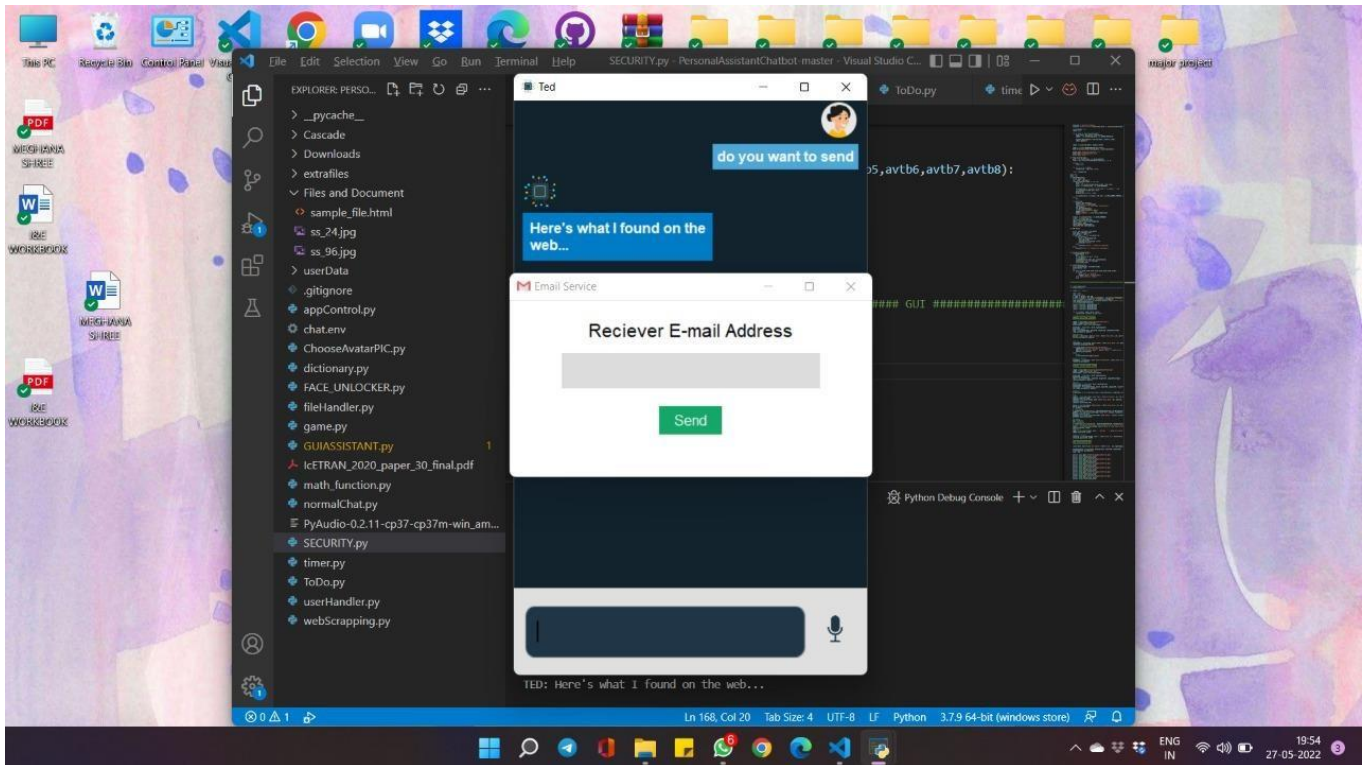**Fig 7.7 Response of a joke**
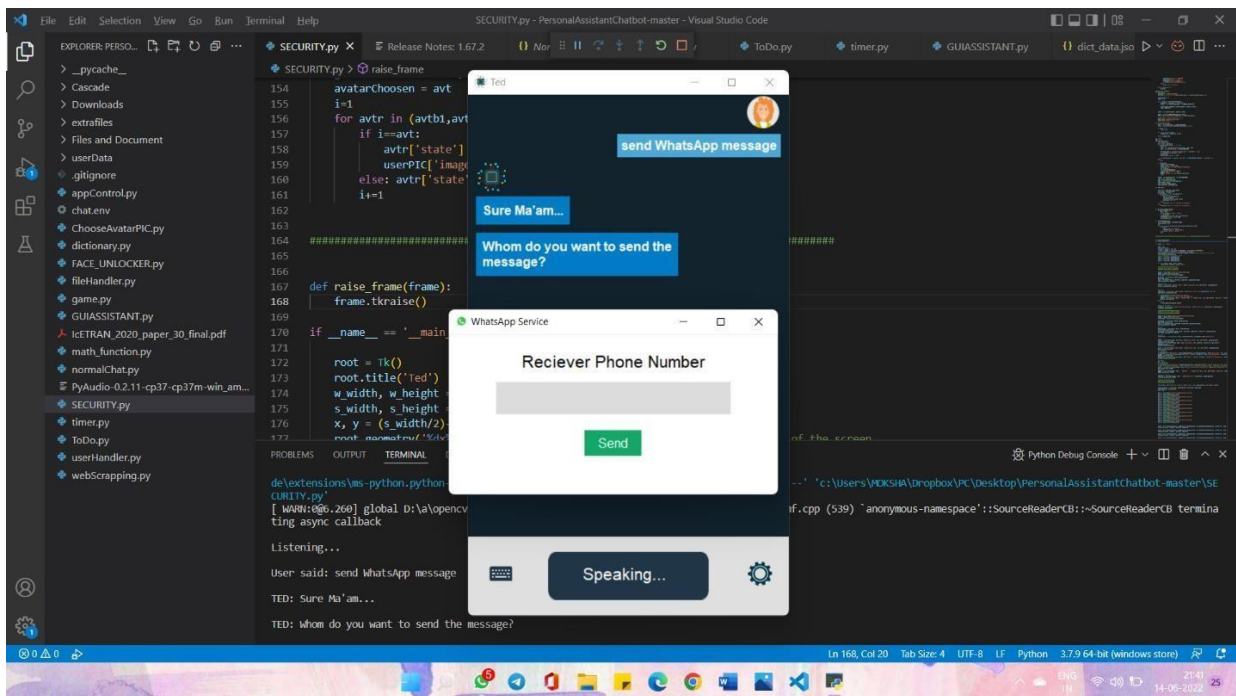
Fig 7.8 Sending an Email

Fig 7.9 Sending WhatsApp message

CHAPTER 8

CONCLUSION

CHAPTER 8 CONCLUSION

In this project, we have introduced a chatbot that is able to interact with users. This chatbot can answer queries in the textual user input. For this purpose, AIML with program-o has been used. The chatbot can answer only those questions which he has the answer in its AIML dataset. So, to increase the knowledge of the chatbot, we can add the APIs of Wikipedia, Weather Forecasting Department, Sports, News, Government and a lot more. In such cases, the user will be able to talk and interact with the chatbot in any kind of domain. Using APIs like Weather, Sports, News and Government Services, the chatbot will be able to answer the questions outside of its dataset and which are currently happening in the real world.

The next step towards building chatbots involves helping people to facilitate their work and interact with computers using natural language or using their set of rules. Future Such chatbots, backed by machine-learning technology, will be able to remember past conversations and learn from them to answer new ones. The challenge would be conversing with the various multiple bot users and multiple users.

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