A PROJECT REPORT ON

SMART AND VOICE RECOGNITION AUTOMATION BOT USING AI AND ML

Submitted in partial fulfillment of the requirements for the award of the Degree of

BACHELOR OF TECHNOLOGY

In

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Submitted By

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... Empowering Minds

Department of Computer Science & Engineering
SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Accredited by NAAC with 'A' grade & NBA (CSE, ECE & ME)
Approved by AICTE, New Delhi & Affiliated to JNTUK, Kakinada
An ISO 9001:2008 Certified Institute
Nandamuru, Pedana Mandal, Krishna Dt. A.P

2019-2023

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CERTIFICATE

This is to certify that the project report entitled entitled "**SMART AND VOICE RECOGNITION AUTOMATION BOT USING AI AND ML"** is a bonafide work carried out by

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Under my guidance and supervision in partial fulfillment of the requirements for the award of degree of **B.Tech** in Computer Science Engineering from **JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA.** The results embodied e in this Project report have not been submitted to any other University or Institute for the award of any degree or diploma.

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SIGNATURE OF EXTERNAL

DECLARATION

We certify that,

- The work contained in this report is original and has been done by us under the guidance of our supervisor.
- The work has not been submitted to any other institute for any degree or diploma. We have followed the guidelines provided by the institute in preparing the report.
- We confirm to the norms and guidelines given in the Ethical code of Conduct of the institute.
- Whenever we have used materials (data, theoretical analysis, figures and text) from the sources, we have given due credit to them by references.
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ABSTRACT

Now a days, Automation Bots are using in many industries in many fields. A bot is a software application that is programmed to do certain tasks. Bots are automated, which means they run according to their instructions without a human user needing to manually start them up every time. Bots often imitate or replace a human user's behaviour. Typically, they do repetitive tasks, and they can do them much faster than human users could.

A bot can be used for many services which is used for efficient purposes and do the work in less and simple, fast manner .Bots are using in many applications like Flipkart ,Amazon, Google etc to develop their services as longas the customer needs .For many purposes bots are using from that we are developing a bot which is using with Voice commands and it is based on the Artificial Intelligence and Machine Learning .

In my Project, bot can learn from the past things what we are talking with botin recent times it will remember all the things and gives the voice according tothe questions we are given to the bot .

It will store the whole conversations in a text file used for the next conversations and we can manipulate the brain of the AI according to our needs. We can fix the bot mind.In this main feature is that can respond to our own language and replies in English Language.

PROBLEM STATEMENT

We are using Automation in all the fields for a easy and make simple the workfor the people who are busy in their work. our goal to design a Automation botfor a system desktop or pc which takes commands from a user or personal owner who used the system which can be accessed through the Voice their
.Which gives him the work efficiency can do the work simple manner in faster.

PRODUCT GOALS AND OBJECTIVES

Currently, the project aims to provide the Windows system Assistant to their personal to make their work simple ,work efficiently and fluently through commands of the user through their Voice without use of their presence in themanual ,he can do the multiple things in a few minutes or Seconds which the user do in manual it gives him the work smooth and can make multiple wondersjust with the voice.

PRODUCT DESCRIPTION

As a personal assistant, PC Bot assists the end-user with day-to-day activities like general human conversation, searching queries in various search engines like Google, Bing or Yahoo, searching for videos, retrieving images, live weather conditions, word meanings, searching for medicine details, health recommendations based on symptoms and reminding the user about the scheduled events and tasks. The user statements/commands are analysed withthe help of machine learning to give an optimal solution. SCOPE Presently, PCBot is being developed as an automation tool and virtual assistant. Among theVarious roles played by PC Bot are:

1. Search Engine with voice interactions.
2. Medical diagnosis with Medicine aid.
3. Reminder and To-Do application.
4. Vocabulary App to show meanings and correct spelling errors.
5. Weather Forecasting Application. 6.Performs

Mathematical Problems Tricky.

7. Train by self with using the Techniques of Machine Learning and theArtificial Intelligence by using the past conversations using the text file.
8. Set the Alarm For the User When the required through the commands.
9. Set Day Schedule by saying the voice it fills them in the text file and readwhen the user needs that by remember commands.
10. Greetings by the PC bot based on the time of the weather greetings likeGood morning ,Good evening etc.
11. It can by own pause the Videos, Play the Videos by automatically throughthe commands of the user.
12. Gives the Temperature,Weather Report ,News Reading by the Bot.
13. Calender Events upto 10days.
14. Internet Speed,Configuration of windows,specifications,etc
15. when the user for entertainment bot makes the jokes ,plays the Games withthe user like Rock,Paper scissor.
16. When user is in Alone the bot is like the Friend.
17. In this we added automation Whatsapp in this based on the commands thePC Bot sends messages.

18. When user requires it gives suggestions to the user .

19. Gives the content from the web using wikipedia,live score of cricket ,Headlines of news etc.

TECHNOLOGIES USED

FRONTEND FRAMEWORK :

- PQT5 PYTHON

BACKEND STACK :

- PYTHON -3.10.9
- OpenCV.
- SELENIUM AUTOMATION TOOL.
- MACHINE LEARNING.
- ARTIFICIAL INTELLIGENCE(OPENAI).

PYTHON PIPS USED SOME OF THEM ARE:

- astroid==2.4.2
- attrs==20.3.0
- autopep8==1.5.4
- beautifulsoup4==4.9.3
- cachetools==4.1.1
- certifi==2020.11.8
- chardet==3.0.4
- click==7.1.2
- colorama==0.4.4
- comtypes==1.1.7
- decorator==4.4.2
- flake8==3.8.4
- future==0.18.2
- geocoder==1.38.1
- geographiclib==1.50
- geopy==2.0.0
- google-api-core==1.23.0
- google-api-python-client==1.12.8
- google-auth==1.23.0
- google-auth-httplib2==0.0.4
- google-auth-oauthlib==0.4.2

- googleapis-common-protos==1.52.0
- httplib2==0.18.1
- hurry==1.1
- hurry.filesize==0.9
- idna==2.10
- isort==5.6.4
- lazy-object-proxy==1.4.3
- lxml==4.6.2
- mccabe==0.6.1
- more-itertools==8.6.0
- MouseInfo==0.1.3
- numpy==1.19.5
- oauthlib==3.1.0
- Pillow==8.0.1
- pprintpp==0.4.0
- protobuf==3.14.0
- psutil==5.7.3
- pyasn1==0.4.8
- pyasn1-modules==0.2.8
- PyAutoGUI==0.9.52
- pycodestyle==2.6.0
- pyflakes==2.2.0
- PyGetWindow==0.0.9
- pyjokes==0.6.0
- pylint==2.6.0
- PyMsgBox==1.0.9
- pyperclip==1.8.1
- pypiwin32==223
- PyQt5==5.15.2
- pyqt5-plugins==5.15.2.2.0.1
- PyQt5-sip==12.8.1
- pyqt5-tools==5.15.2.3
- PyRect==0.1.4
- PyScreeze==0.1.26
- python-dotenv==0.15.0
- pyttsx3==2.90
- PyTweening==1.0.3
- pytz==2020.4

- pywhatkit==3.2
- pywin32==300
- qt5-applications==5.15.2.2.1
- qt5-tools==5.15.2.1.0.1
- ratelim==0.1.6
- requests==2.25.0
- requests-oauthlib==1.3.0
- rsa==4.6
- selenium==3.141.0
- six==1.15.0
- soupsieve==2.0.1
- SpeechRecognition==3.8.1
- toml==0.10.2
- uritemplate==3.0.1
- urllib3==1.26.2
- wikipedia==1.4.0
- wincertstore==0.2
- wolframalpha==4.1.1
- wrapt==1.12.1
- xml-python==0.3.5
- xmltodict==0.12.0

API'S ARE USED FOR THE AUTOMATION BOT ARE:

- News API.
- Live Cricket API.
- Open AI API.
- SMTP PORT

CHAPTER-1

INTRODUCTION

INTRODUCTION

AI voice assistant, also known as a virtual or digital assistant, is a device that uses voice recognition technology, natural language processing, and Artificial Intelligence (AI) to respond to people. Through technology, the device aggregates user messages, breaks them down, rates them, and gives meaningfulfeedback in return. Artificial intelligence can bring real conversations. Virtualassistants, understand natural language voice commands and performs tasks for users. These tasks, previously performed by a personal assistant or secretary, include dictation, reading text messages or exchanging email messages aloud, schedule appointments for end users.

The AI assistant can also perform other activities, such as sending messages, answering phone calls, and getting directions. It also helps to read news and weather updates, open Google, You Tube, Stack Overflow, etc. , answer any questions, web scraping, play music, etc. Although this definition emphasizesthe digital style of a virtual assistant, the term virtual assistant or virtual personal assistant is additionally unremarkably wont to describe contractemployees United Nations agency work from home and perform body tasks unremarkably performed by executives, assistant or secretary. Digital assistants can also be compared with other form of consumer-facing AIprogramming known as responsive advisors. Sensible adviser programs are topic-oriented, whereas virtual assistants are task-oriented. "Virtual assistants are typically cloud-based programs that require internet-connected devices and/or applications to function". The technologies that power virtual assistantsrequire vast amounts of knowledge, powering the platforms, as well as machine learning, language communication processes, and speech recognitionarena.

There are dedicated devices to provide virtual assistance. The most stylish on the market from Amazon, Google and Microsoft having Alexa, Google Siri and Cortana as AI voice assistants respectively given by each company.

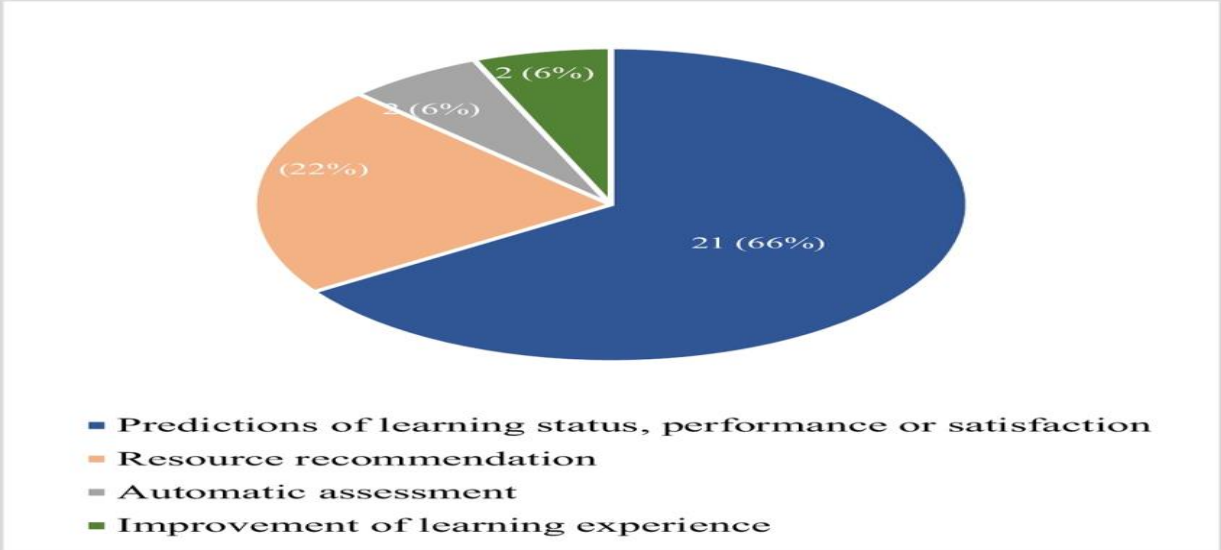
AI voice assistants often perform simple tasks for end users, such as adding tasks to the calendar; provide information that can usually be searched in an Internet browser; or control and check the health of sensitive devices in the home, send emails, setting up of alarms, getting weather reports, can give yourlocation, perform some basic mathematical calculations, check news, start themusic, and open different websites like stack overflow, you tube, Facebook etc.

CHAPTER-2

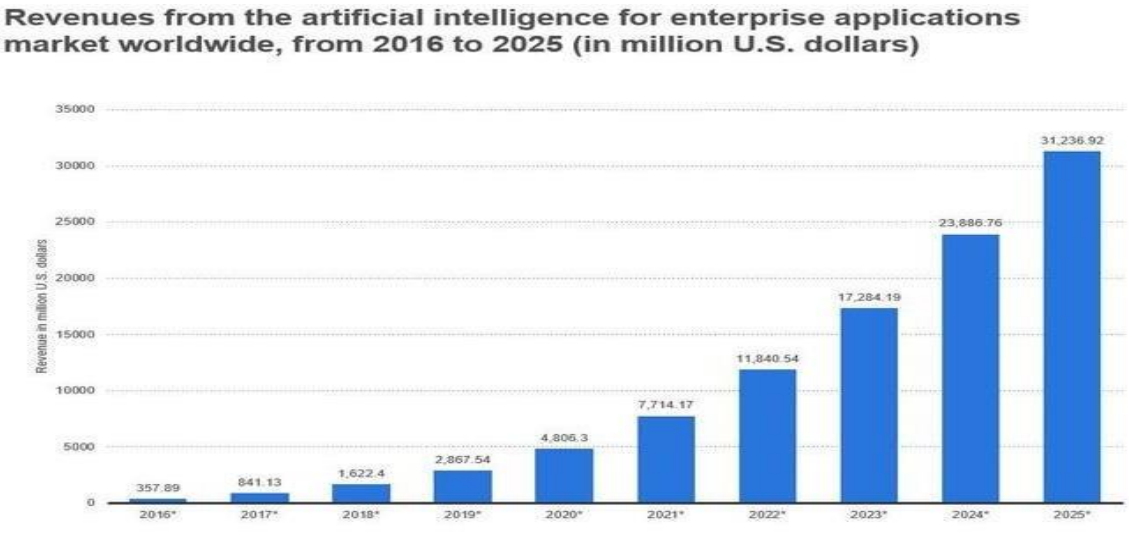
Related work

2. Related Work 2.1

Generalization The below mentioned pie chart shows the analysis of virtual assistants in context to education as well as purpose of this work with a total of papers from 13 countries. The highest contribution was made by country England with most number of papers (3), followed by Russia and Switzerland(2 papers each). The remaining countries, namely Singapore, Pakistan, Canada, India, France, Bulgaria, Saudi Arabia and Germany are also mentioned with 1 paper each



Pie Chart The below displayed bar graph shows that growth is continuous in research papers since 2000, except the year 2010 (Figure 2.2). So this is indicating that this field of research is progressive in a contiguous manner.



2.2 Specific Researches :

AI technologies appear to be extensively adopted, folks don't use them in some cases. Technology adoption has been studied for several years, and there is a square measure, several general models, within the literature describing it. How-ever, having a lot of made-to-order models for rising technologies upon their options appears necessary. during this study, we have a tendency to develop an abstract model involving a replacement system quality construct, i.e., interaction quality, that we have a tendency to believe will higher describethe adoption of AI-based technologies.[5] Artificial Intelligence programs have currently become capable of difficult humans by providing professional Systems, Neural Networks (NN), Natural Language Processing (NLP), and Speech Recognition. Computer science brings a bright future for various technical inventions in various fields. This review paper shows the final thought of computer science, and therefore the use of speech recognition, andgifts the impact of computer.

- The project aims to develop a non-public assistant for Computers (computerPersonal Assistant). It provides an easy interface for finishing a selection of tasks by using bound well-defined commands. Users will move with the assistant through voice commands. As a non-public assistant, it assists the end-user with regular activities sort as general human spoken communication, looking out queries, reading the most recent news, translating words, live weather, and causation mail through voice. The software package uses a device's electro-acoustic transducer to receive voice requests whereas the output takes place at the system's speaker.[11] "The virtual worlds offer many resources to engage their users (named avatars) like freedom of movement, teleport yourself to other locals, communication with other inhabitants (both text and voice messages), capacity to create, modify and destroy objects and the possibility of programming behaviors to these objects via scripts". The world is surplus of the resources for excelling in different fields but they just require some ways for communication. [10] This article introduces virtual embedded voice assistants including gTTS, and ad-vanced Python-based technology in custom assistant development. It integrates features of AIML and Google's industry-leading platform for textto-speech con-version, and thus human voices are included in the gTTS library. This is often the result of applying the Pythons pyttsx dynamic base that is consideredwise in the contiguous phases of gTTS and AIML, facilitating the establishment of noisy dialogues that are worth attention between the assistantand thus the user.[7] The below survey tab.

Table 2.1: Survey Table

S. No	Project	Technologies	Result	Issues
1.	Voice Assistant using python	Voice activation, automatic speech recognition, dialog management	Design and implementation of digital assistance	Absence of additional or multiple features
2.	AI based voice assistant	Python 2.7 , Spider, json, machine learning	A modern model with some advance features established.	Similar with basic prototype and lacks multidimensionality
3.	An interpretation of AIML with integration of gTTS and Python	gTTS(Google text to speech), AIML(Artificial Intelligence Markup Language)	Integration of gTTS, AIML	Dependency on a particular platform
4.	Interoperability in virtual world	WWW(World wide web) services, HTTP, XML	Virtual world's communication, real world to virtual world (R2V)	Less vulnerable to modern operating systems
5.	Natural language understanding	Artificial Intelligence, Natural language processing	Understanding of natural language processing, syntact processing	Only developing the understanding of NLP, difficult to implement
6.	Chabot song recommender system	Python, chatterbot library, list trainer	Developing basic Chabot system	Dedicated to a particular feature only
7.	AI Chabot in python	Pip , NumPy, tensorflow, random	Automated communication system developed	Limited to certain queries and conversation

CHAPTER-3

System Analysis

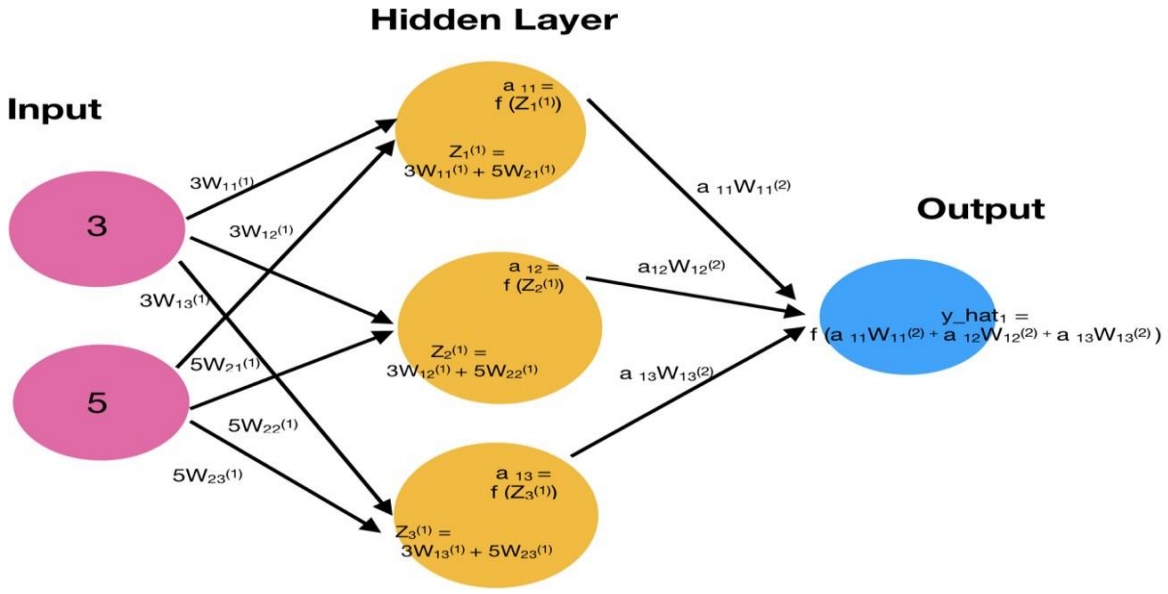
3. System Analysis :

3.1 Training Model

With the help of NN as neural network and NLP as natural language processing, create a brain of the model. And, with the help of machine learningmodules and Deep Learning modules built emotions in the model and dataset to help the model in training.

3.2Neural Networks

"NN reflects the behavior of the human brain, enabling computer programs torecognize patterns and solve common problems in artificial intelligence and other AI applications". An Artificial Neural Networks (ANNs) consists of a layer of nodes, including an input layer, one or more hidden layers, and an output layer. Each node is connected to another node, with weights and thresholds associated with it. If the output of an individual node is greater thanthe specified threshold, that node wakes up and sends data to the next layer of the network. Otherwise, the data will not be sent to the next layer of the network. The network relies on training datasets to learn and improve accuracyover time.



Think of each node as a unique linear regression model consisting of input data, weights, bias as thresholds, and outputs. ziri + th = z1r1 + z2r2 + z3r3 + th output = g(r) = 1 if z1x1 + c >= 0; 0 if z1x1 + c < 0 When an input layer is specified, weight area units are assigned. These weights make it easy to see theimportance of a particular variable. Large variables pay a lot of attention to theoutput for different inputs. Then the units of all input areas are incremented and summed with different weights. Then the output is passed. When this output exceeds a certain threshold, the node is triggered and knowledge is propagated to future layers in the network. This makes the exit of one node theentrance of future nodes. This method of passing knowledge from one layer tothe future layer defines this neural network as a feed forward network.

3.3 Natural Language Processing

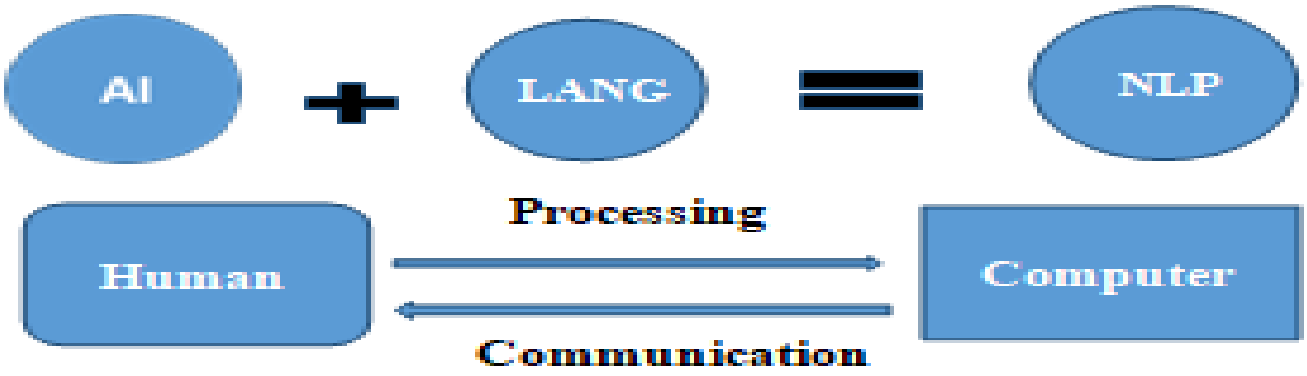
NLP implies "Natural Language Processing", which is part of the user language of computer science and one of the applications of artificial intelligence. This is a technology used by machines to understand, analyze, manipulate, and interpret human language. This helpdevelopers organize theirknowledge to perform tasks such as translation, book reading, speech recognition, and topic segmentation.

1) NLP helps users ask questions about a topic and get a direct answer withinseconds.

2) NLP provides accurate answers to your questions. That is, it does not pro- vide unnecessary and unnecessary information.

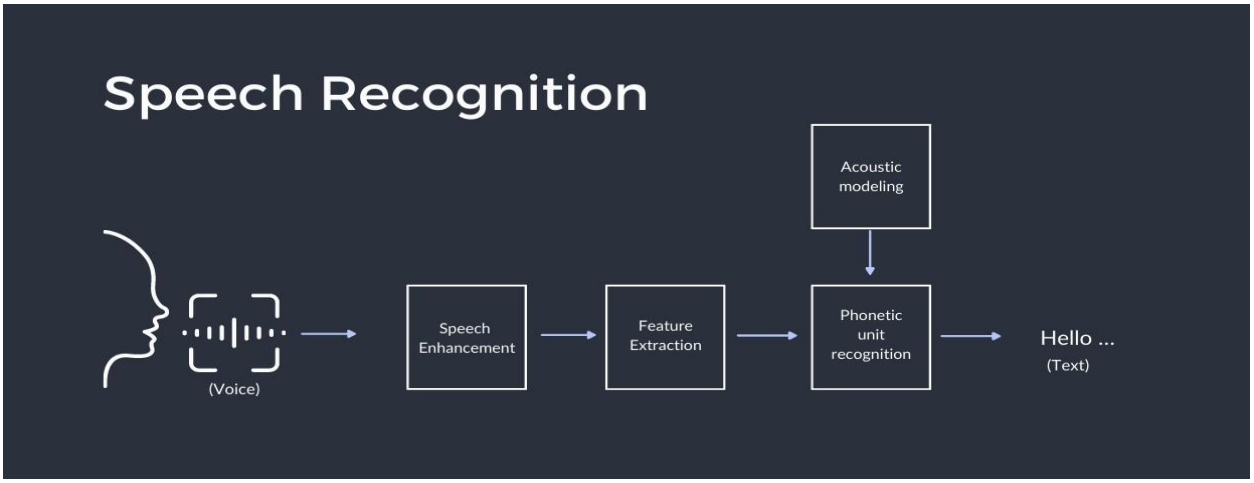
3) NLP helps computers communicate with people in that language.

4) Most IT industries use natural language processing to improve the efficiencyand accuracy of the documentation process and identify information from largedatabases.



3.4 Speech Recognition System

The speech recognition system is the core of the voice application system, which is capable of understanding the voice input given by the user, and at thesame time operating the applications efficiently and generating voice feedback to the user. This system is an important component for users as a gateway to use their voice as an input component. In a word, in order to clearly recognizethe user's speech command and get a response from the system, we should consider that the speech recognition system contains the whole process by which the application system directs the generation. voice signal to text data and some important meanings, forms of speech.



In the Speech Recognition we used the speak function from the pyttsx3 pip python.

3.5 PyTorch

- Machine Learning Library PyTorch allows developers to teach neural network models in a very distributed way. It uses Python's native support for user-machine communication and asynchronous execution of aggregate operations to provide optimized performance in analytics and productionenvironments.

torch.cuda: supports CUDA tensor types that implement the same function asCPU tensors.

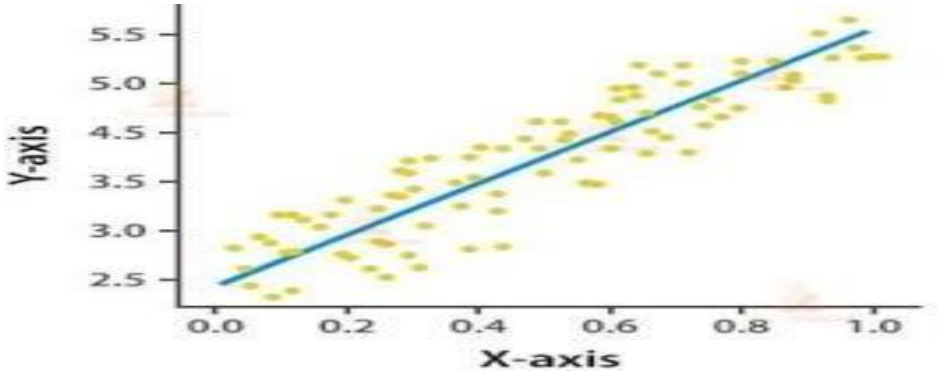
torch.nn: this package provides many more classes and modules to implementand train the neural network.

torch.utilis.data: this package is mainly used for creating datasets.

3.6 Linear Regression

Concept This algorithm is a method of finding a linear relationship between adependent variable and an independent variable by minimizing the distance. This is a supervised algorithm. Here, we use a machine learning supervised algorithmic approach to categorize individual categories. Using this algorithm,we created a voice assistant model that allows

users to predict relationships between dependent and independent entities.



D=p+qI

p= (D)(I2)-(I)(ID)n(I2) - (I)2 (D)(I2) - (I)(ID)n(I2) - (I)2q= n(ID)

- (I)(D)n(I2) - (I)2

I is the independent variableD is

the dependent variable

p is intercept and q is slope of line here

CHAPTER-4

Face Recognition

Face Recognition

A fairly simple way is mentioned to implement facial recognition system using Python and OpenCV module along with the explanation of the code step by step in the comments.

Before starting we need to install some libraries in order to implement the code. Below you will see the usage of the library along with the code to installit:

- **OpenCV:**
  OpenCV (Open Source Computer Vision Library) is an open-source computer vision and machine learning software library. which is built to provide a common infrastructure for machine learning algorithms and computer vision. It has thousands of optimized algorithms which can be used different purposes like detecting and recognizing faces, identifying objects and many more. We need it to take pictures using our webcam and some manipulation needed to bedone in the image.
  To install the library you need to install pip in your system after that you can follow the steps in command prompt:

  pip install opencv-contrib-python

- **NumPy:**
  NumPy is the fundamental package for scientific computing in Python which provides a multidimensional array object other mathematical operations can be performed using this but simply speaking we just need it to convert our images into some form of an array so that we can store the model that has been trained.To install the library you can type a simple line of code in your command shell:

  pip install numpy
- **HaarCascade:**
  Haar Cascade is basically a classifier which is used to detect the objects for which it has been trained for, from the source. The result is an XML file which stores the trained result. If said simply the Haar Cascade is trained by superimposing the positive image over a set ofnegative images. The training requires a high spec system and a goodinternet connection and thousands of training images that is why itis carried out in the server. For increasing the efficiency of the resultsthey use high-quality images and increase the number of stages for which the classifier is trained. We need haar cascade frontal face recognizer to detect the face from our webcam.

What are face detection and face recognition?

Face recognition is a method of identifying or verifying a person's face from images or video frames. Without any effort, we can immediately recognize the faces. But it is a challenging task for a computer. Low resolution, occlusion, lighting fluctuations, and other factors all add to the complexity, and hence face recognition and detection process becomes difficult. These parameters have a significant impact on the computer's ability to detect faces more accurately.

Let us understand the difference between face detection and face recognition.

Face detection is a computer vision process that uses artificial intelligence (AI)algorithms to recognize and identify human faces in digital photographs. Facedetection technology can be used in a variety of industries to enable real-timesurveillance and tracking of people, including security, biometrics, law enforcement, entertainment, and personal safety.

Face Detection: Face detection is defined as the process of locating and extracting faces (in terms of location and size) from an image for use by a facedetection algorithm.

Face Recognition: Face recognition method is used to identify features in an image that are unique. It is the method of identifying or recognizing certain features of the face such as eyes or mouth or validating whether a certain person is present in the given image or not.

Implementation using HAAR Cascade Algorithm

The HAAR cascade is a machine learning technique that involves training a cascade function using a large number of positive and negative images. Those with faces are considered as positive images, whereas images without faces areconsidered negative. Image characteristics are viewed as numerical information taken from images that can distinguish one image from another inface detection.

On all of the training photos, every feature of the algorithm is applied. At the outset, each image is assigned the same weight. The algorithm determines theappropriate threshold value for categorizing the faces into positive or negative.Errors and misclassifications are possible but we aim to choose characteristicswith the lowest error rate, which implies these features are the ones that best distinguish between face and non-facial photos.

To calculate the numerous characteristics, all feasible sizes and locations of thekernel are used.

CHAPTER-5

Proposed System

Proposed System

The voice assistant initiates voice mode and prompts the user to provide inputin voice/text format for best results from the voice assistant. As this program can also be controlled with your phone with help of an application 'WO-MIC',it just turns any android phone into a wireless microphone and helps in the reduction of unwanted noise in the environment. Using this application, whichis Wikipedia's search engine, users can contact the wizard and the wizard willretrieve the data from the internet. The results are displayed in the console window in audible format, up to a limited number of lines.

- **Getting Current News** about his/her motherland, about world, about technologies, about sports or about entertainment of the industry and much more, the user can easily get the news just by giving voice input to assistant toopen news so it will open new tab and it can also fetch the data from the websites and return it to the console and read out for user without any labor.

- **Weather Forecast**, through this feature users can see the weather forecast for any location. In addition, the temperature and humidity of Kelvin will return the weather.

- **Open Applications** like , YouTube, google search engine , launchingwebsites , system applications with the help of web browser python library and os for opening system applications(like, code editor, notepad,chrome,etc.) Close Applications, the application work perfectly by providing a command 'TASKKILL/ F/im file.exe'. The assistant close that application asked to close.

- **Automation**, the application performs automation for YouTube and any search engine with the help of keyboard python library. The user just need to give input and the assistant will perform the automation ask.

- **Voice Assistant** caneven repeat the user's words by takeCommand functionand speak function.

- **WhatsApp Messages**, the application work by taking mobile number of thereceiver or the name of the receiver, message to send , time when to send as aquery. As the result , voice assistant will send the message and inform you. This is done with help of pywhatkit python library. And the history of messageswill be saved in pywhatkit database file .

- **Checking Internet Speed**, the application is done with the help of speedtestpython library by which assistant will check and return the result on the console.

- **Checking my location**, this feature allows users to view their current location or find directions to any location.

- **Listening to music,** the voice assistant plays the music requested by the user, either from the user's system or through an online search, without the user having to do it.

- **PC BOT translator**, this feature translates the user's original text input intothe desired language. Over forty human languages are stored in the dictionary.

- **Audiobooks**, the application is very attractive as the voice assistant will openand read the book in your favourite language for the user to understand the book with the help of pypdf python library.

- **The Assistant** create a note to save the user's important data for future use.

- **Sending Mails**, this feature allows users to send an email to someone whosecontacts include an email address. It then sends the successful execution of thetask back to the user via the Hearing Assistant.

- **TimeTable Notification**, the voice assistant will remind you the work accord-ing to the user's time table schedule and as a result it also give notification with the help of notify python library .

- **The Voice Assistant** can answer any query with the help of Open AI pythonlibrary and Open AI algorithm,

- **A setting alarm** is a basic function of any device, this allows the user to setthe alarm to a specific time.

- **Chatbot**, this feature communicates with the user on a case-by-case basis. Italso works whenever the user provides voice input to the assistant and the userreceives the output in the voice response of the voice assistant ChatBot.

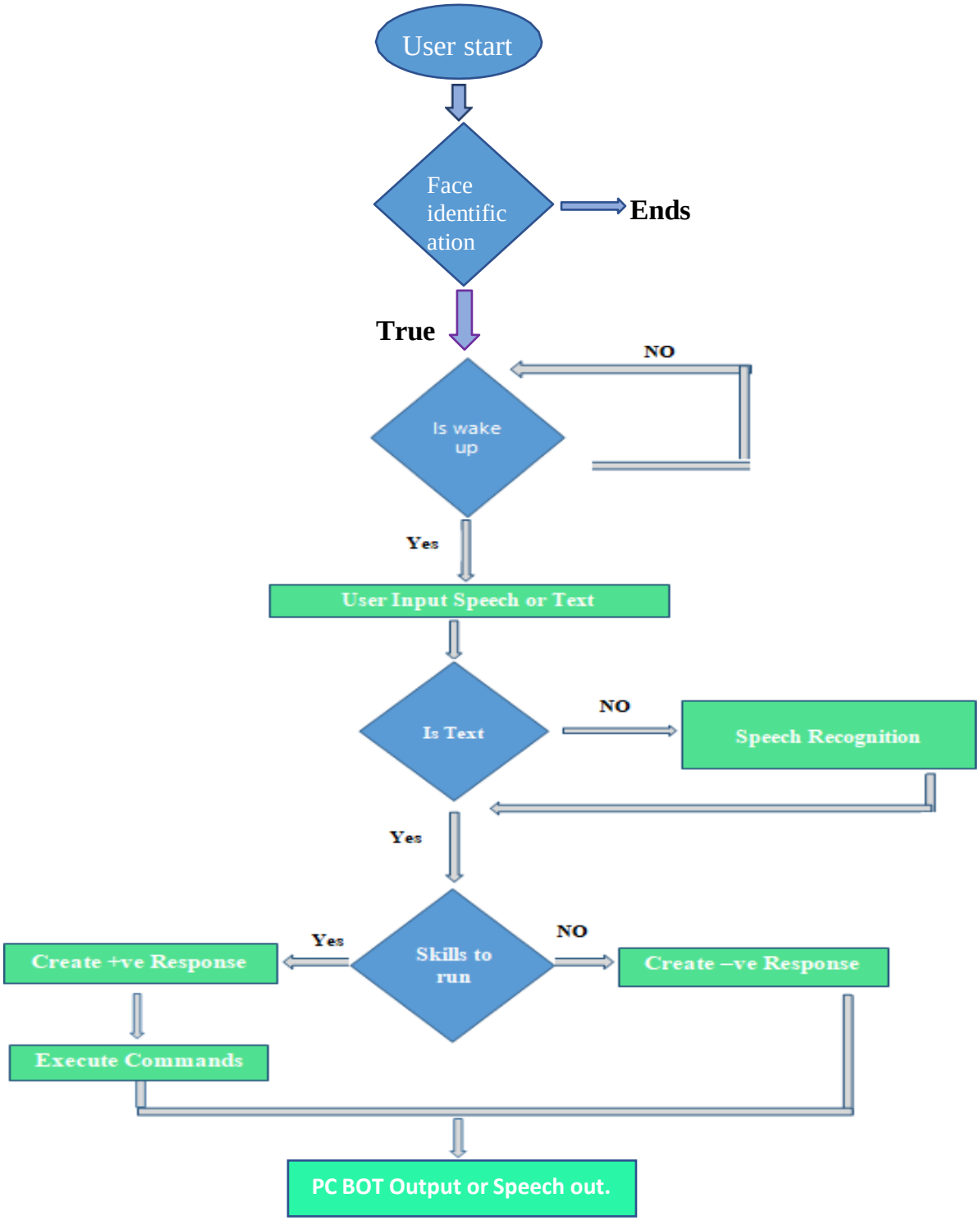
- **Screenshot**, this feature allows the user to take a screenshot of the current window or photo or current file and ask the user for the name of the file to savein the required file folder on the system for later viewing.

- **Calculations**, this function performs an arithmetic calculation with a user's voice command and produces an output that is a calculated solution through avoice assistant.

CHAPTER-6

System Architecture

System Architecture



Initially the Voice Assistant of the PC bot is get as a output then bot says theuser opening with the face identification to verify that the Authorized is usingthe PC then the user kept the Face in Front of the Camera then Bot recognizesthe Face of the User if the matches with the person then that the bot gives verify message and allowed the person to give commands to the PC bot .

Then the PCbot responses the queries of the user initially that the Voice taken by the PC bot is convert into the form of text then the text is used to give the response from the PCbot side.

The PC bot uses the Opencv to recognize and identify the Face of the user .The PC bot

uses the Pyttsx3 used to recognize the Voice of the user .

The PC bot uses the API key of ChatGPT to give the response for the user query in a quick manner and the user speaked text is stored in the text file it helps for the pc to give response in future conversations with the user in a effective manner.

We can modify the PC bot brain that is nothing but the text file .

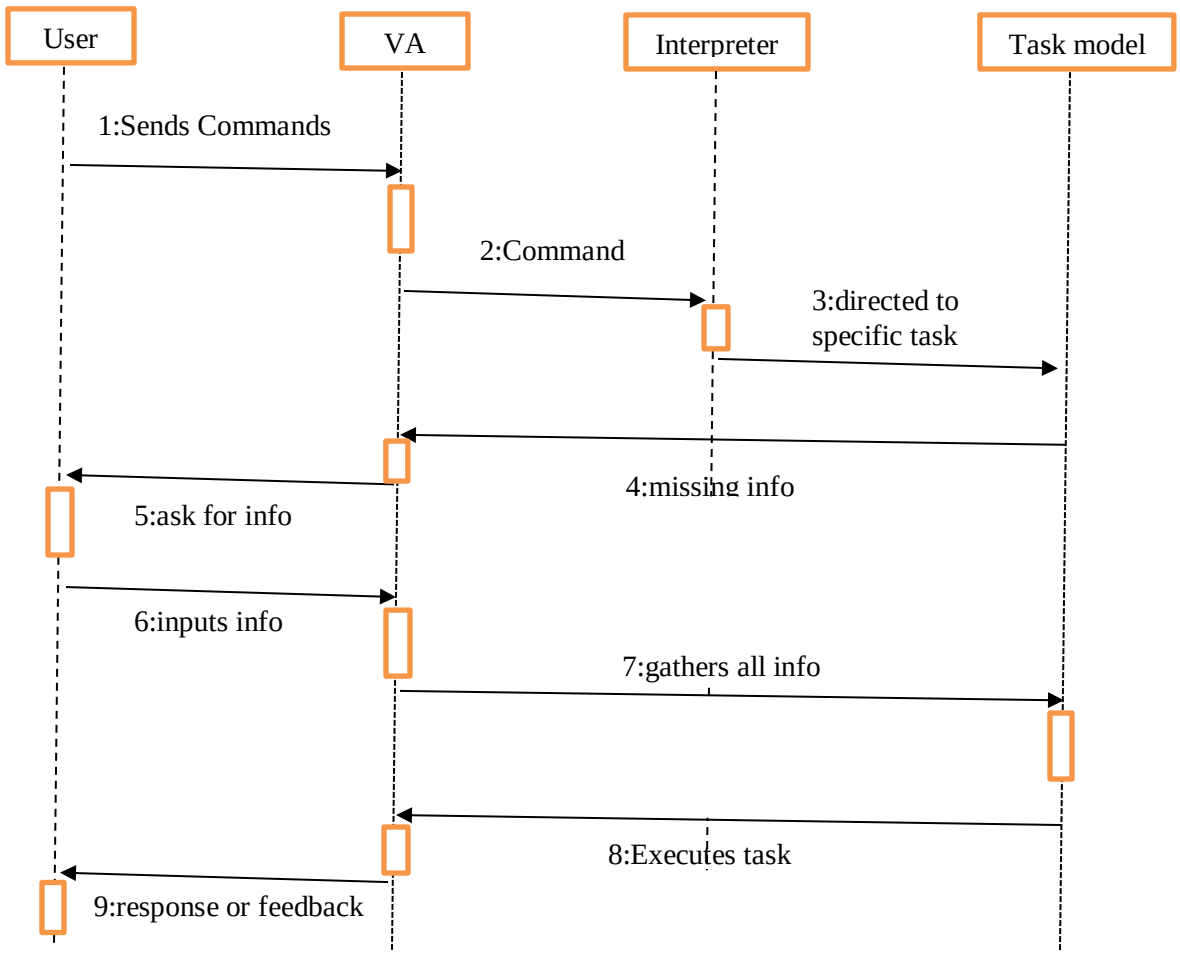
CHAPTER-7

UML DIAGRAMS

UML DIAGRAMS:

7.1 Sequence Diagram

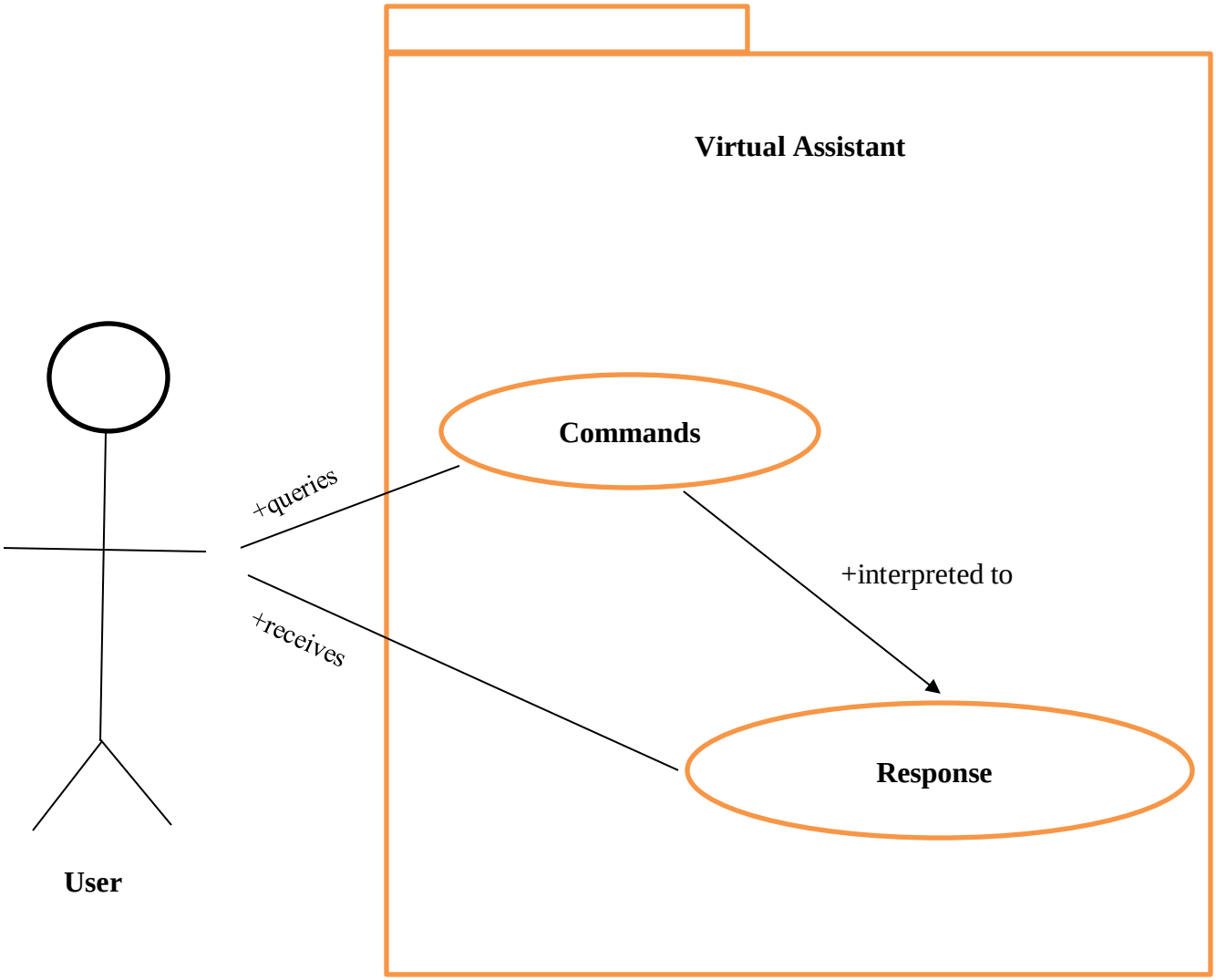
Interaction Sequence Diagram



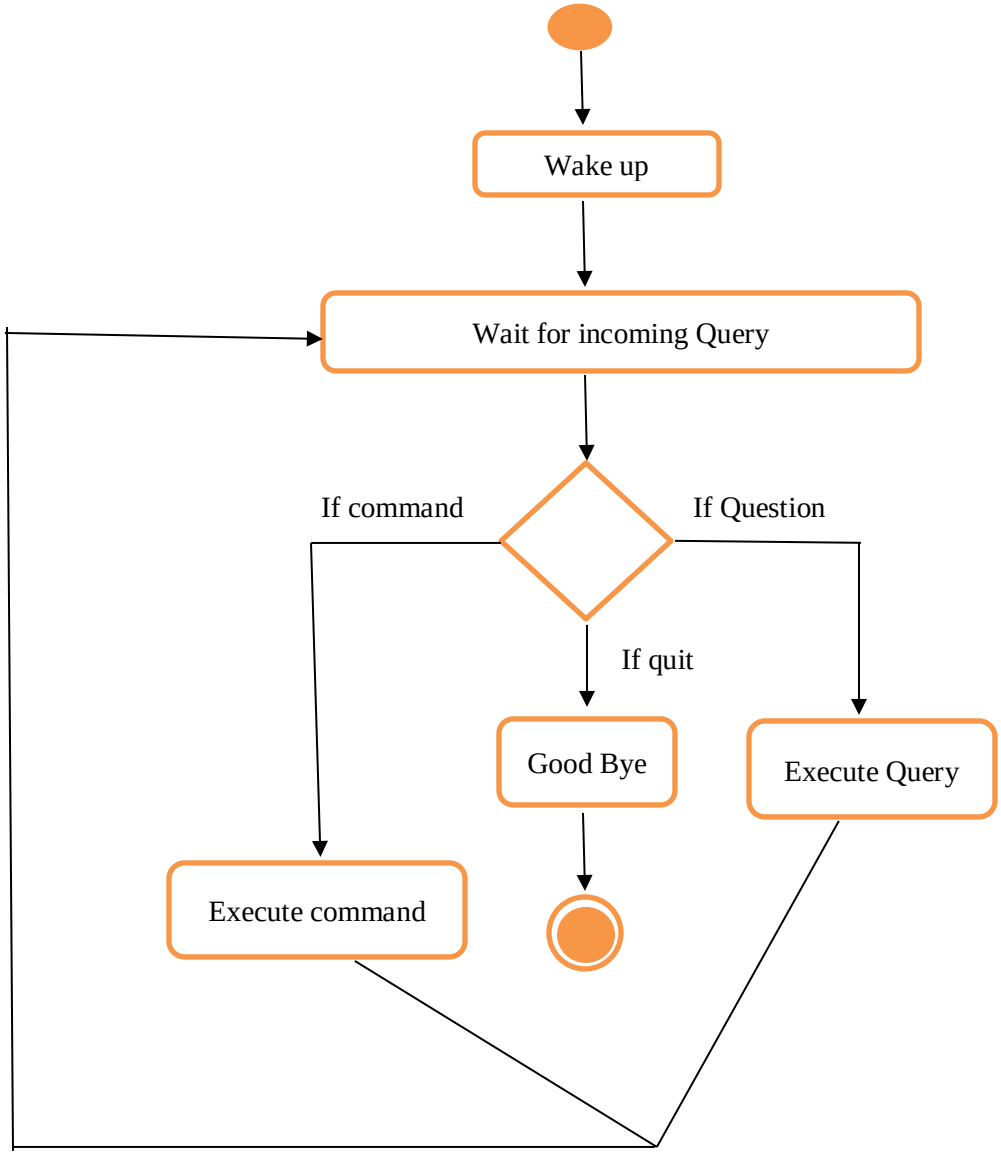
- The user sends command to the voice assistant PCbot then it forwards it to Interpreter i.e. speech recognition feature here and then is directed perform the specific task, after the processing in task model PCbot executes the task and give the response or feedback to the user. (Figure 4.2).

- If after the processing at task model there is some missing information thenPCbot asks for that information, takes the input again, gathers all information and follow the same process as detailed above. (Figure 4.2)

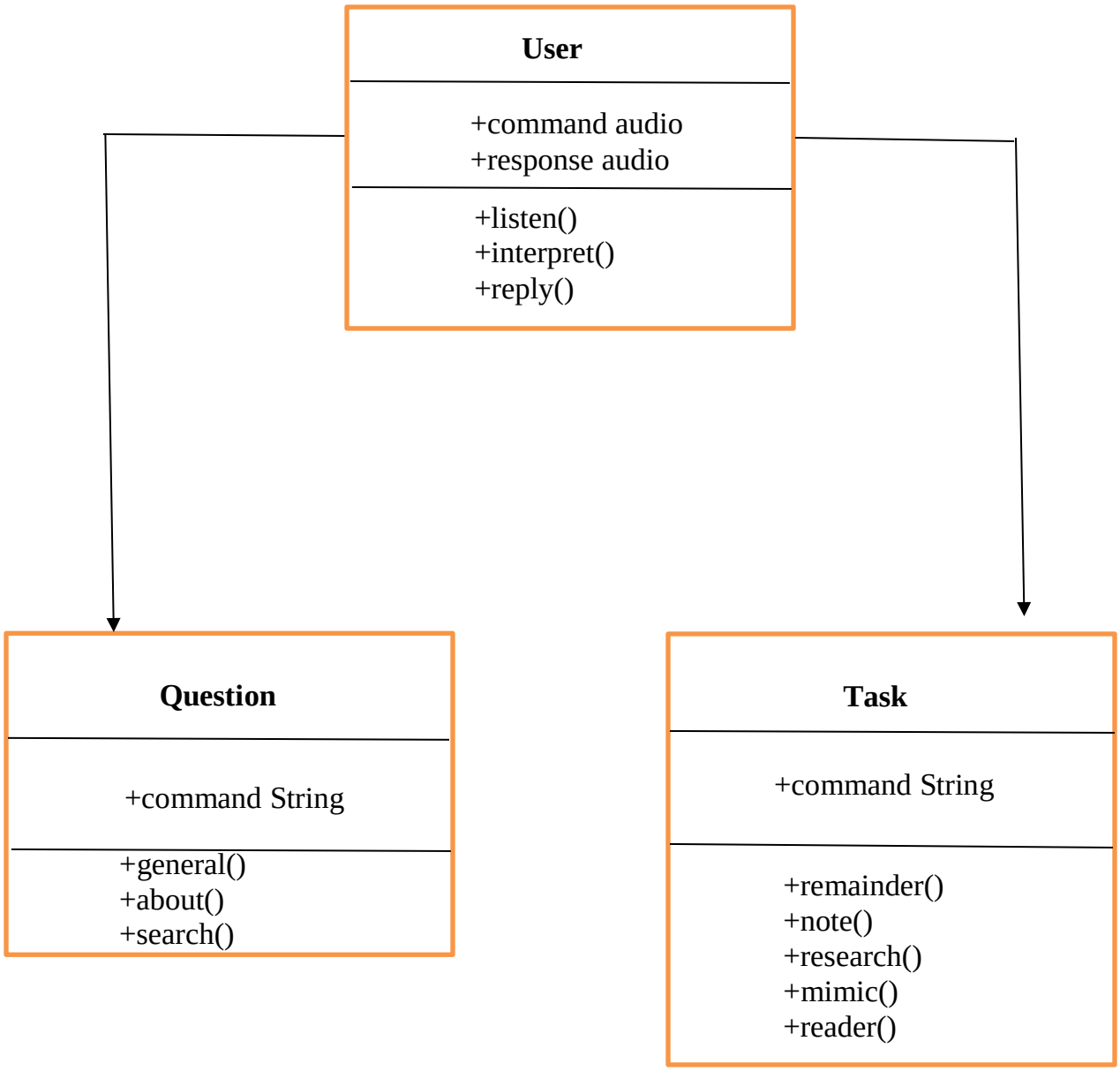
7.1 Use Case Diagram



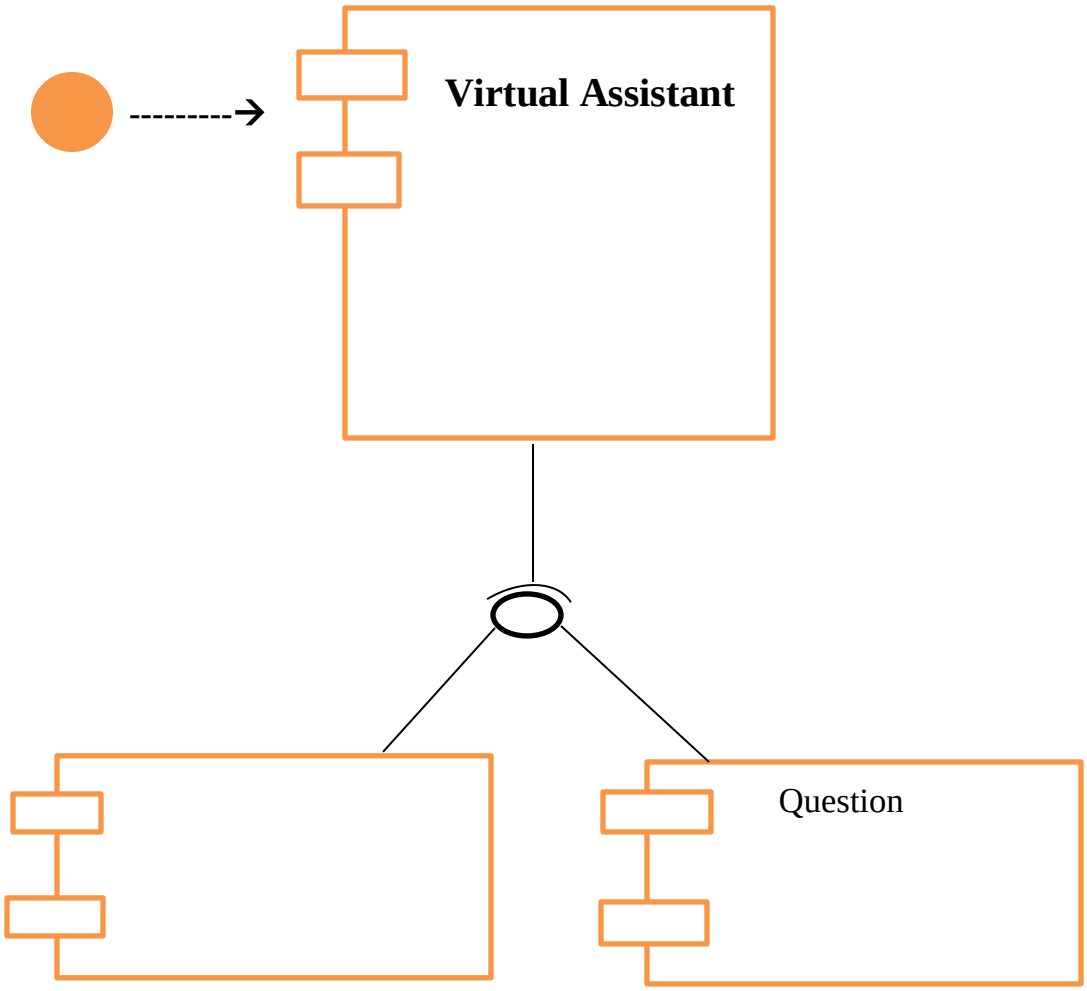
7.2 Activity Diagram



7.3 Class Diagram



7.4 Component Diagram



CHAPTER-8

PREPROCESSING

PREPROCESSING

PCBOT Automatically:

-eliminates NaN or missing values

-encodes (binarizes) any qualitative input

-deletes any input or output that has zero variance (becauseit has no

meaning)

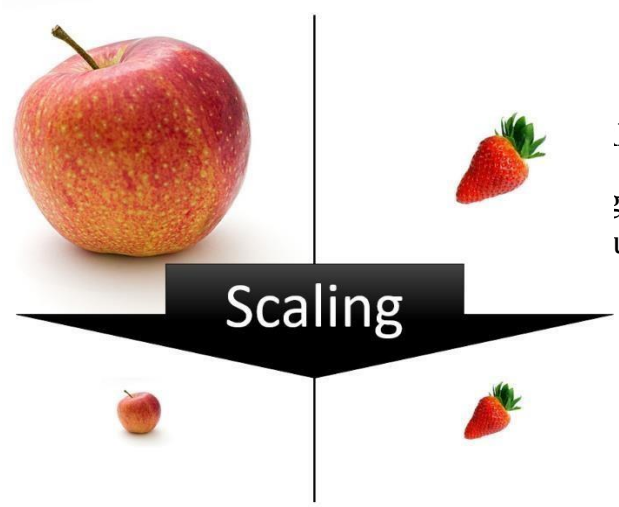
-scales inputs and/or outputs with standard scaling, min- max scaling or powerscaling (or no scaling at all, following the user's request)

-balances the dataset by downsampling or upsampling (SMOTE algorithm or duplicates without train-test leakage) (following the user's request) (for classification)

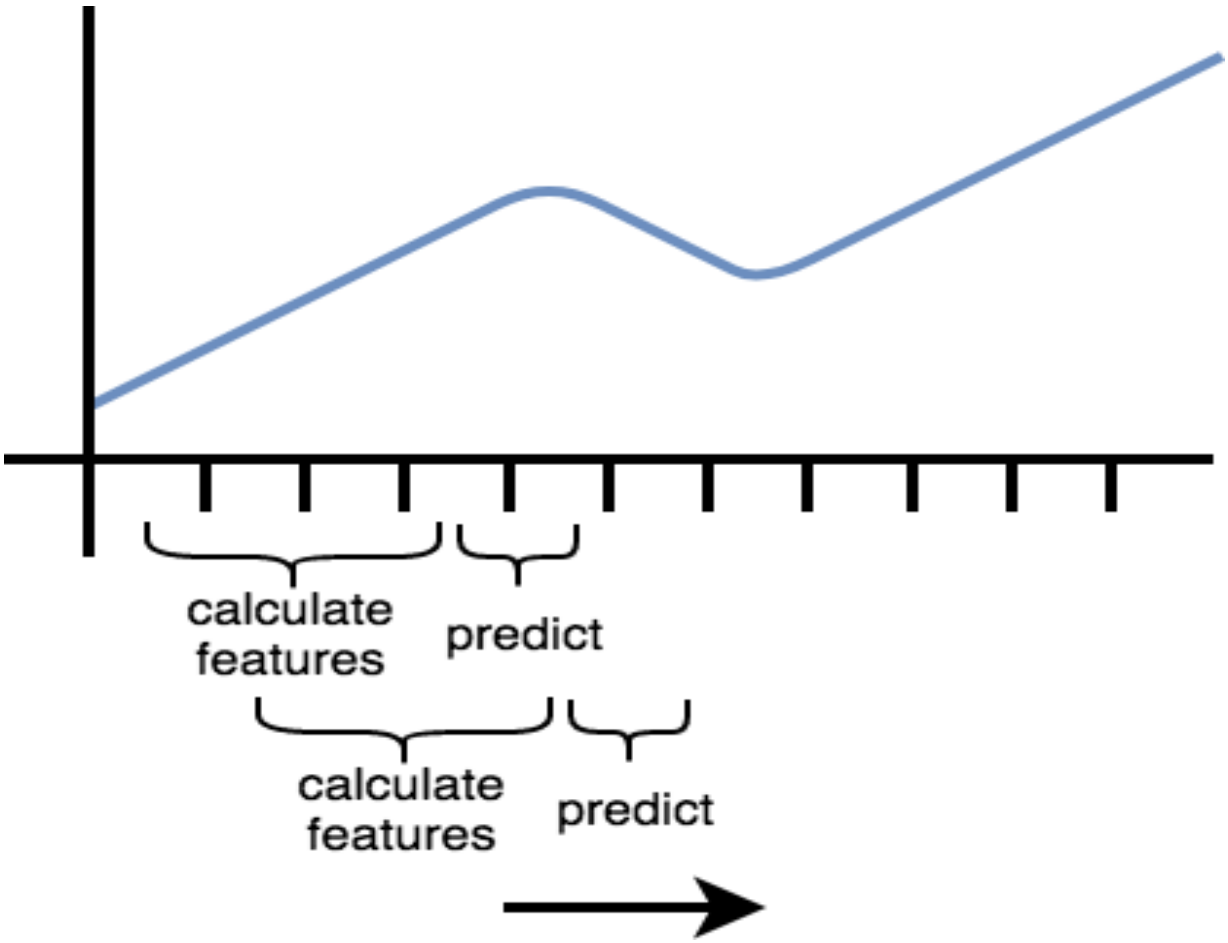
-eliminates any class under a user-specified threshold (for

classification)

-transforms the data from time-series to supervised-data (for transient states)(following the user's request)



PCBOT can also compute statistical summaries for ‘deep’ past data beyond thepast rolling window (min, max, mean, standard deviation, skewness, kurtosis,Fourier transform, etc.) to enhance predictions.

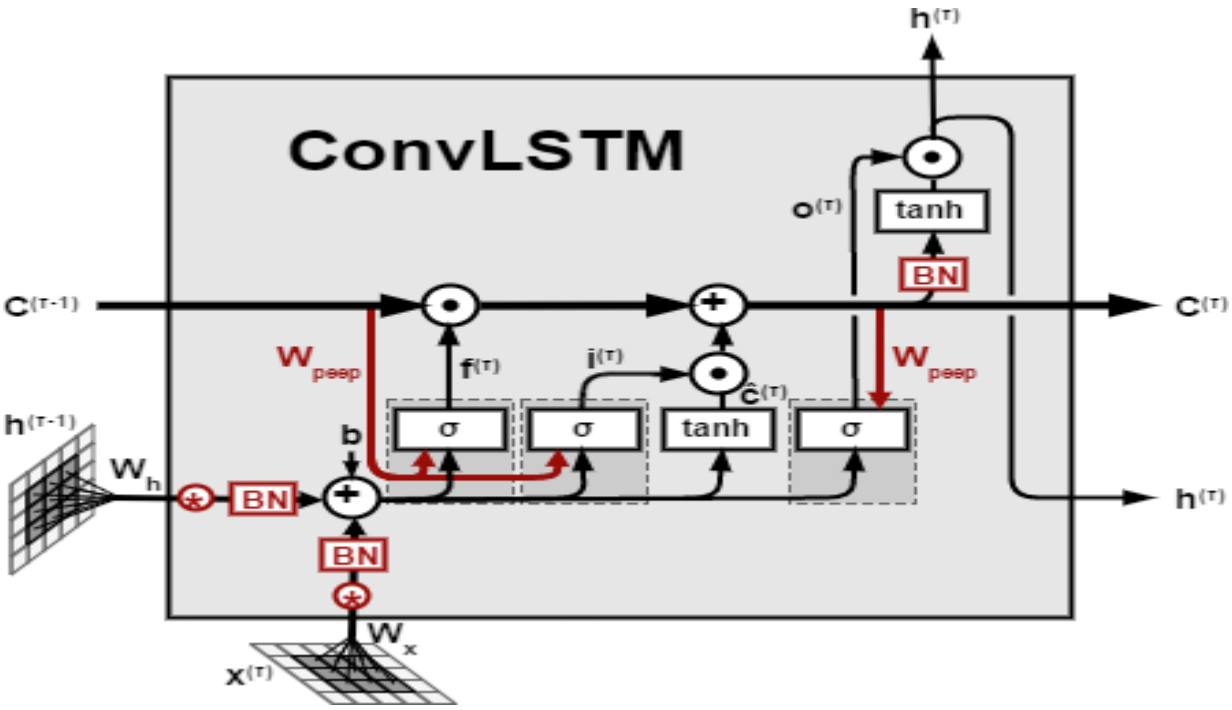


For transient states, PCBOT can use both machine learning and deep learningtechniques

For deep learning, PCBOT uses ‘classic’

feedforward perceptrons

We tried LSTMs and CNNs for time series but we were not convinced so theywere finally not implemented.


ConvLSTM
h(τ)
o(τ)
tanh
BN
C(τ-1)
C(τ)
W peep
f(τ)
i(τ)
ĉ(τ)
W peep
h(τ-1)
b
σ
σ
tanh
σ
W h
BN
BN
h(τ)
W x
x(τ)

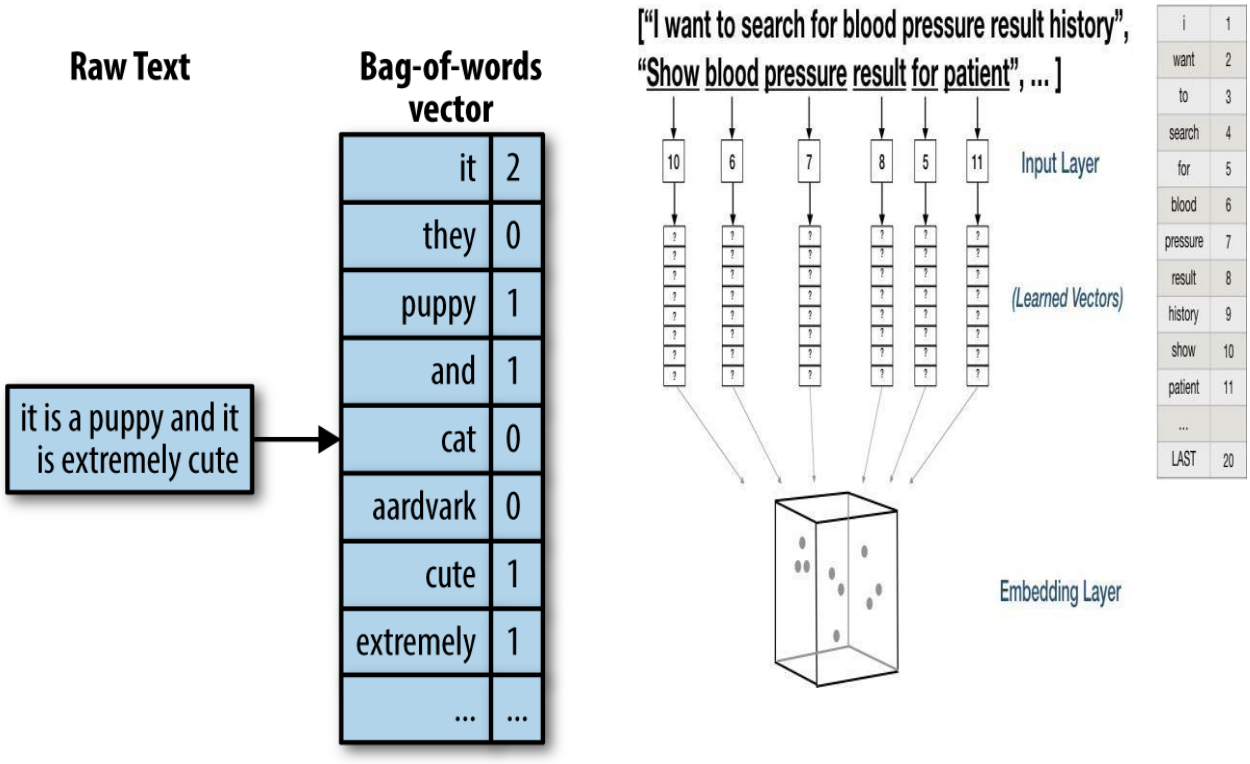
CHAPTER-9

NATURAL LANGUAGE PROCESSING

NATURAL LANGUAGE PROCESSING

For text data, PCBOT automatically :

- removes capitals, numbers and punctuation
- removes stop words
- removes any word under a certain user-defined frequency threshold
- applies a word stemmer
- encodes words either with :
- the bag-of-words approach (according to count, frequence or TF-IDFfollowing the user's request)
- the embedding approach (Keras embedding layer) for neural networks



PCBOT offers several validation strategies :

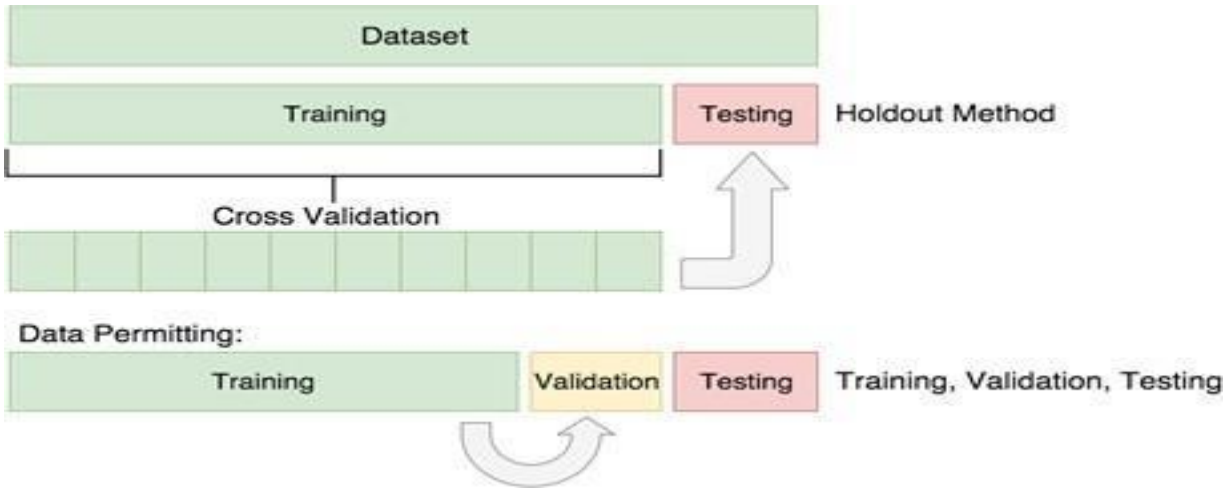
-training-validation split.

-training-validation-test split.

-3 folds cross validation split.

-3 folds cross validation + test split.

Split can be performed randomly or following a 'PreDefinedSplit' variablegiven by the user.



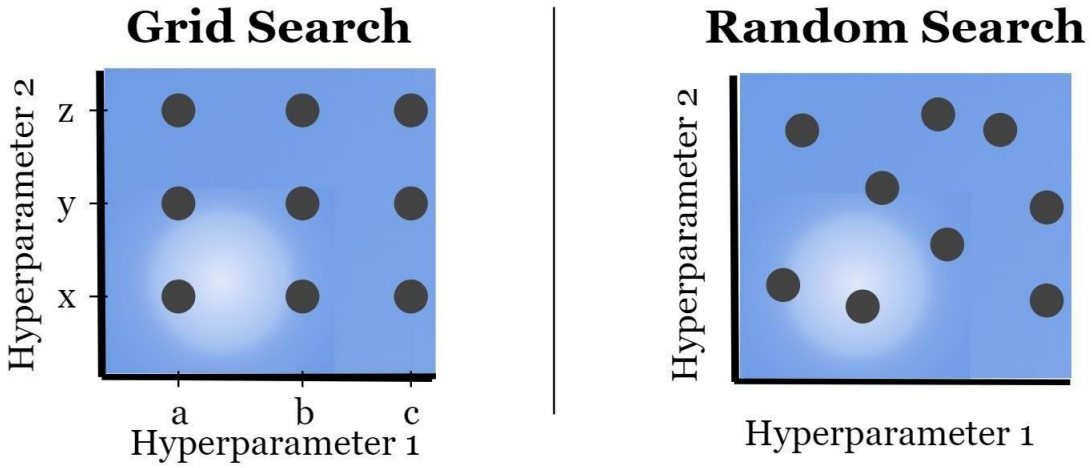
PCBOT offers 4 'intensity' levels for hyperparameteroptimization:

Level 0 will only look for default parameters, level 1 will look for ~10 modelsfor each algorithm, level 2 will look for ~100 models for each algorithm and level 3 will look for ~1000 models for each algorithm

PCBOT uses brute-force grid search

The grids are predefined but the user can modify the grids or ask for random grids

'Smart' search using results-aware approaches such as Bayesian search or Forest Minimize [4] were tested but we were not convinced [10] so



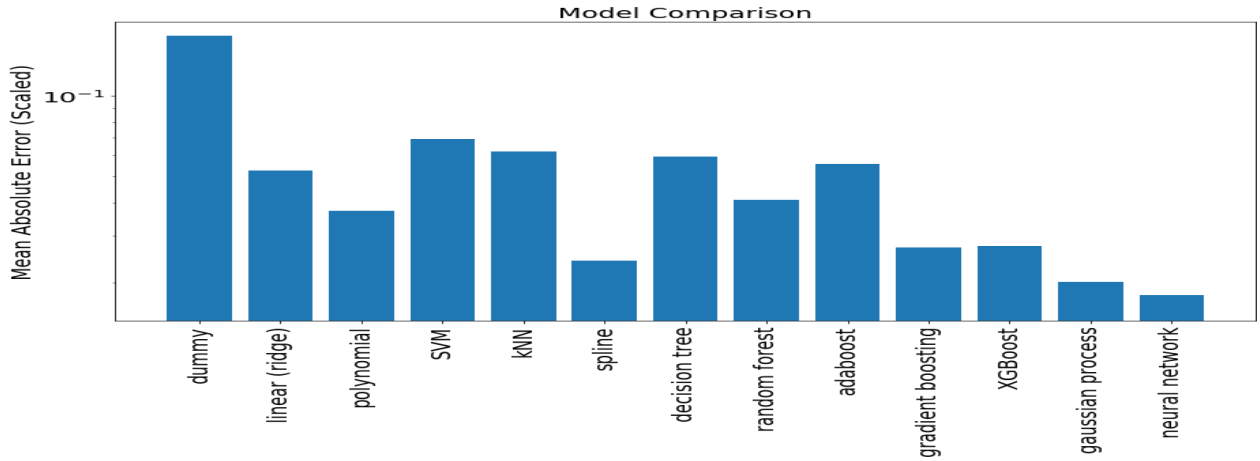
PCBOT will automatically optimize and compare all the algorithms requestedby the user and will indicate and select the best one with its best hyperparameters.

PCBOT offers Mean Absolute Error and Mean Absolute Percentage Error forregression (allowing for relative error), and weighted or non-weighted F1- score for classification.

```
MEAN ABSOLUTE ERROR SUMMARY (SCALED)

419 configuration(s) tested

Dummy = 0.168
Linear (Ridge) = 0.0526
Polynomial = 0.0373
Support Vector Machine = 0.0689
kNN = 0.062
Spline = 0.0242
Decision Tree = 0.0593
Random Forest = 0.0408
Adaboost = 0.0559
Gradient Boosting = 0.0272
XGBoost = 0.0276
Gaussian Process = 0.0202
Neural Network = 0.018
```



CHAPTER-10

MODEL EXPLANATION

MODEL EXPLANATION

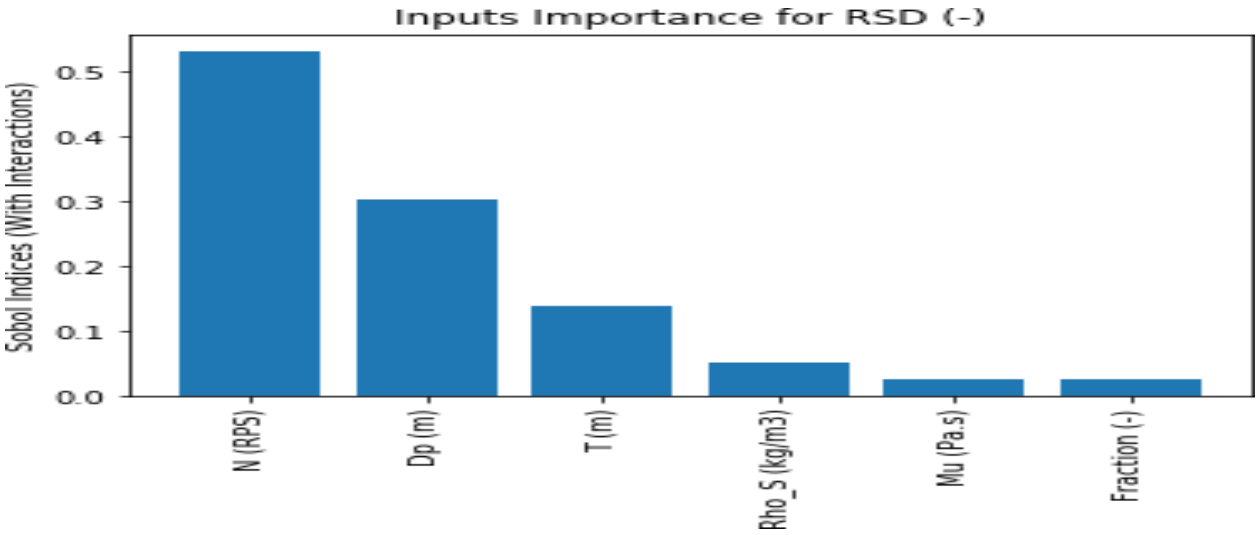
PCBOT offers 3 ways to explain the model :

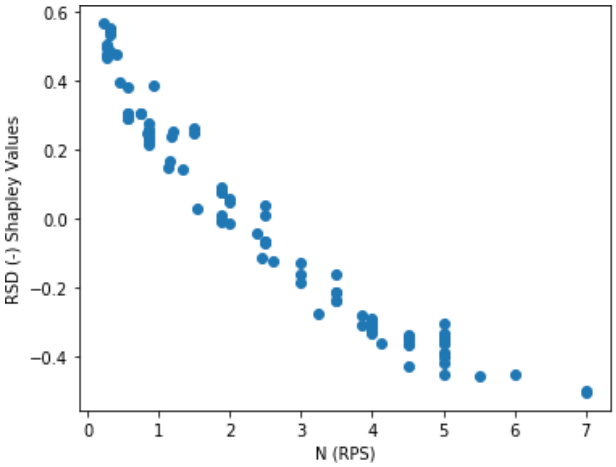
-1D Partial Dependence Plots.

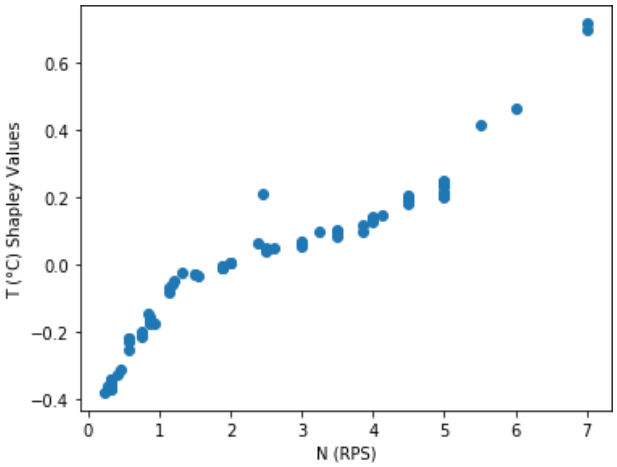
-Sobol Indices (with interactions) (SALib package [5]).

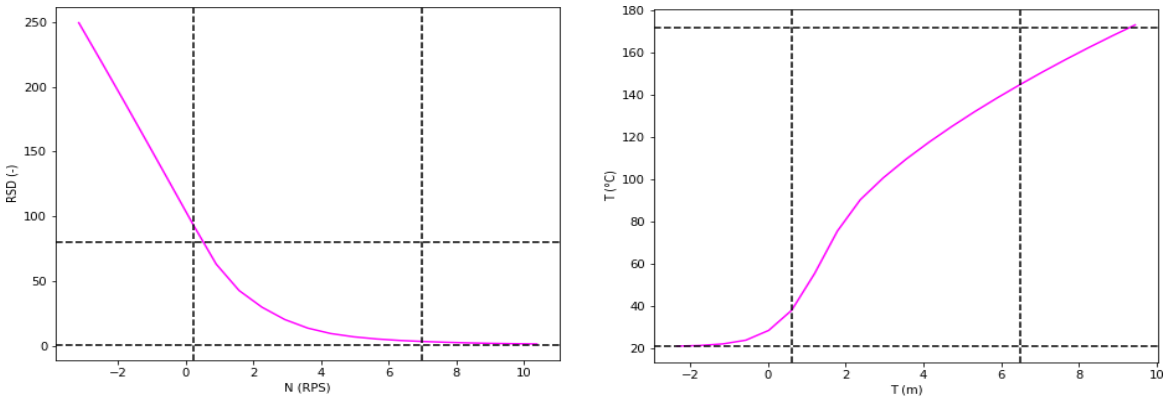
-Shapley Values and Shapleys Graphs (SHAP package [6]).

These 3 approaches show how the model behave, both quantitatively and qualitatively, can 'explain' the value of the outputs as a function of each inputand can even show how the model behaves in extrapolation.









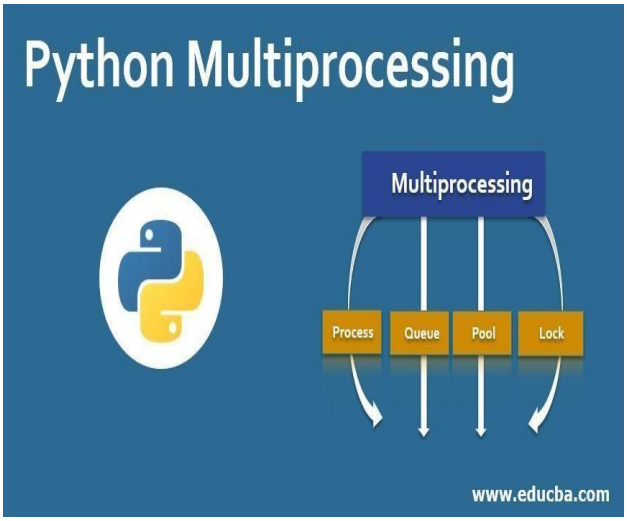
COMPUTING

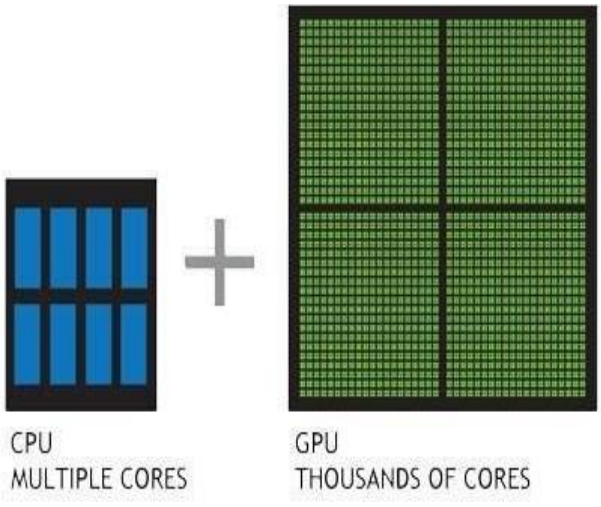
PCBOT can run the training on a single or multiple CPU core(s) or on a singleor multiple GPU(s)

The parallelization is performed with the Joblib and Multiprocessing librariesThe training is parallelized at the grid search level and not at the model level

(tiny models would not benefit from parallel computing)

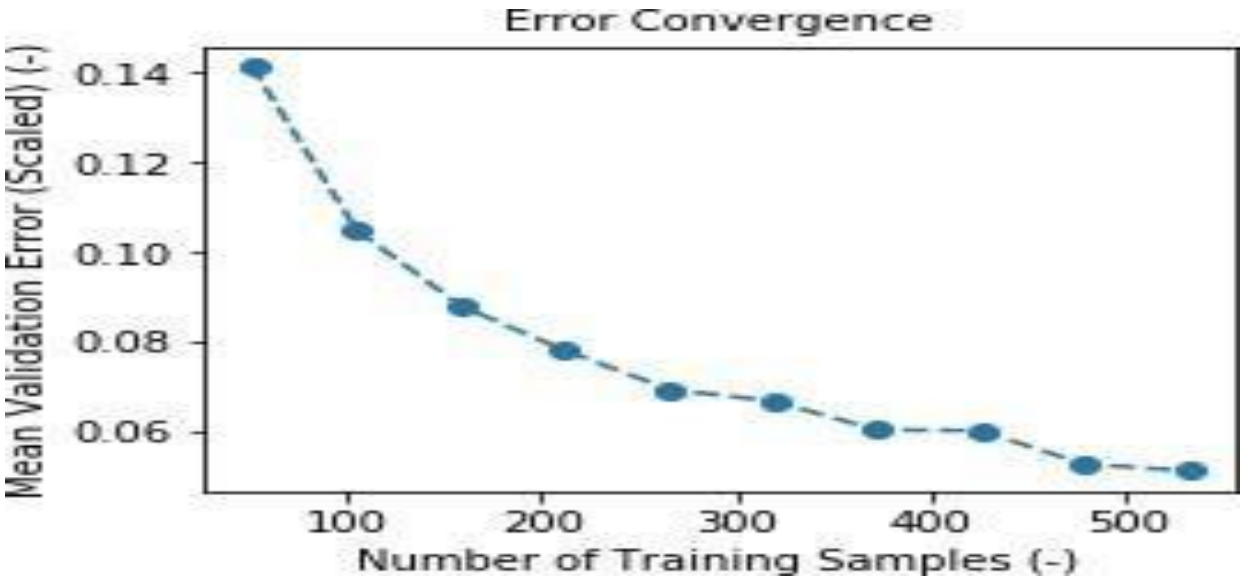
The speed-up from 1 CPU core to 4 GPUs can be of 2 orders of magnitude.





CONVERGENCE

PCBOT automatically performs a convergence study to show the effect of thesize of the dataset on the machine learning score or error, by performing 10 subsamplings from 10% to 100% of the training set to plot the validation scoreor error for each subsampling, so the user can see if more data would be betteror not :



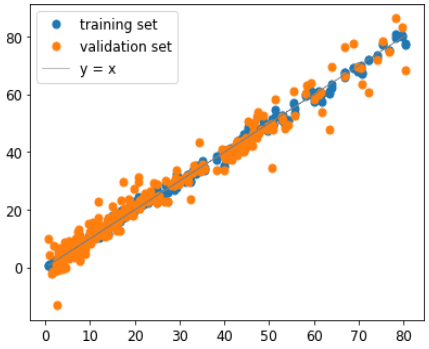
CHAPTER-11

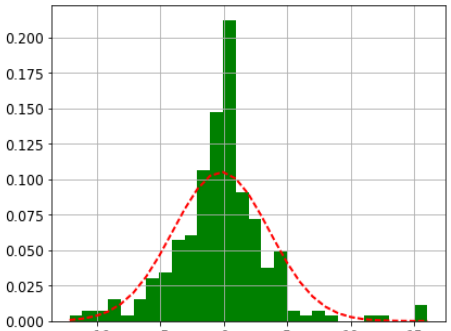
GRAPHS AND RESULTS

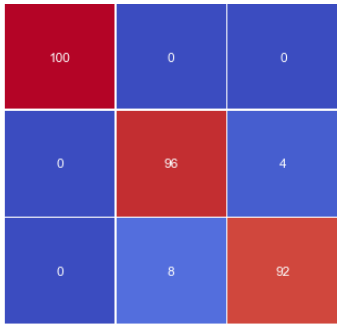
GRAPHS AND RESULTS

PCBOT will automatically calculate errors or scores, draw parity plots or confusion matrices and show error statistics, histograms and classification reports.

PCBOT will automatically saves the database with the original and predicted results so the user can check the error case by case.



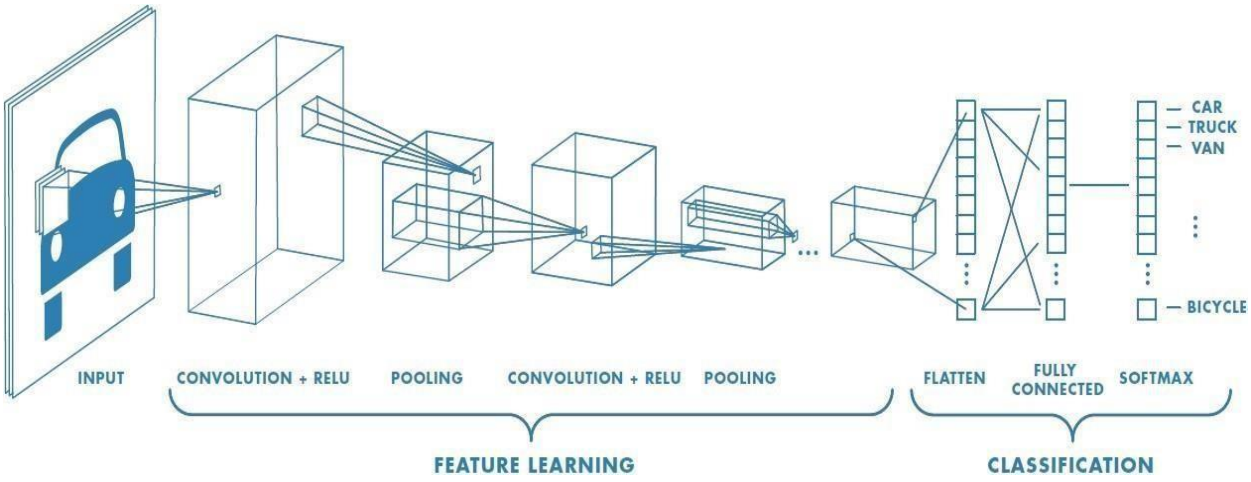




COMPUTER VISION

PCBOT also offers image processing capabilities for vision (classificationlearning)
PCBOT automates image pre-processing :

- Sizing to a single and homogeneous scale
- Gray conversion if requested
- Data augmentation (scaling, rotations, mirrors, etc.) if requested.



PCBOT builds and trains convolutional neural layers followed by fullyconnected layers, following the user's

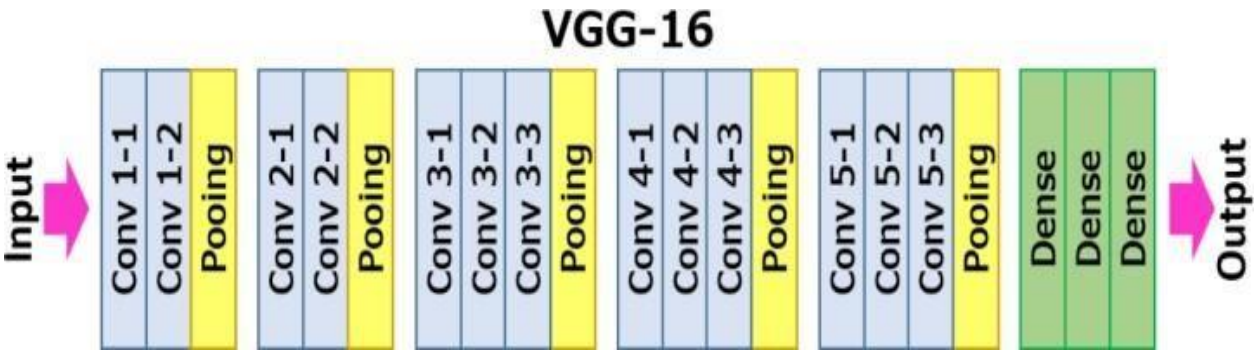
requests for the following parameters :

- Number and size of convolutional layers
- Type and size of pooling layers
- Number and size of fully connected layers
- Type of activation functions

It is possible to load a pre-trained convolutional neural network such as VGG[7], ResNet [8] or INCEPTION [9]

with a single keyword to reduce training time and increase performancePCBOT trains the network on CPU or GPU

PCBOT also offers the possibility to train an XGBoost model instead of a fullyconnected neural network (after loading a frozen pre-trained neural network), making the model extremely fast to train compared to a « full » neural network.



CHAPTER-12

Deployment

DEPLOYMENT

The models are easily deployed to perform new predictions as PCBOT saves the final model in a dedicated directory with all the necessary pipelines(cleaning, encoding, scaling, NLP, unscaling, etc.)

The model can then be easily reloaded and used to make new prediction fromnew inputs from a simple text file

The new prediction can be 'explained' with the Shapley values

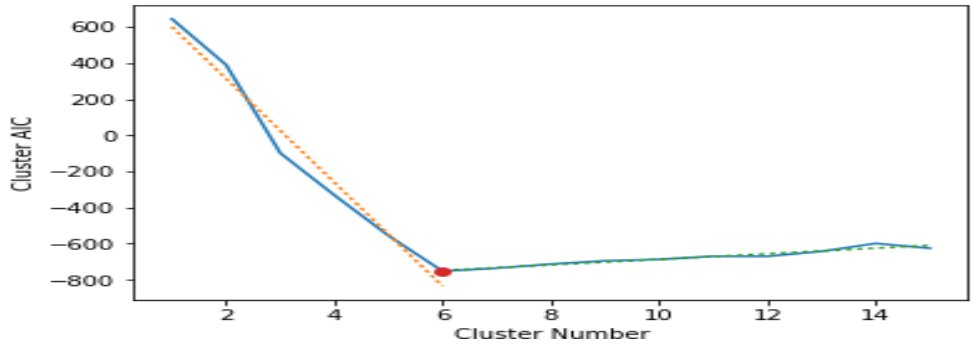
In transient state, PCBOT can read any new input sequence of any length and will automatically perform the new transient prediction sequence.

SAMARITAN-UNSUPERVISED LEARNING

PCBOT also offers the SAMARITAN module that performs unsupervisedlearning for :

- Clustering (the number of clusters to be looked for is automated with theElbow method) (Gaussian Mixture and DBSCAN) [1]
- Anomaly detection (DBSCAN, One-Class SVM, Z-Score, IsolationForest and Auto-Encoding) [1][2].

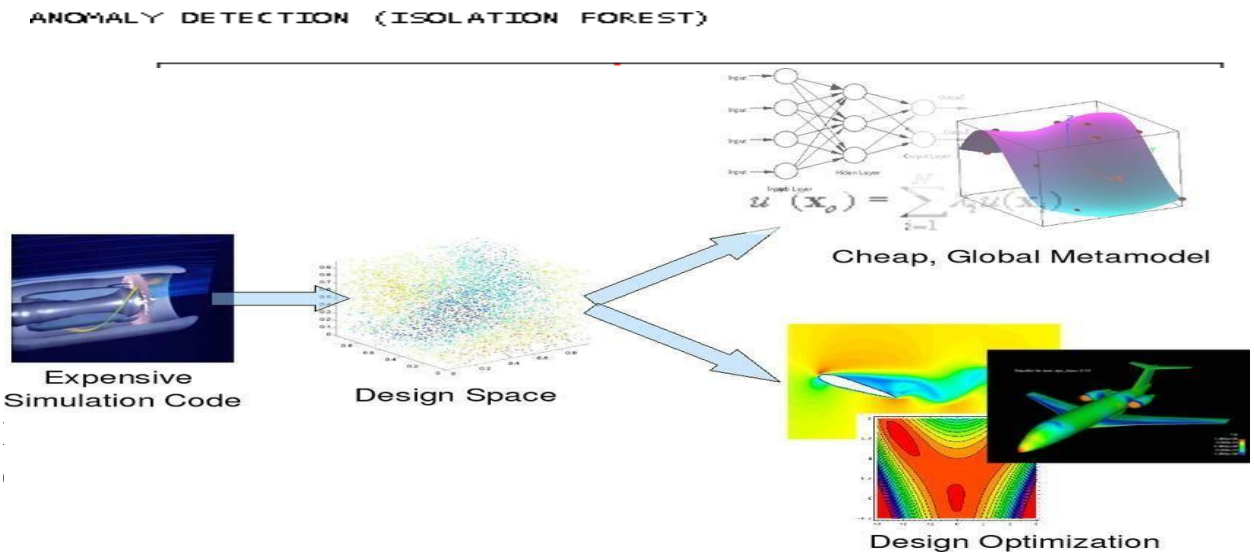
```
CLUSTERING (GAUSSIAN MIXTURE)
SAMARITAN found 6 clusters by searching for the cluster Gaussian Mixture AIC elbow:
```

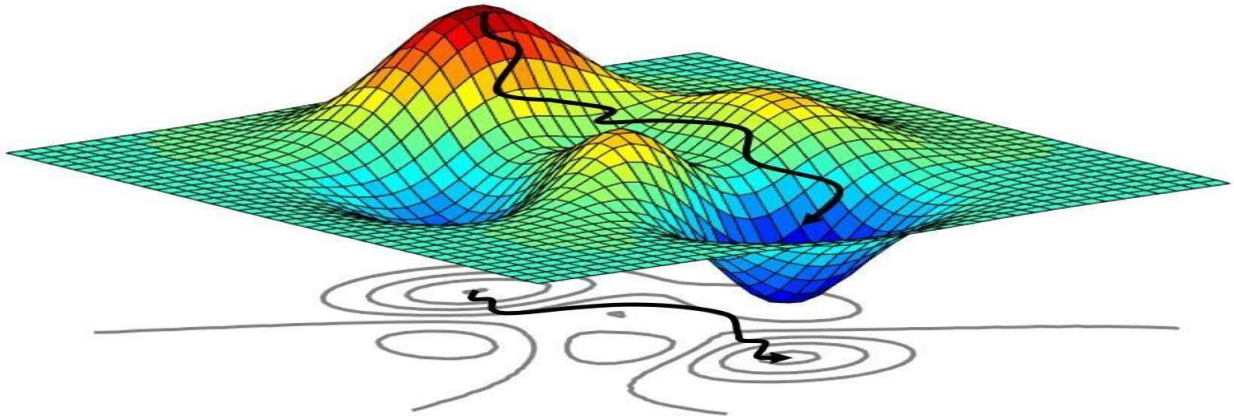


OPTIMIZATION

Models built with PCBOT can be coupled to an optimizer program built withSciPy

This approach makes use of the instantaneous response of the model to look quickly for an optimum, for instance to minimize a total cost or a reactant whileensuring performance and safety criteria





CHAPTER-13

PYQT5-GUI INTERFACE

PYQT5-GUI INTERFACE

PyQt5 is the latest version of a GUI widgets toolkit developed by Riverbank Computing. It is a Python interface for **Qt**, one of the most powerful, and popular cross-platform GUI library. PyQt5 is a blend of Python programming language and the Qt library. This introductory tutorial will assist you in creating graphical applications with the help of PyQt. Our tutorial on earlier version − PyQt4 is available.

PYQT5 is a library that lets you use the QTGUI FRAMEWORK from Python.Qt itself is written in C++. By using it from Python, you can build applicationsmuch more quickly while not sacrificing much of the speed of C++.

PyQt5 refers to the most recent version 5 of Qt. You may still find the occasional mention of (Py)Qt4 on the web, but it is old and no longersupported.

An interesting new competitor to PyQt is QT FOR Python. Its API is virtuallyidentical. Unlike PyQt, it is licensed under the LGPL and can thus be used forfree in commercial projects. It's backed by the Qt company, and thus likely thefuture. We use PyQt here because it is more mature. Since the APIs are so similar, you can easily switch your apps to Qt for Python later.

PyQt is a python binding of the open-source widget-toolkit Qt, which also functions as a cross-platform application development framework. Qt is a popular C++ framework for writing GUI applications for all major desktop, mobile, and embedded platforms (supports Linux, Windows, MacOS, Android, iOS, Raspberry Pi, and more).

PyQt is a free software developed and maintained by Riverbank Computing, acompany based in England, whereas Qt is developed by a Finnish firm called The Qt Company.

INSTALLING PYQT5

pip install pyqt5

If successfully installed one can verify it by running the code:

>>>import PyQt5

PyQt5 provides lots of tools and QtDesigner is one of them. For this run thiscommand:

pip install PyQt5-tools.

Features of PyQT

Here are important features of PyQt:

Learn PyQt which consists of more than six hundred classes covering a rangeof features such as

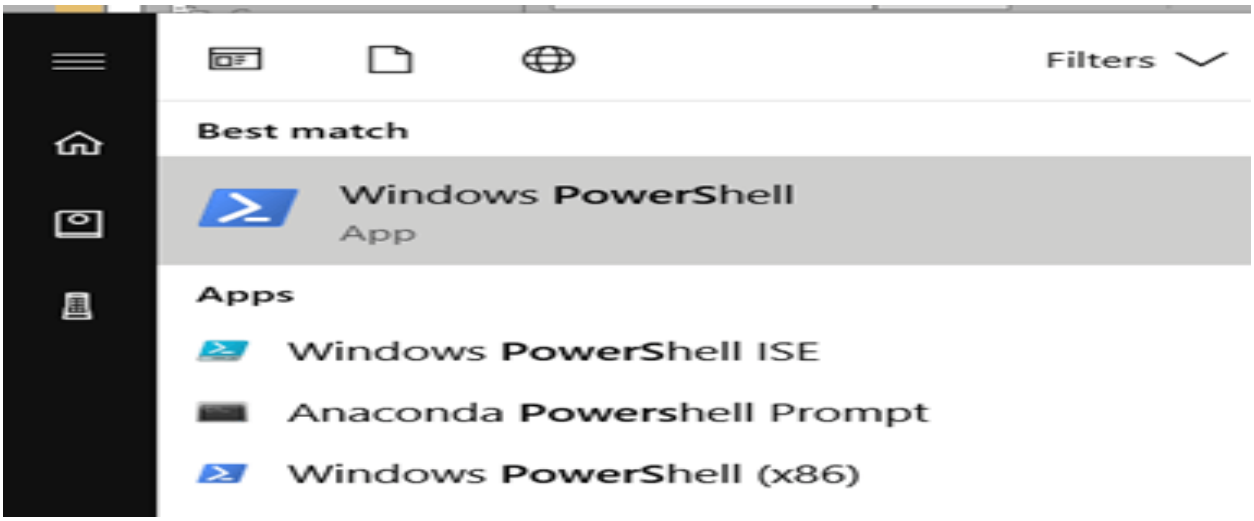
- Graphical User Interfaces
- SQL Databases
- Web toolkits
- XML processing
- Networking

These features can be combined to create advanced UIs as well as standalone applications. A lot of major companies across all industries use Qt. Some examples are LG, Mercedes, AMD, Panasonic, Harman, etc.

PyQt Versions

PyQt is available in two editions, PyQt4 and PyQt5. PyQt4 provides glue codefor binding 4.x and 5.x versions of the Qt framework while PyQt5 provides a binding for only the 5.x versions. As a result, PyQt5 is not backward compatible with the deprecated modules of the older version. In this Qt GUI tutorial, PyQt5 will be used for the demonstration of examples. Apart from these two versions, Riverbank Computing also provides PyQt3D—the python bindingsfor the Qt3D framework. Qt3D is an application framework used to create real-time simulation systems with 2D/3D rendering.

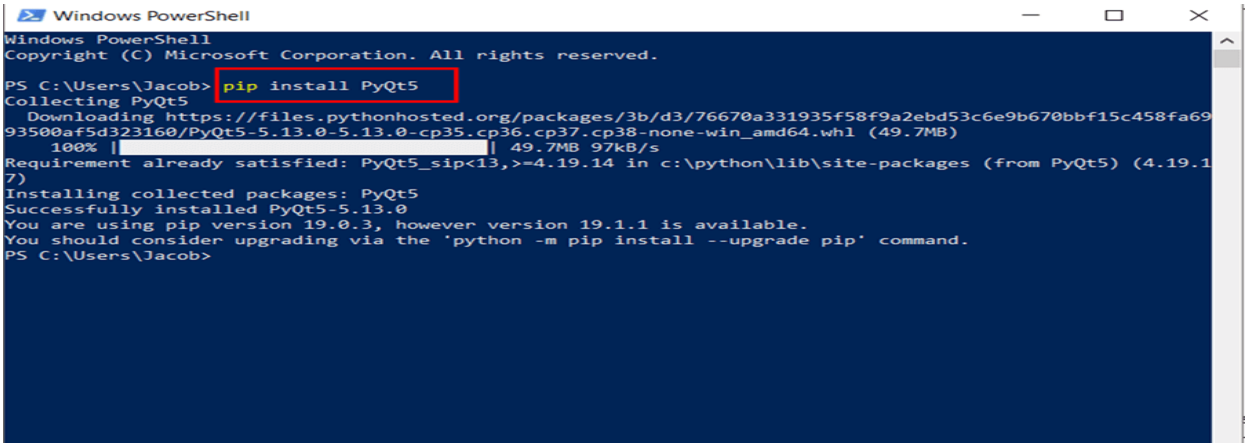
Step1) Open command prompt or PowerShell in your Windows machine.



Step 2) Type in the following.pip

install PyQt5

Step 3) Installation successful.
This step in this PyQt5 tutorial will download the PyQt5 whl package (about50 MB) and install it on your system.



A **QLabel** object acts as a placeholder to display non-editable text or image, or a movie of animated GIF. It can also be used as a mnemonic key for other widgets. Plain text, hyperlink or rich text can be displayed on the label.

The following table lists the important methods defined in QLabel class −Given below

are the most commonly used methods of QLabel.

Sr.No.	Methods & Description
1	**setAlignment()** Aligns the text as per alignment constants Qt.AlignLeft Qt.AlignRight Qt.AlignCenter Qt.AlignJustify
2	**setIndent()** Sets the labels text indent
3	**setPixmap()** Displays an image

4	**Text()** Displays the caption of the label
5	**setText()** Programmatically sets the caption
6	**selectedText()** Displays the selected text from the label (The textInteractionFlagmust be set to TextSelectableByMouse)
7	**setBuddy()** Associates the label with any input widget
8	**setWordWrap()** Enables or disables wrapping text in the label

signals of QLabel Class

linkActivated	If the label containing embedded hyperlink is clicked, the URL will open. setOpenExternalLinks feature must be set totrue.
linkHovered	Slot method associated with this signal will be called whenthe label having embedded hyperlinked is hovered by the mouse.

CHAPTER-14

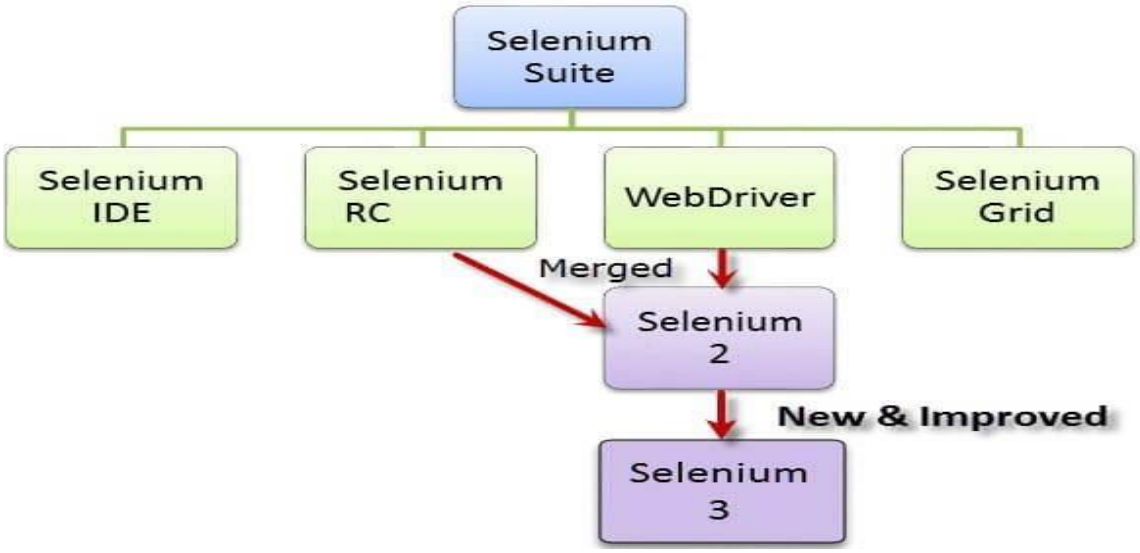
SELENIUM AUTOMATION TOOL

SELENIUM

AUTOMATION TOOL

Selenium is a free (open source) automated testing suite for web applications across different browsers and platforms. It is quite similar to HP Quick Test Pro (QTP now UFT) only that Selenium focuses on automating web-based applications. Testing done using Selenium tool is usually referred to as Selenium 12 Testing. Selenium is not just a single tool but a suite of software,each catering to different testing needs of an organization.

The entire Selenium Tool Suite is comprised of four components: Selenium IDE, a Firefox add-on that you can only use in creating relatively simple test cases and test suites. Selenium Remote Control, also known as Selenium 1, which is the first Selenium tool that allowed users to use programminglanguages in creating complex tests. WebDriver, the newer breakthrough thatallows your test scripts to communicate directly to the browser, therebycontrolling it from the OS level. Selenium Grid is also a tool that is used with Selenium RC to execute parallel tests across different browsers and operatingsystems.



Selenium RC and WebDriver were merged to form Selenium. Selenium is more advantageous than QTP in terms of costs and flexibility. It also allows you to run tests in parallel, unlike in QTP where you are only allowed to run tests sequentially.

SUB-PROCESSES/CHILD PROCESS

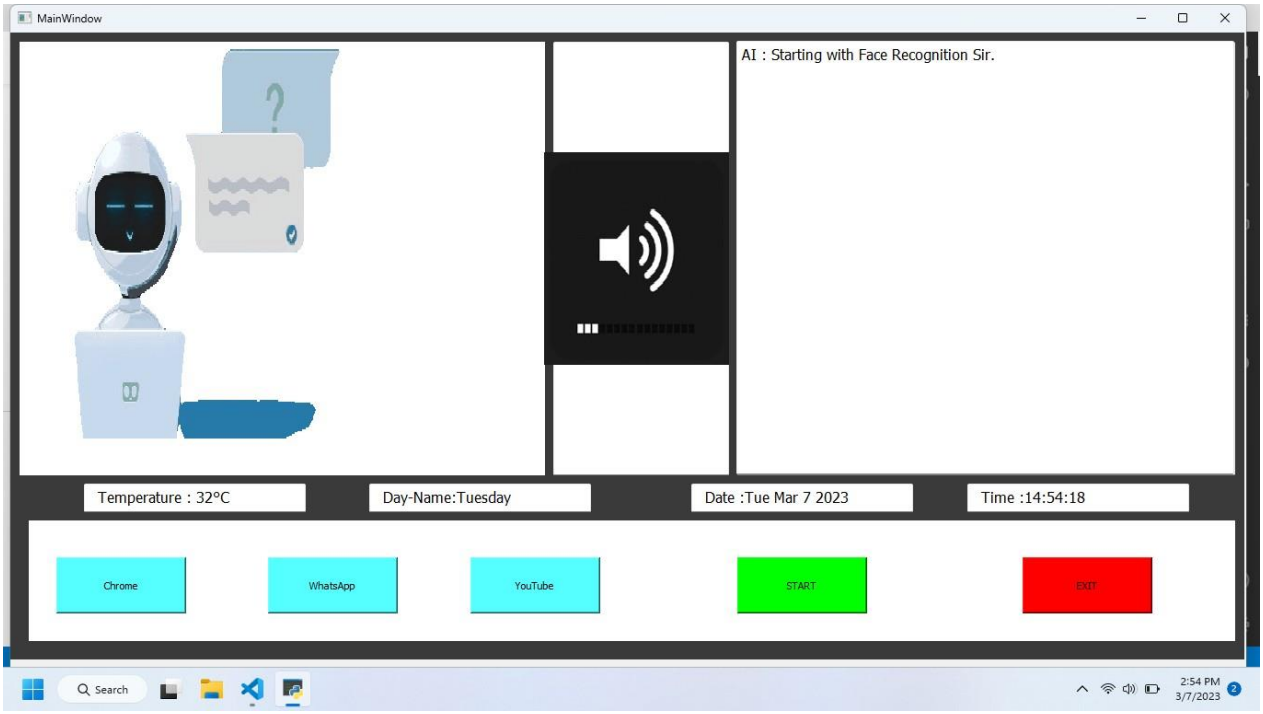
A subprocess is a process started by another program. There are two major procedures for creating a child process: the fork system call (preferred in Unix-like systems and the POSIX standard) and the spawn (preferred in the modern(NT) kernel of Microsoft Windows, as well as in some historical operating systems). A child process inherits most of its attributes, such as file descriptors,from its parent. In Unix, a child process is typically created as a copy of the parent, using the fork system call. The child process can then overlay itself with a different program (using exec) as required. Each process may create many child processes but will have at most one parent process; if a process does not have a parent this usually indicates that it was created directly by thekernel. In some systems, including Linux-based systems, the very first process(called init) is started by the kernel at booting time and never terminates (see Linux startup process); other parentless processes may be launched to carry outvarious daemon tasks in userspace. Another way for a process to end up without a parent is if its parent dies, leaving an orphan process; but in this case,it will shortly be adopted by init. 14 When a child process terminates, some information is returned to the parent process. When a child process terminatesbefore the parent has called wait, the kernel retains some information about theprocess, such as its exit status, to enable its parent to call wait later. Because the child is still consuming system resources but not executing it is known as a zombie process.

CHAPTER-15

FEATURES IN PC BOT

FEATURES IN PC BOT

FIRST OF ALL, SHOWING THE INTERFACE OF OUR PCBOT & OPERATIONS:



In the above picture shows the buttons like Chrome ,Whatsapp ,Youtube, Start,Exit etc.

In which we start the Automation Bot by using the Start Button then the Automation bot starts recognition by our Voice,initially it verifies the Face Recognition and identifies the Person .

Exit Button : used to exit from the Automation bot & Stops the Automation ofbot.

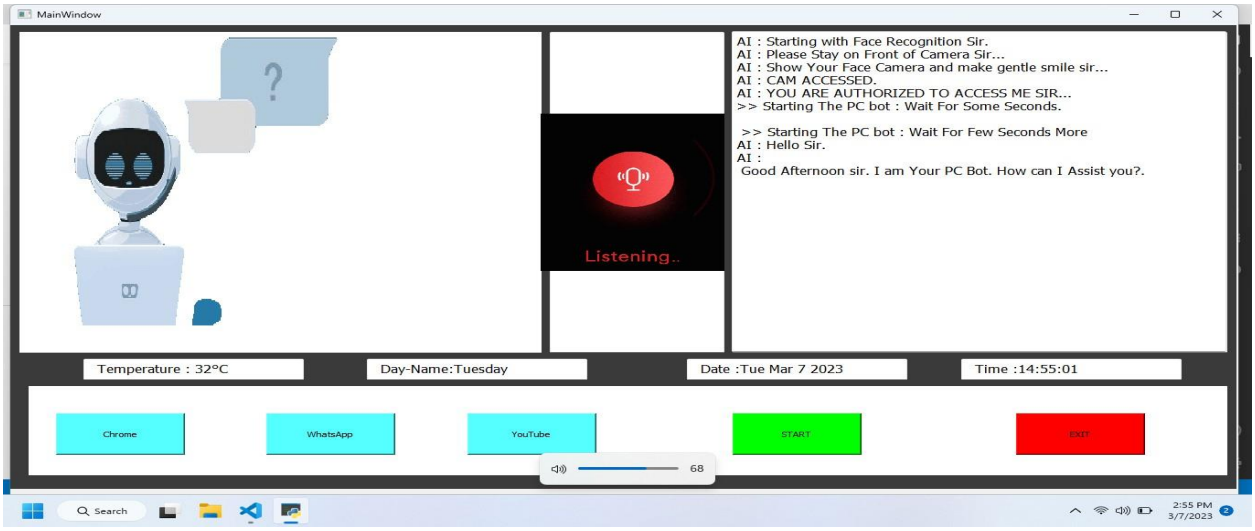
Chrome Button : used to open chrome on the Screen just by clicking on the button of Chrome.

Whatsapp Button : used to open the whatsapp on the screen of the pc by justclicking on the button of the whatsapp button as like Youtube also.

FACE RECOGNITION SYSTEM:

This is used to verify the person of the owner of the PC.

It verifies that the Person is the owner of PC then it Starts responding to theuser by the commands:

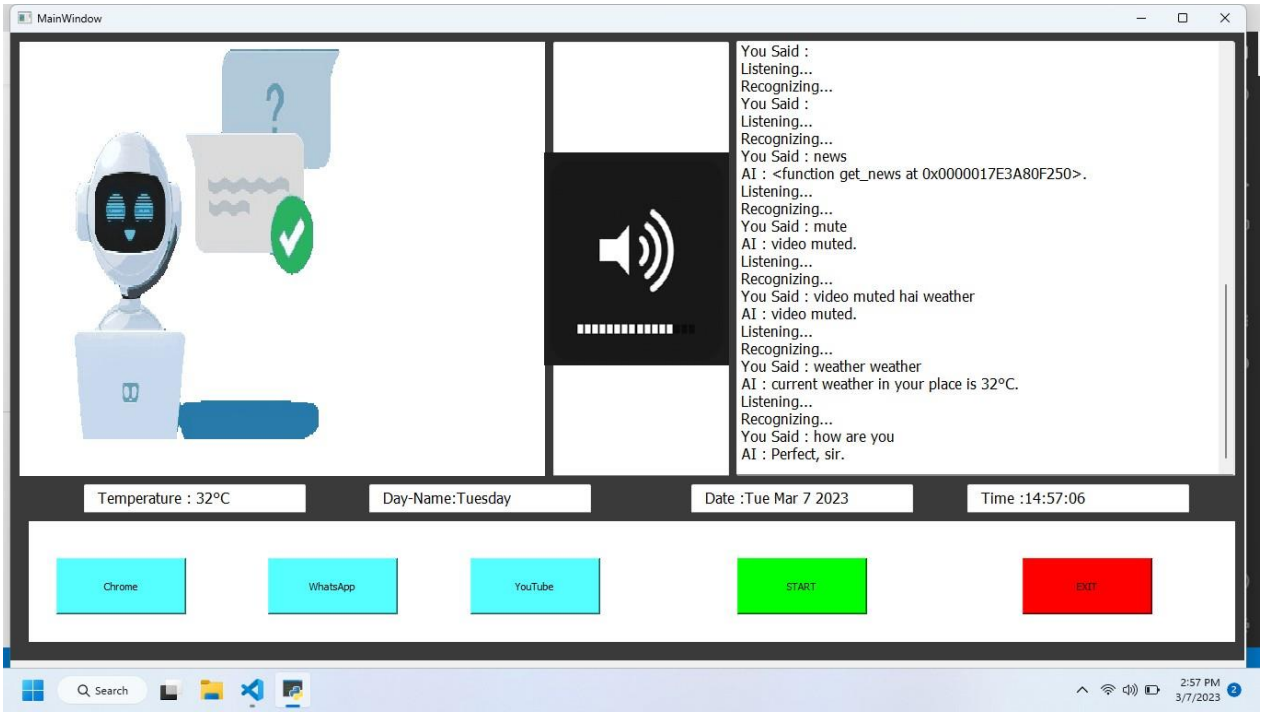


VIDEO PAUSE ,VOLUME UP,DOWN

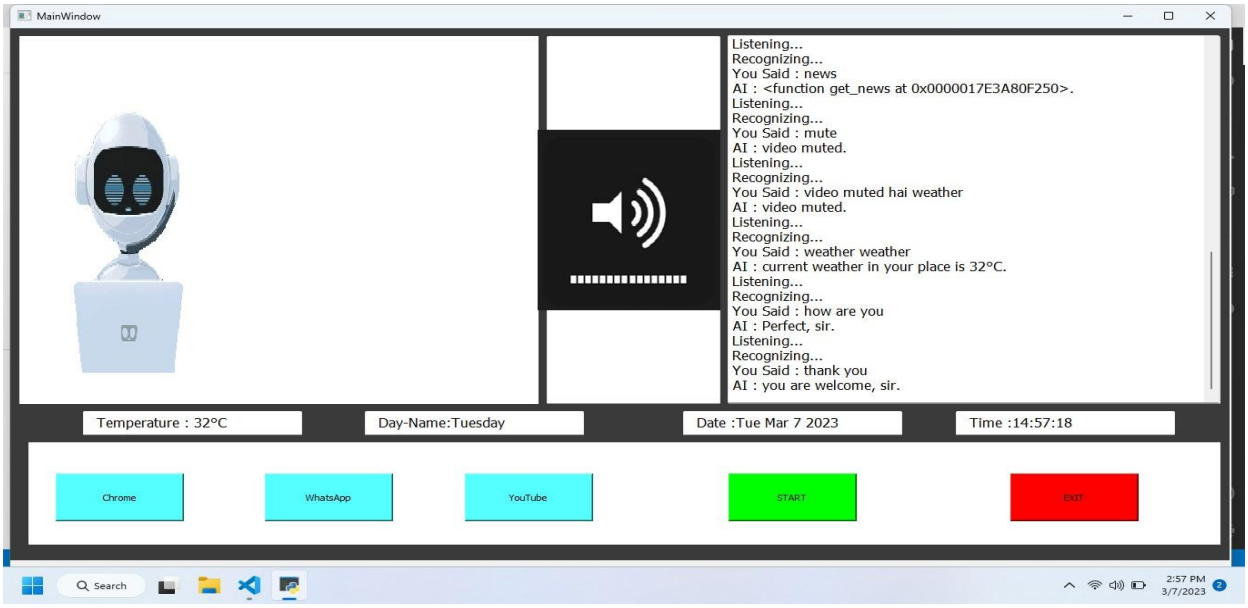
OUTPUT IMAGE ON SCREEN:

Shows the Volume UP:

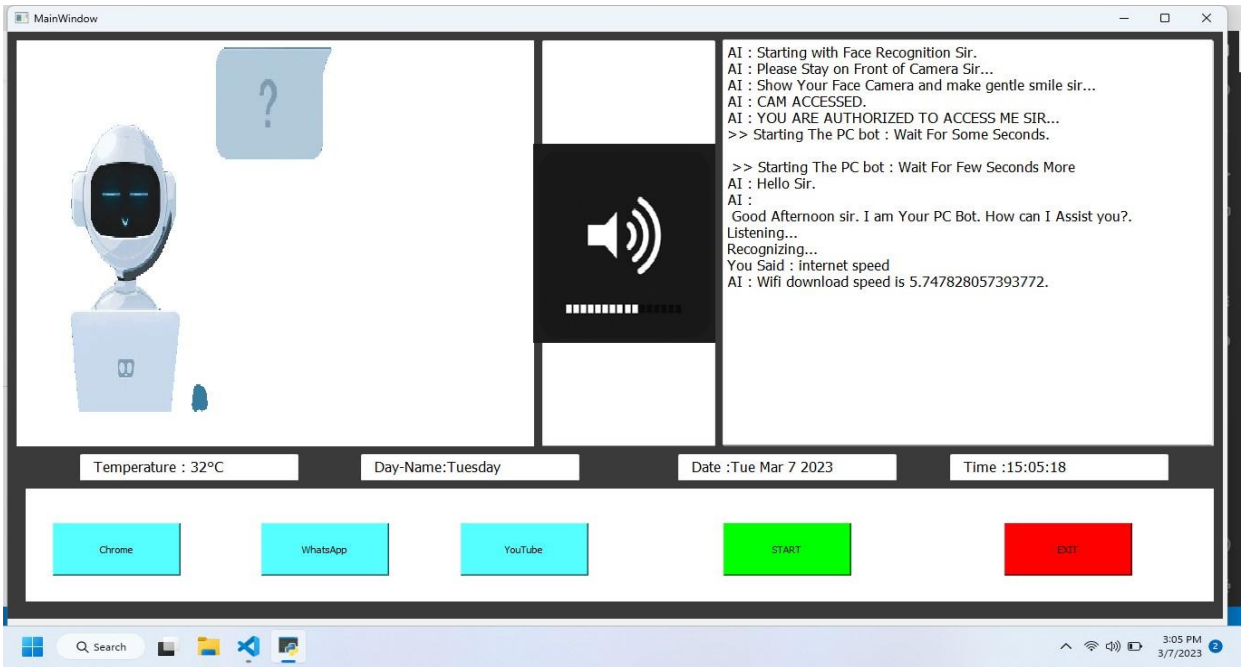
PC bot wishes the user:



PC bot wishes and video pause ,Video play:



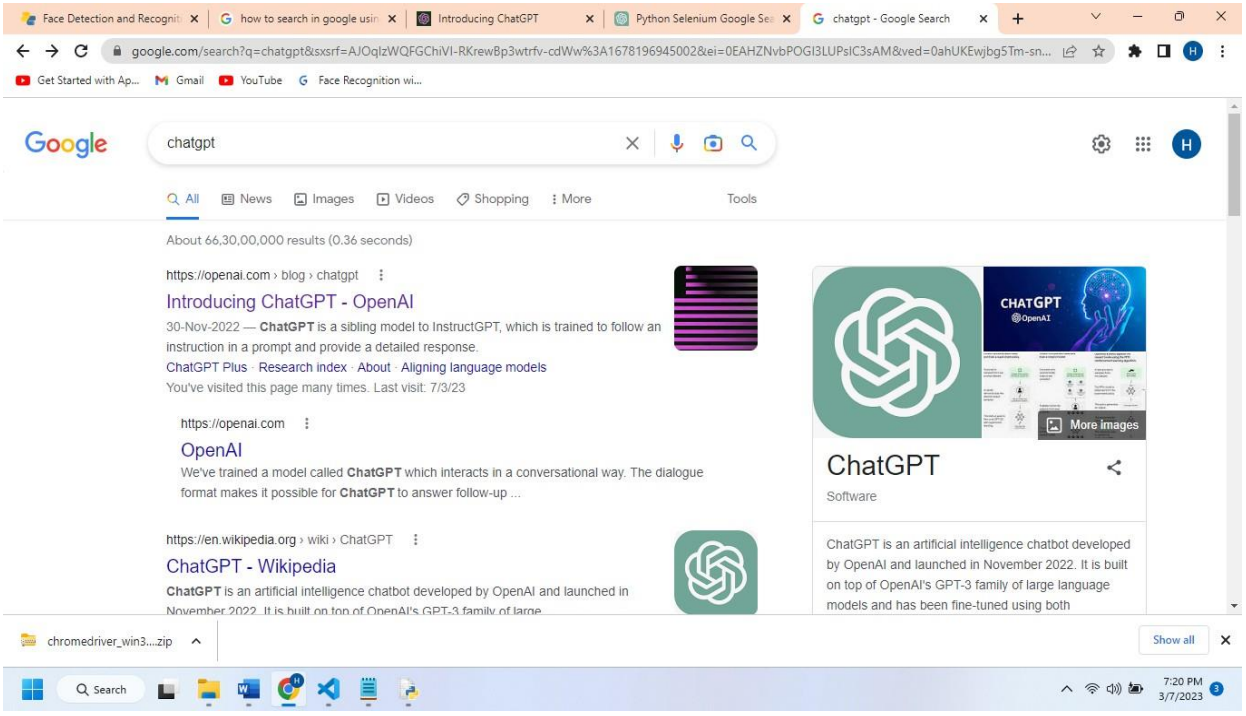
Shows the Internet Speed on the Screen of the PC:



QUERIES FROM THE WEB:

Making queries is an essential part of one's life, and nothing changes even fora developer working on Windows. We have addressed the essential part of a netizen's life by enabling our voice assistant to search the web. Here we haveused Node JS and Selenium framework for extracting the result from the webas well as displaying it to the user. PC BOT supports a plethora of search engines like Google, Bing and Yahoo and displays the result by scraping the searched queries. In order to make queries from different search engines, the given format should be adopted: PC BOT supports Google, Bing and Yahoo, which should precede the desired query.

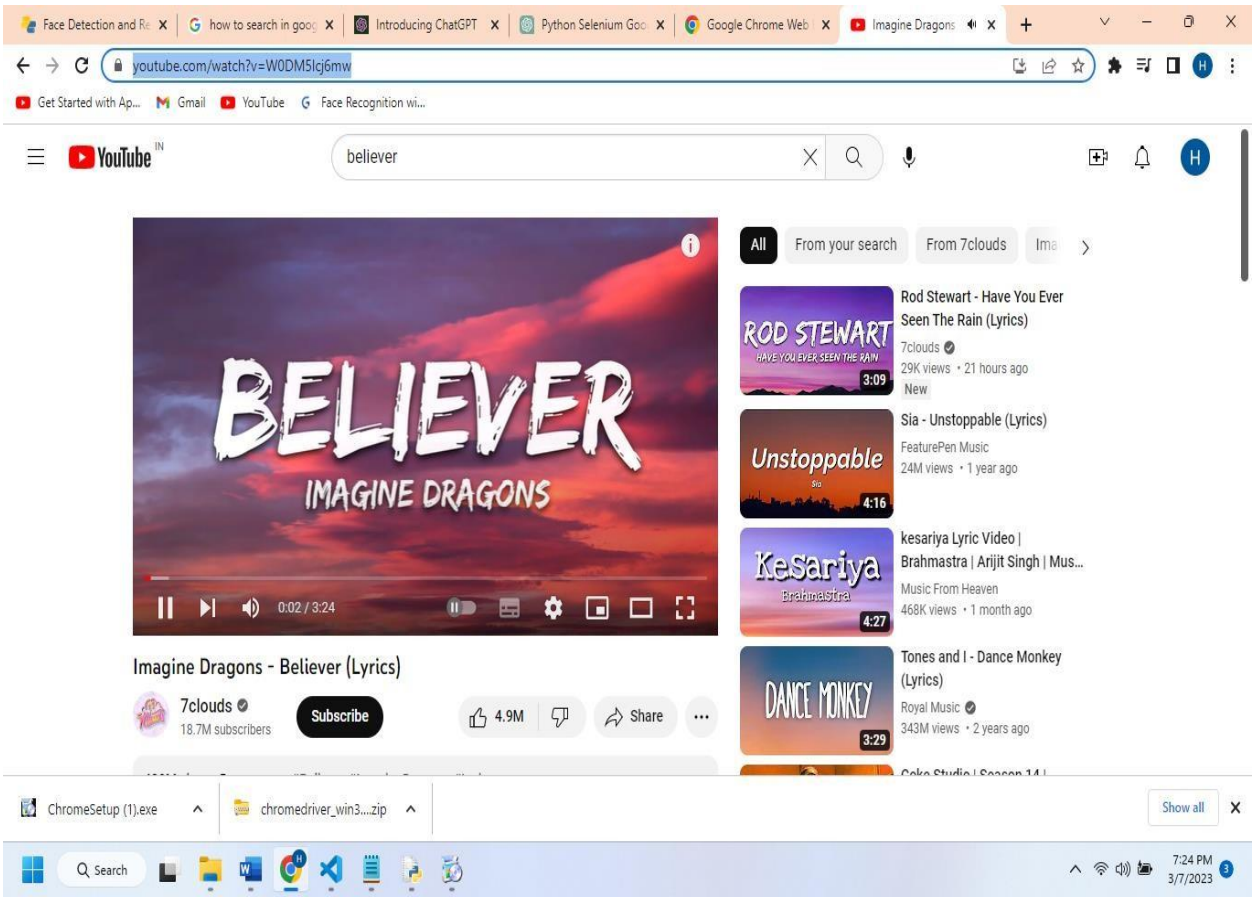
OUTPUT IMAGE ON SCREEN:



2.ACCESSING VIDEO CONTENT ON YOUTUBE:

Accessing the youtube by using the python pip by the PC BOT which usesthe Pywhatkit to open the youtube and asks the user what I have to search sirthen user tells the content he has to see in the youtube then the content is retrieve and played by the PC BOT and make use of the pause key to pause thecontent and play command is used for to play the content in the youtube.

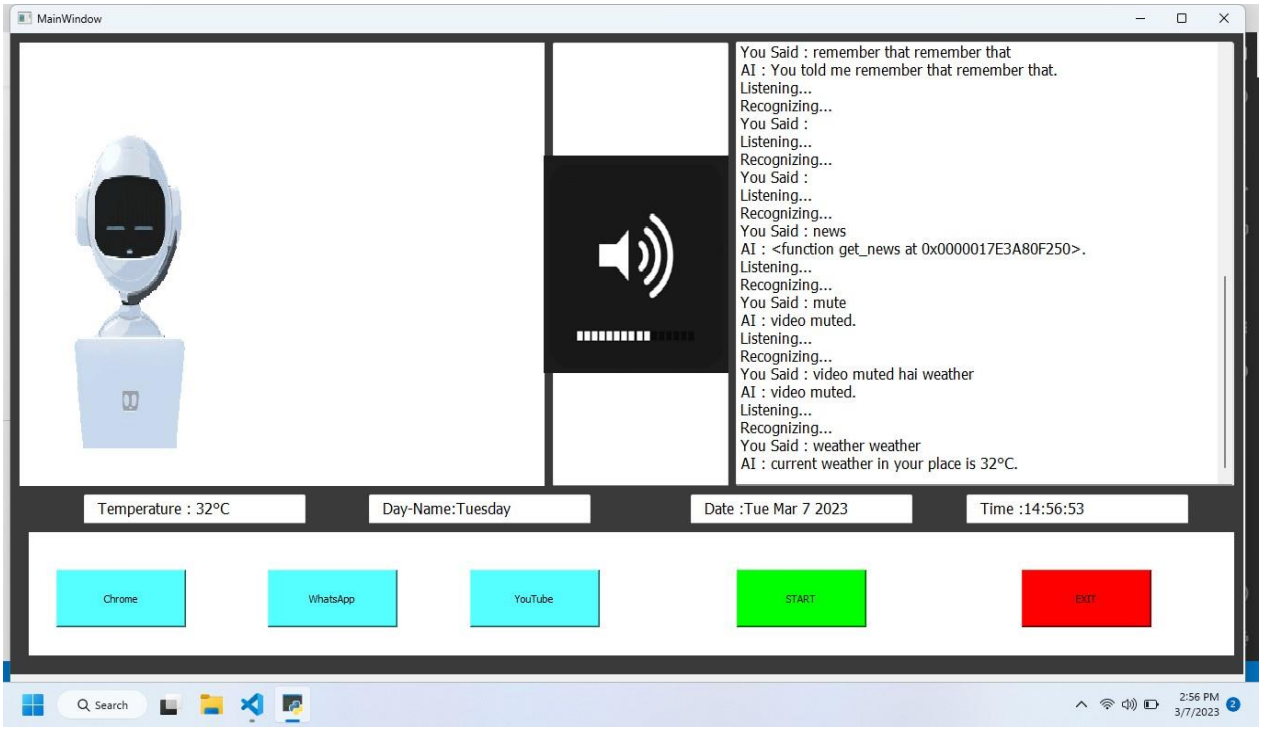
OUTPUT IMAGE ON SCREEN:



3. GET WEATHER OF CURRENT LOCATION

Getting live weather conditions about a place remains an important task of virtual assistants. It helps the user charter the course of their action. PC BOT addresses this issue with the help of Python. In order to access the live weathercondition format is: Weather.

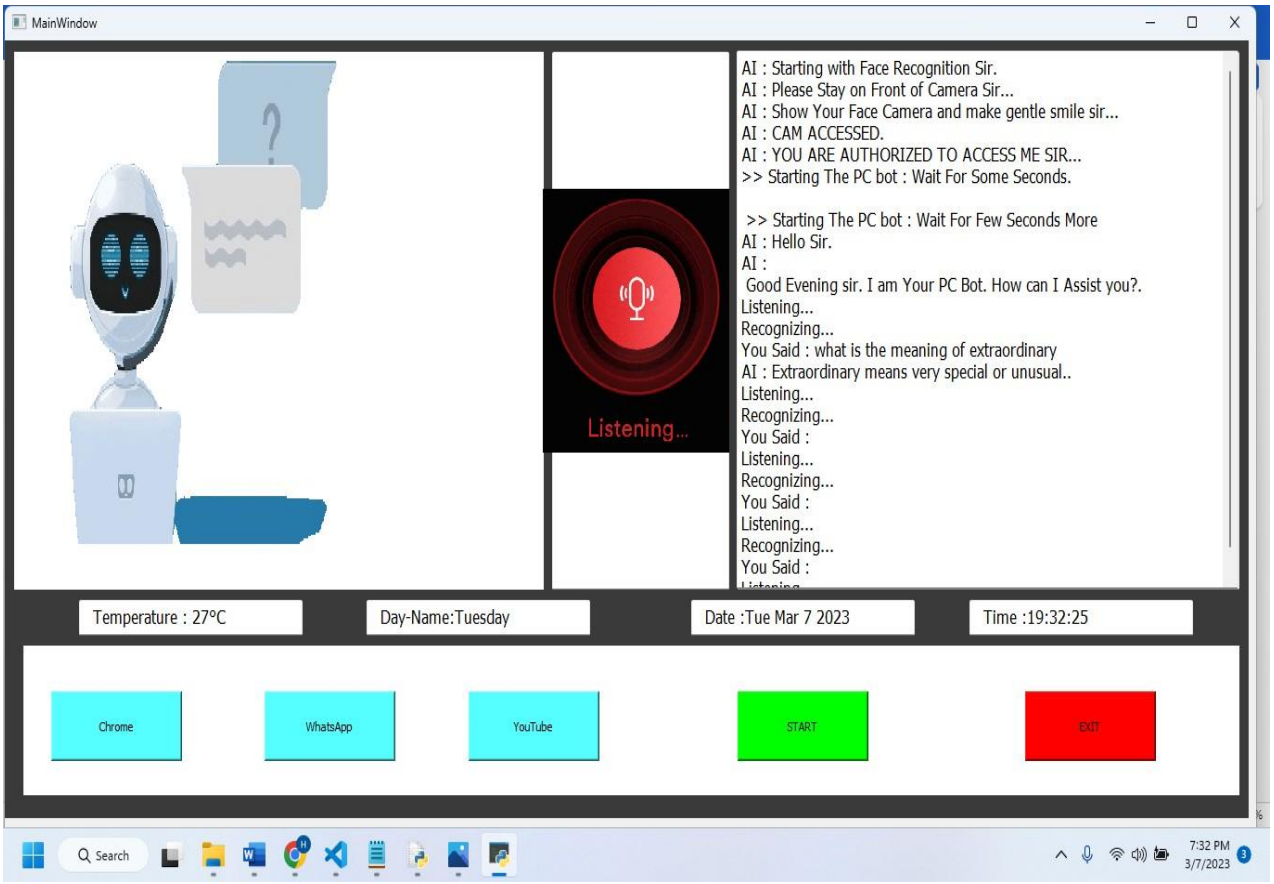
OUTPUT IMAGE ON SCREEN:



4.DICTIONARY MEANING:

One of the usages of the web is to find word meaning and its usage in our dayto day life. Instead of going through the bulky books, our users can simply search for it using the voice assistant and get the meaning within a fraction ofseconds. For retrieving the meaning of a word format is, meaning.

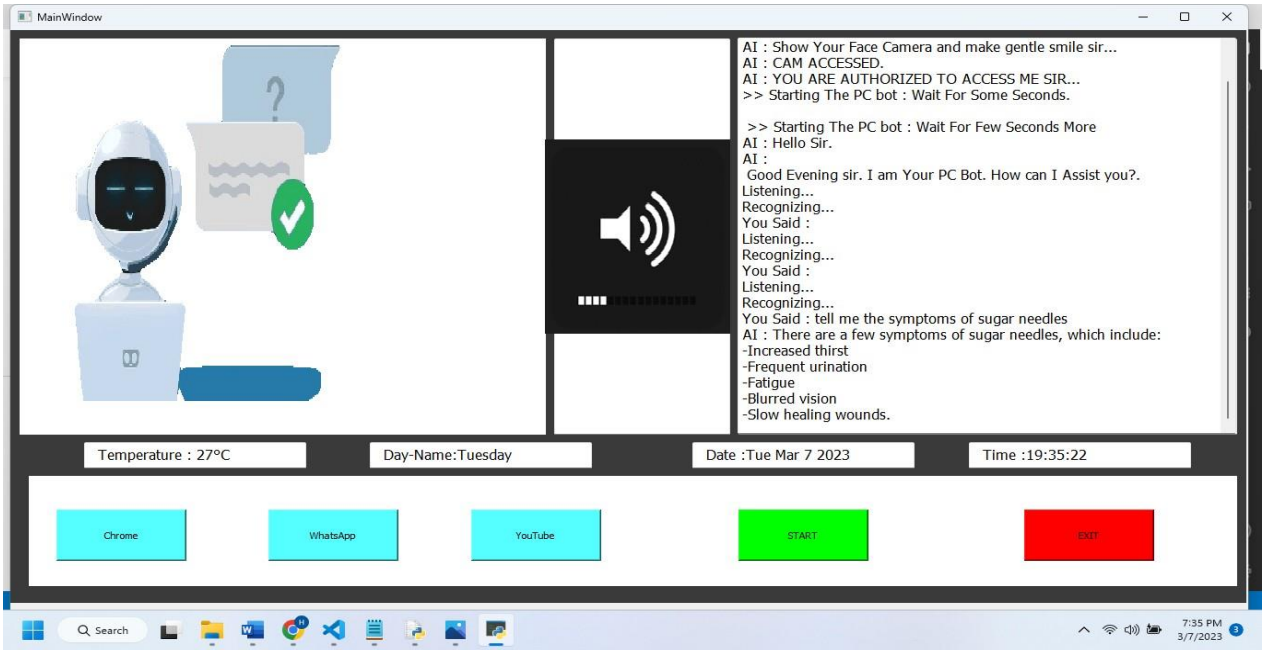
OUTPUT IMAGE ON SCREEN:



6. MEDICINE DETAILS

One of the important issue PC BOT addresses is of healthcare, and medicine in general. The user can query either the medicine or the symptoms. The formerlets you know the complete details of the medicine, like indications, contradictions, trade or brand names, dosage, the process of consumption, warning and precautions, storage conditions, etc. On the other hand, the symptom feature lets 28 you query about the symptoms while PC BOT lists various diseases one is likely to be affected along with their medicine. This ishelpful for people who are quite busy with their life and find trouble visiting the doctor immediately, thus relying on the web to find the best result for shortterm cause. Here we use Node JS framework along with Selenium to scrap therequired data from the web and display it to the user. We have a huge databaseof various medicines and symptoms which helps PC BOT respond to the queries of the user at ease. The syntax to be used for querying the necessary are: In order to get details about medicine format is, Medicine In order to re-track the causes of symptoms format is, Symptoms.

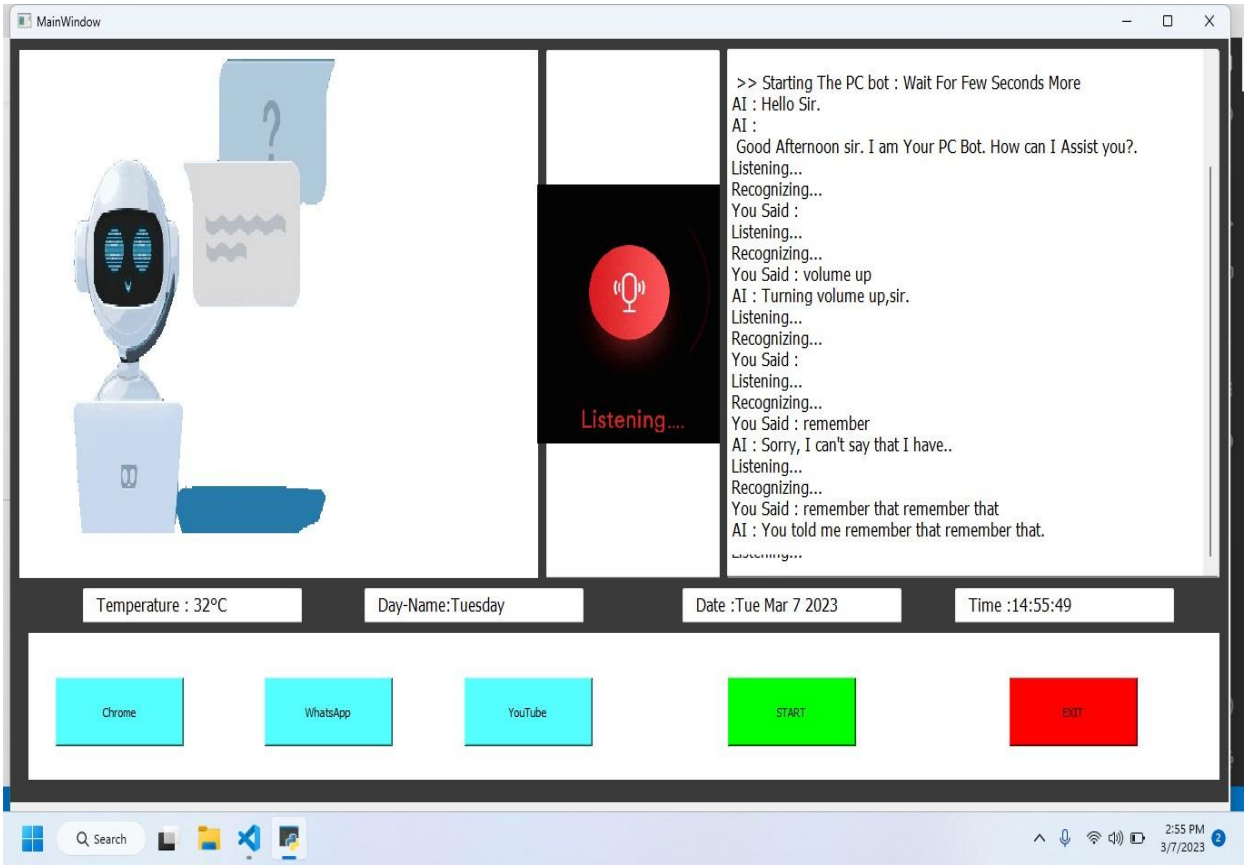
OUTPUT IMAGE ON SCREEN:



7.SET REMAINDERS:

One of the main features of a voice assistant is to set a reminder for the user accordingly. PC BOT is no different when it comes to this. The user can set reminders to be notified about a task at a particular time. This will help users,especially developers to schedule their time and resources easily. All the user have to do is to input Set reminder to the assistant. A form will be displayed. Fill the form with the required details and click on set reminder button.

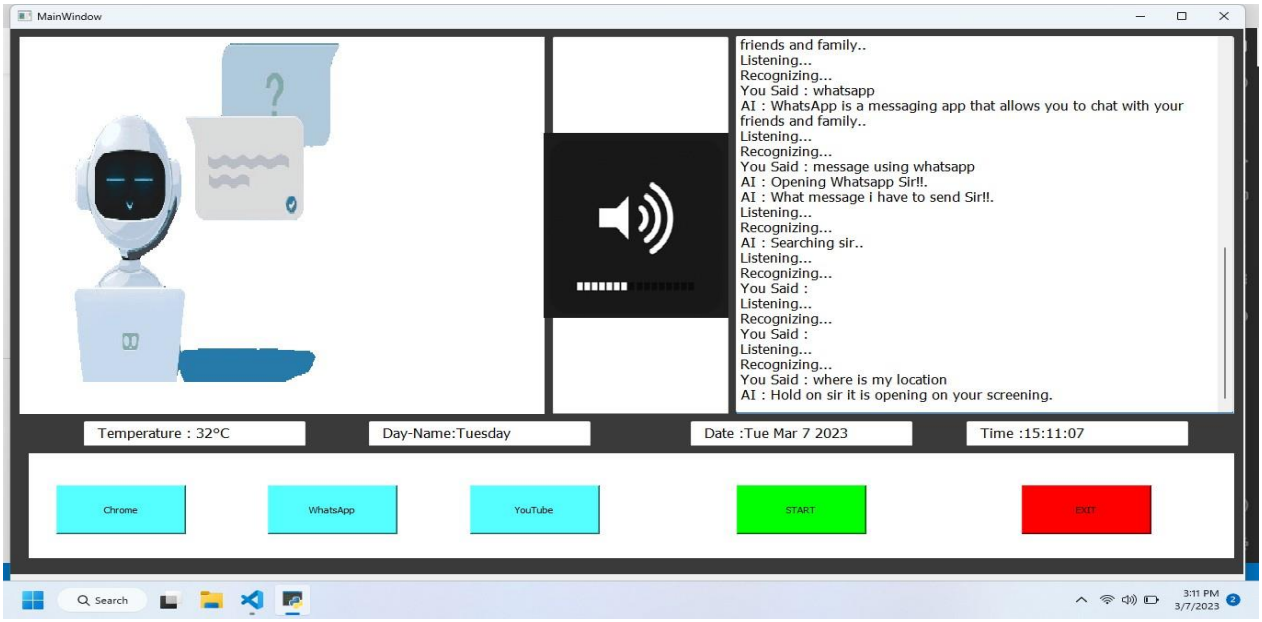
OUTPUT IMAGE ON SCREEN:

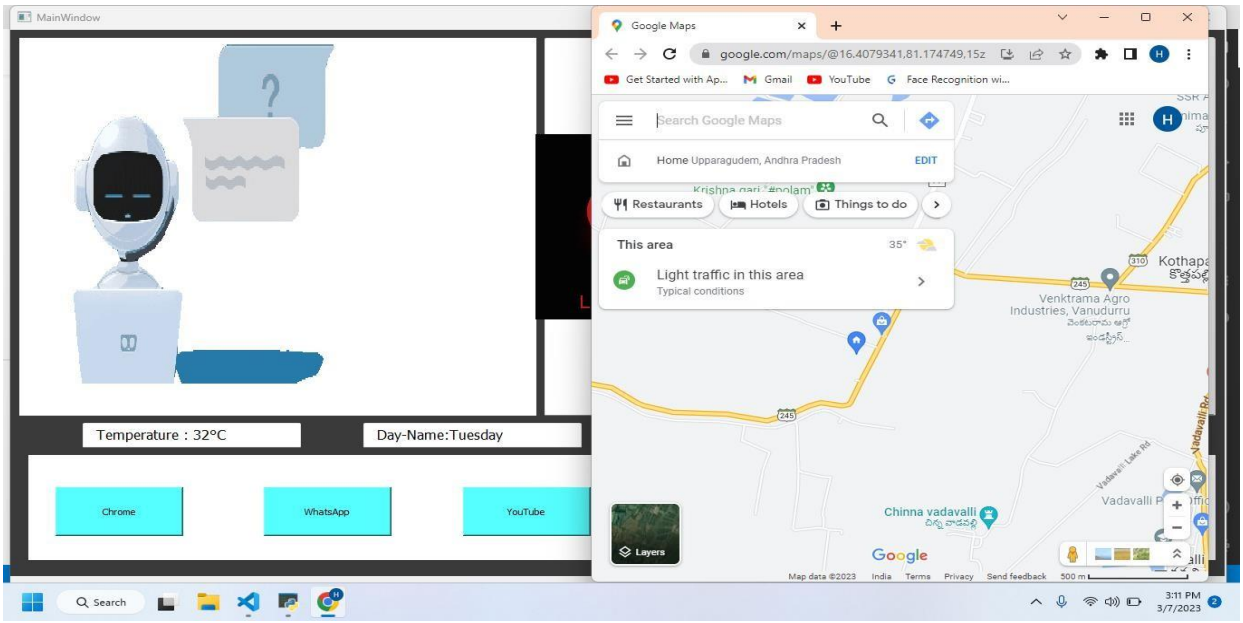


8.Where is my Location:

It shows the Current Location where we are located by using the googlemaps it sends the map on the screen of the window of pc .

OUTPUT IMAGE ON SCREEN:



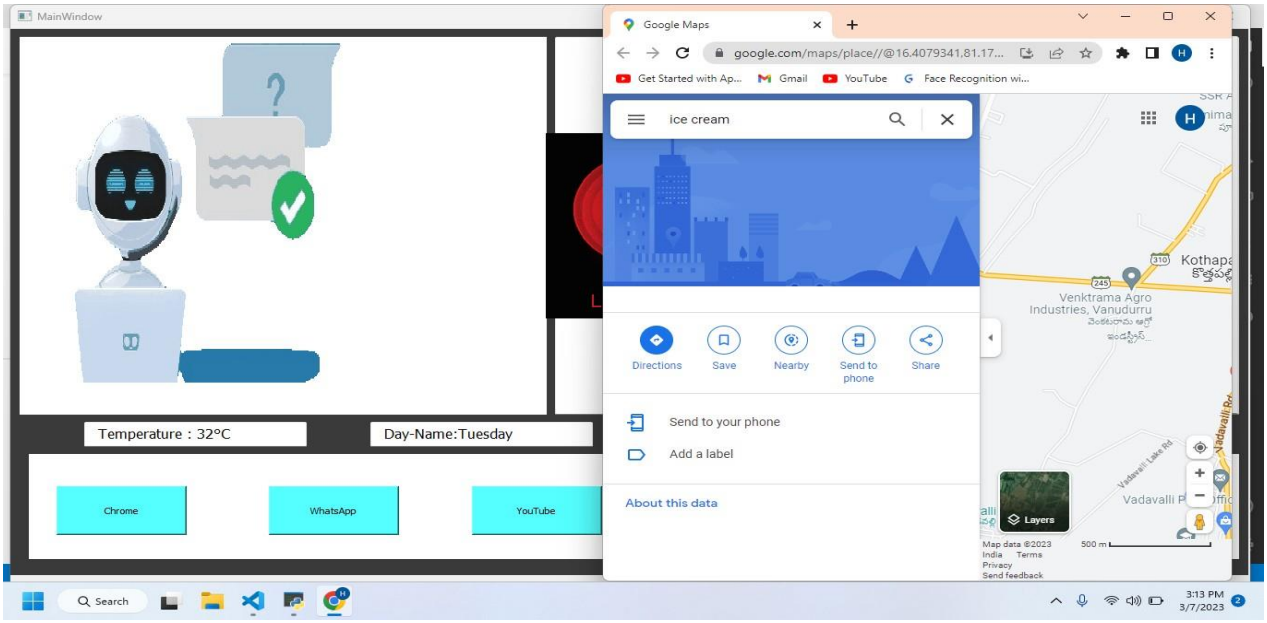


9.Where is Ice Cream city

It gives the distance between our current location and the ice cream city calculates the distance and sends to the screen of the window in our PC by thePC bot .just see the Sample Image.

OUTPUT IMAGE ON SCREEN:

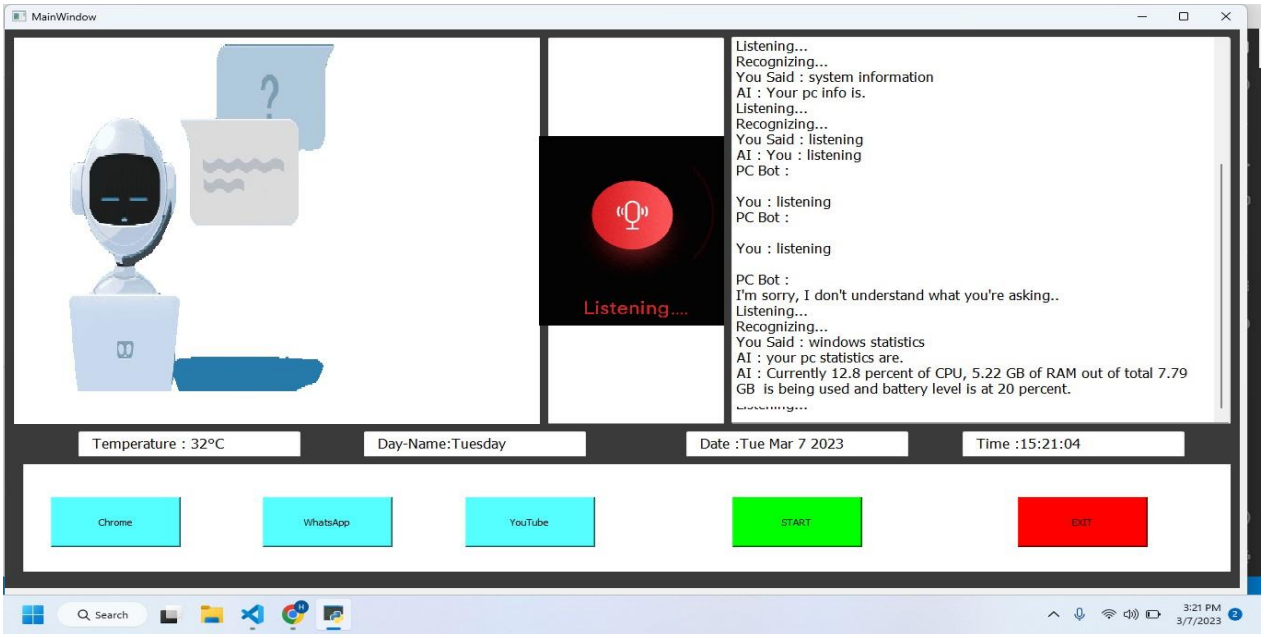
Second Image Shows You the Map of the Searched Location:



10.Shows the windows statistics of our PC:

It Shows the Statistics of the windows on the PC screen like the output ScreenBelow:

OUTPUT IMAGE ON SCREEN:



CONCLUSION:

We are developed a virtual voice assistant automation which is helpful fora human or user in many ways like multitasking ,heavy work in efficient and simple manner .And it is also useful for business purpose also to make the interactions easy and simple. It will work through commads which we are injected to a bot while building the software.it is also having safety and secureit scans the person then it allows the person to use the pc through commands .

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