Engineering Exploration

Project Report

On

VOICE ASSISSTANT

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Submitted to

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2021 – 2022

CERTIFICATE

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ACKNOWLEDGEMENT

We would like to thank our college principal Dr. P Ravinder Reddy wholeheartedly. Along with that we also express our gratitude towards HOD mam Dr. Y Ramadevi CSE Department and HOD sir Dr. Y Srinivasa Reddy. We would like to thank our mentor Ch. Vijaya Lakshmi mam for helping us with this project. She allowed us to work on this project. She gave us new ideas, suggestions which helped us a lot. We also like to thank our teacher Y Sreeram sir for giving us opportunity to do project, under his guidance and teachings we successfully completed the project.

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ABSTRACT

Personal Assistants, or conversational interfaces, or chat bots reinvent a new way for individuals to interact with computes. A Personal Virtual Assistant allows a user to simply ask questions in the same manner that they would address a human, and are even capable of doing some basic tasks like opening apps, reading out news, taking notes etc., with just a voice command. A user can say, what is the weather?? and the voice assistant will answer with the weather report for that day and location. They could say, “Tell me a joke? “, and the assistant will jump into a tale. It takes voice as input. The system is being designed in such a way that all the services provided by the mobile devices are accessible by the end user on the user's voice command.

A voice assistant is a piece of voice recognition software used through electronic devices such as smartphones and speakers can produce audible and natural communication with an end user. Commands can be given, and questions asked of the voice assistant which can perform the tasks or services requested.

The market leading and most well-known voice assistants include Amazon’s Alexa, Apple’s Siri, the Google Assistant and Microsoft’s Cortana.

We are using Artificial intelligence for this Task. This voice assistant will gather the audio from the microphone and then convert that into text, later it is sent through GTTS (Google text to speech). GTTS engine will convert text into audio file in English language, then that audio is played using play sound package of python programming Language.

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INTRODUCTION

A voice assistant is a digital assistant that uses voice recognition, language processing algorithms, and voice synthesis to listen to specific voice commands and return relevant information or perform specific functions as requested by the user.

Based on specific commands, sometimes called intents, spoken by the user, voice assistants can return relevant information by listening for specific keywords and filtering out the ambient noise.

While voice assistants can be completely software based and able to integrate into most devices, some assistants are designed specifically for single device applications, such as the Amazon Alexa Wall Clock.

Today, voice assistants are integrated into many of the devices we use on a daily basis, such as cell phones, computers, and smart speakers. Because of their wide array of integrations, There are several voice assistants who offer a very specific feature set, while some choose to be open ended to help with almost any situation at hand.

BACKGROUND

EXISTING SYSTEM:

Existing voice assistant includes answering the user questions such as searching some information from Wikipedia, computing expert level answers using Wolfram algorithms, knowledgebase, and AI technology, obeying commands such as telling date and time, or opening sites such as google, YouTube, etc.

PROPOSED SYSTEM:

The modified voice assistant system proposed by our group is on making the voice assistant much more personal and user friendly. we have added features like a personalised GUI window as welcome screen and easy quick action buttons to start, ask and end the assistant. Some of the useful features we have implemented in our voice assistant include Weather report and top new headlines using API's, sending an email efficiently and perform searches with ease.

SOFTWARE AND HARDWARE REQUIREMENTS:

Python as it is a suitable language for scriptwriting and developing projects for beginners. So, we have used Python IDE (JUPYTER NOTEBOOK) to write and execute the code. This Program can be run on a basic computer with minimum specs as all it requires is a functioning python ide.

Windows 7 to 10, with 2GB RAM (4GB preferable)
Linux- Ubuntu 16.04 to 17.10.

MOTIVATION

Virtual assistants are software programs that help you ease your day-to-day tasks, such as showing weather reports, creating remainders, making shopping lists etc .

But not only can voice assistants improve productivity in and around the workplace, it can also improve safety. In many cases including driving or cooking, being able to communicate through voice instead of typing is both more practical and safer.

In this ever-changing world, people believe in multitasking, if someone wants to open some app, or check some information in the Wikipedia, opening the app and checking maybe a hinderance to their fast packed work. Our project comes to rescue in that sort of situations.

People busy in their work, and not willing to touch their mobile repeatedly, can just press a button and can accomplish their work.

PROBLEM STATEMENT

Current voice assistants use advanced Artificial Intelligence and Machine Learning as the basis for their workings. This increases the cost and complexity of the device hence resulted.

The main aim of our project is to increase the productivity of people by developing a voice assistant that can listen to specific voice commands and return relevant information or perform specific functions as requested by the user using basic control structures.

LIST OF MODULES

- Subprocess: - This module is used to get system subprocess details used in various commands i.e., Shutdown, Sleep etc.

- WolframAlpha: - It is used to compute expert-level answers using Wolfram algorithms, knowledgebase, and AI technology.

- Pyttsx3: - This module used for the conversion of text to speech in a program

- Tkinter: - This module is used for building GUI and comes inbuilt with python

- Wikipedia: -It's a great source of knowledge and can be used to get information or to perform a search. It must be installed separately.

    pip install wikipedia

- Speech Recognition: - Since we're building an application of voice assistant, one of the most important things in this is that your assistant recognizes your voice (means what you want to say/ ask). To install this module, type the below command in the terminal.

    pip install SpeechRecognition

- Web browser: - To perform Web Search. This module comes built-in with Python.

-Ecapture: - To capture images from your Camera. To install this module, type the below command in the terminal.

pip install ecapture

-Pyjokes: - Pyjokes is used for the collection of Python Jokes over the Internet. To install this module, type the below command in the terminal.

pip install pyjokes

-Datetime: - Date and Time are used to showing Date and Time. This module comes built-in with Python.

-Requests: Requests is used for making GET and POST requests. To install this module, type the below command in the terminal.

pip install requests

-BeautifulSoup: Beautiful Soup is a library that makes it easy to scrape information from web pages. To install this module, type the below command in the terminal.

pip install beautifulsoup4

METHODOLOGY

SPEECH RECOGNITION: -

Using the speech recognition library, sr.microphone() uses the device microphone to take speech input.

pause_threshold is used to give time for the user

listen() is used to take input in the form of audio

Recognizers() is used to recognize the presence of the sound

Here, sr.Microphone uses microphone of our pc as a source and sr.recogniser recognises the sound.r.listen takes source as parameter and returns audio. If the audio is recognised and it is in English, it returns the input to query

SMPTLIB: -

Email is emerging as one of the most valuable services on the internet today. Most internet systems use SMTP as a method to transfer mail from one user to another. SMTP is a push protocol and is used to send the mail.

The main purpose of SMTP is used to set up communication rules between servers. The servers have a way of identifying themselves and announcing what kind of communication they are trying to perform. They also have a way of handling the errors such as incorrect email address. For example, if the recipient address is wrong, then receiving server reply with an error message of some kind.

Some of the commands used are:

EHLO: The client sends this command to the SMTP server to identify itself and initiate the SMTP conversation.

TLS:To improve security, an encrypted TLS (Transport Layer Security) connection can be used when communicating between the e-mail server and the client.

WIKEPEDIA: -

We all know Wikipedia is the online encyclopedia which has tons of information.

Using Wikipedia module available in python we can have an access to all the information we need.

A method named page in wikipedia module helps to get the contents, categories, coordinates, images, links and other metadata of a Wikipedia page.

Syntax of page method:

-wikipedia.page(title)

TKINTER: -

Python offers multiple options for developing GUI (Graphical User Interface). Out of all the GUI methods, tkinter is the most commonly used method. It is a standard Python interface to the Tk GUI toolkit shipped with Python. Python with tkinter is the fastest and easiest way to create the GUI applications.

WOLFRAMALPHA: -

The Wolfram|Alpha Webservice API provides a web-based API allowing the computational and presentation capabilities of Wolfram|Alpha to be integrated into web, mobile, desktop, and enterprise applications.

Wolfram Alpha is an API which can compute expert-level answers using Wolfram's algorithms, knowledgebase and AI technology. It is made possible by the Wolfram Language.

Ex: -

Input: What is the capital of India?

Output: New Delhi

Input : What is sin (30)?

Output : 0.5

PYTTSX3: -

pyttsx3 is a text-to-speech conversion library in Python which works offline.

The command to install this module: pip install pyttsx3

It has the following methods:

say (); stop();getProperty(); runAndWait(); setProperty()

SUBPROCCES: -

The subprocess module allows you to run new processes, connect their input/output/errors, and obtain their return codes. It is a built-in module and the method call() is used in this project.

Ex: -subprocess.call('shutdown / p / f') # to shutdown

-subprocess.call(("shutdown","/r") #to restart

-subprocess.call("shutdown / h") #hibernation

-modesubprocess.call(["shutdown","/l"])# logging out

FORMULATION

Under formulation, we shall look at the program code and its explanation. The below code is written in python.

1.Conversion of text to speech:

To install: pip install pyttsx3

Pyttsx3 is a cross-platform text-to-speech wrapper.

It uses different speech engines based on your operating system:

nsss - NSSpeechSynthesizer on Mac OS X 10.5 and higher

sapi5 - SAPI5 on Windows XP, Windows Vista, and (untested) Windows 7

Code:

```
engine = pyttsx3.init('sapi5')

voices = engine.getProperty('voices')

engine.setProperty('voice', voices[0].id)

def speak(audio):

    engine.say(audio)

    engine.runAndWait()
```

As soon as there's a command speak(" "), the content in the function is stored as audio and spoken out.

2.Taking audio input from user:

Now what we did here is we made the microphone as a source using the Microphone() method.

Then we declared new variable audio that records the input. Till now the audio is only recorded through the microphone and not converted into text.

Now here comes the recognize_google() method. The recognize google method sends the audio data to the google web speech server and retrieves response.The response, in the form of text, in US English is stored as query.

```
def takeCommand():

    r = sr.Recognizer()

    with sr.Microphone() as source:

        print("Listening...")

        r.pause_threshold = 1
```

```
    audio = r.listen(source)
    try:
        print("Recognizing...")
        query = r.recognize_google(audio, language='en-us')
        print(f"User said: {query}\n")
    except Exception as e:
        print(e)
        print("Unable to Recognize your voice.")
        return "Buddy”
    return query
```

We return query.

3.Introduction of the assistant and the user:

```
def username():
    speak(f"I am your Assistant {assname}")
    speak("How may I address you")
    urname = takeCommand()
    speak(f"Welcome ,{urname}")
    print("Welcome", urname)
    speak(f"How may i assist you, {urname}")
```

4.To search content with wilipedia as a source:

To install the library: pip install wikipedia

```
 if 'wikipedia' in query:
        speak('Searching Wikipedia...')
        query = query.replace("wikipedia", "")
        results = wikipedia.summary(query, sentences=3)
        speak("According to Wikipedia")
        ans = Tk()
        ans.geometry("1366x768")
        T = Text(ans, height=10, width=70)
```

```
T.pack()
T.insert(END, results)
speak(results)
ans.mainloop()
print(results)
```

In the above code, when the user asks his query and spells the word wikipedia, the complete question with the name wikipedia(replaced by a blank space) is stored as a query and is searched in wikipedia through a module named as wikipedia. Results are stored in a variable result; it is spoken and the text is displayed on GUI screen.

5.To get answers to general knowledge questions or mathematical problems:

Wolfram Alpha is an API which can compute expert-level answers using Wolfram's algorithms, knowledgebase and AI technology.

```
client = wolframalpha.Client("4a759341da3376d478b606f2e2b2b61c")
res = client.query(query)
try:
    print(next(res.results).text)
    speak(next(res.results).text)
except StopIteration:
    print("No results")
```

Whenever, the keywords – what is, who is, calculate, tell me are spoken by the user,this piece of code is made to run.

We need a wolfram alpha app ID, which can be created by creating an account, then, the query asked by the user, is searched in the wolfram alpha engine through the app ID, and the result is stored as res, the result in the form of text is stored and spoken.

6.Answering to random questions:

```
elif "who am i" in query:
    speak("If you talk then definitely your human.")
```

```
elif "why you came to world" in query:
    speak("Thanks to CBIT. further It's a secret")
 elif 'is love' in query:
    speak("It is 7th sense that destroy all other senses")
 elif "who are you" in query:
    speak("I am your virtual assistant Digi Bud")
 elif 'reason for you' in query:
    speak("I was created as a EE Project,the rest is classified wink wink ")
```

Our voice assisstant, is also capable of answering some random questions asked by the user, apart from the general information.

Front End:

We've created the front end using tkinter which is the standard GUI library for Python. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.

CODE:

```
 master = Tk()
 master.title("DIGI BUD")

border=Frame(master,highlightbackground="white",highlightthickness=4).pack(padx=20,pady=20)
 img1= ImageTk.PhotoImage(Image.open("Capture.PNG").resize((200,200)))
 Label(master, text=" DIGI BUD " , font = ('calibri',20)).pack()
 Label(master,image=img1).pack()
 Button(master, text="Start", command=greeting,height=2,width=6).place(x=700,y=500)
 Button(master, text="Ask Me", command=lambda:voice(assname), height=2, width=6).place(x=700, y=550)
 Button(master, text="Stop", command=end_pro, height=2, width=6).place(x=700, y=600)
```

As soon as the program is runned, thr GUI appears,and user gets the options to introduce himself, using the Start button,can ask questions by pressing the Ask me button,and can terminate the program using the Sop button.

Button method takes the attributes text,

7.To get the weather report:

If the user wishes to know about the weather details of a city, as soon as he spells the word city, this piece of code runs and an API key,and a weather website url, is entered, the assistant takes the city name, and using the base url,city name,and the api key,

```
api_key = "4a759341da3376d478b606f2e2b2b61c"
base_url = "http://api.openweathermap.org/data/2.5/weather?"
speak(" City name ")
print("City name : ")
city_name = takeCommand()
complete_url = base_url + "q=" + city_name + "&APPID=" + api_key
response = requests.get(complete_url)
x = response.json()
y = x["main"]
current_temperature = y["temp"]
current_pressure = y["pressure"]
current_humidity = y["humidity"]
z = x["weather"]
weather_description = z[0]["description"]
print(" Temperature (in kelvin unit) = " + str(
    current_temperature) + "\n atmospheric pressure (in hPa unit) =" + str(
    current_pressure) + "\n humidity (in percentage) = " + str(current_humidity) + "\n description = " + str(
    weather_description))
results=f"Current Temperature is {current_temperature},Current Humidity is {current_humidity},current pressure is {current_pressure}and description is {weather_description}
```

8.To get current News:

News is obtained using news.org API and this key is used to obtain top current headlines.

```
elif 'news' in query:
    try:
        jsonObj = urlopen(
          '"https://newsapi.org/v2/top-headlines?country=in&apikey=5fcb732b78b34006a282c1a0f218d8e0"')
        data = json.load(jsonObj)
        i = 1

        speak('here are some top news of india')
        print('"=============== NEWS ============"' + '\n')

        for item in data['articles']:
            if i < 6:
                print(str(i) + '. ' + item['title'] + '\n')
                print(item['description'] + '\n')
                speak(str(i) + '. ' + item['title'] + '\n')
                i += 1
            else:
                break
    except Exception as e:
            print(str(e))
```

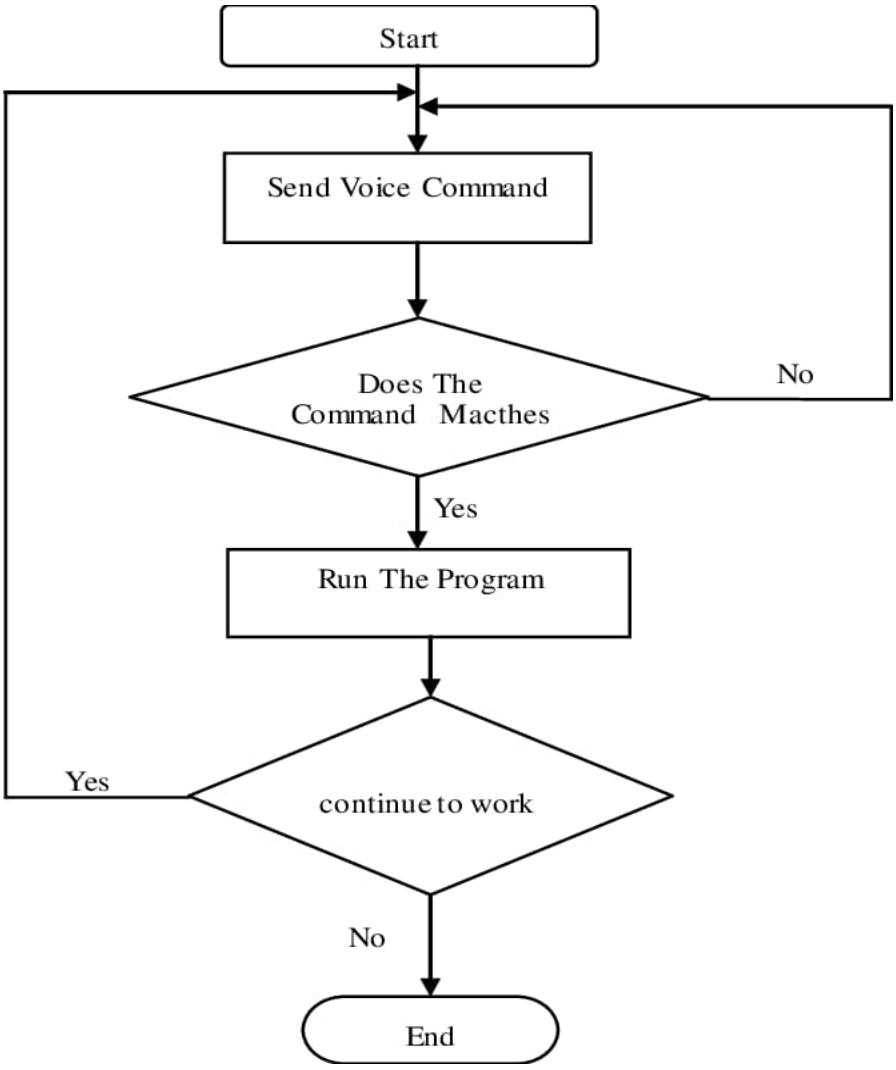
9.To send an email:

Email can be sent using the python Smtp Library which accepts the message as voice command

```
def sendemail(subject, to_address, message):
    smtp1 = smtplib.SMTP('smtp-mail.outlook.com', 587)
    smtp1.ehlo()
```

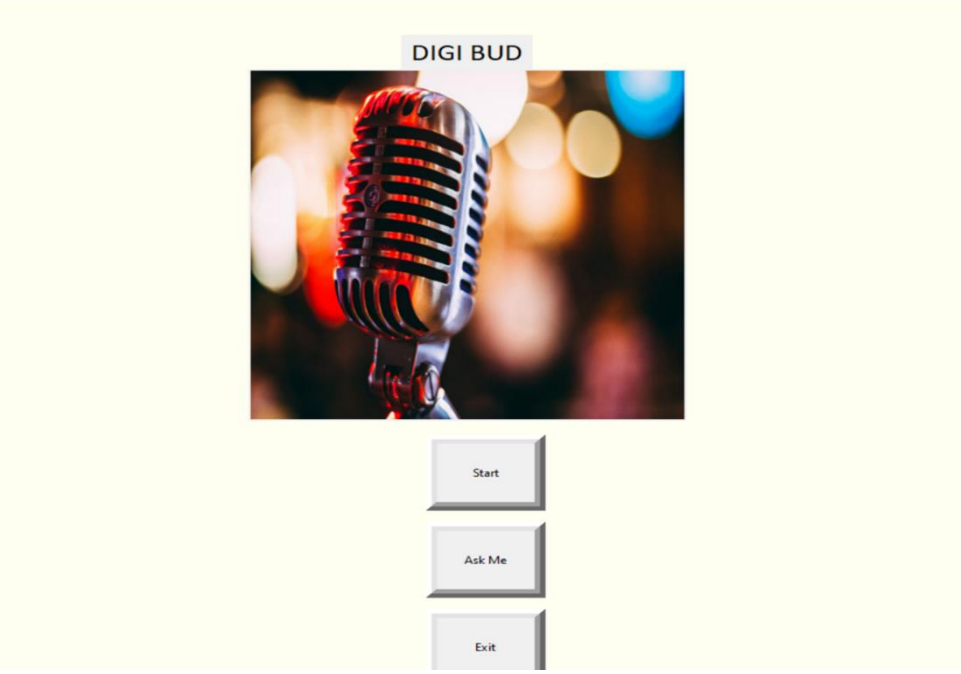
```
smtp1.starttls()
email = input("Enter your mail id:")
password = getpass.getpass("Enter your password:")
smtp1.login(email, password)
msg = EmailMessage()
msg.set_content(message)
msg['subject'] = subject
smtp1.sendmail(email, to_address, msg.as_string())
clear = lambda: os.system('cls')
clear()
wishMe()
elif "email" in query:
    speak("Please provide the subject of your message")
    subject = takeCommand()
    speak("Please convey the message you want to send")
    message = takeCommand()
    speak("Whom should I send this message")
    to_address = input("Enter recipient mail id:")
    speak("Please provide your login credentials")
    sendemail(subject, to_address, message)
    speak("Email has been sent !")p
```

FLOWCHART:


Start
Send Voice Command
Does The
Command Macthes
No
Yes
Run The Program
continue to work
Yes
No
End

RESULTS AND DISCUSSION

RESULT:



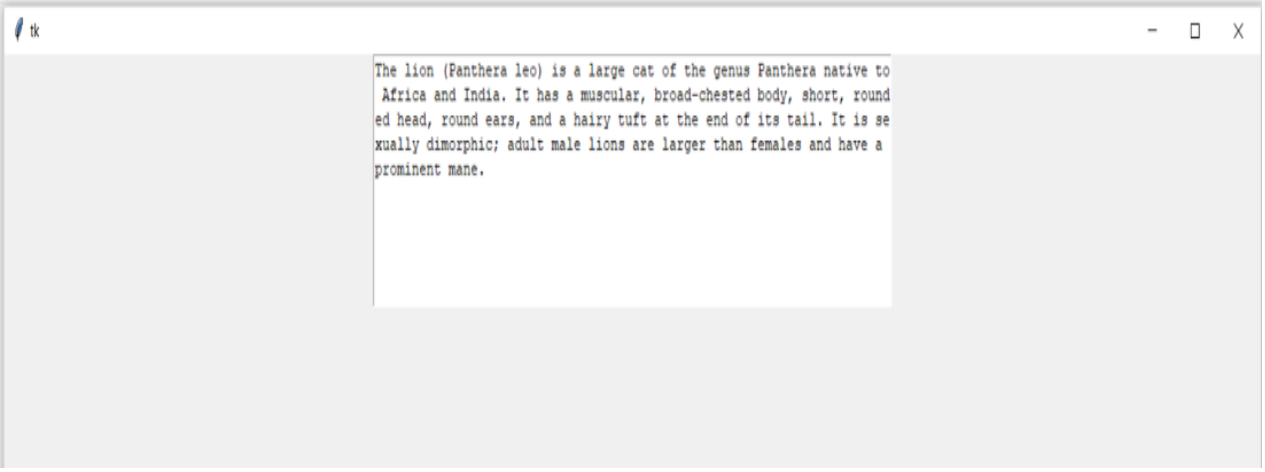
Output screen looks like this.

When the start button is pressed, the assistant introduces itself and the user can introduce himself.

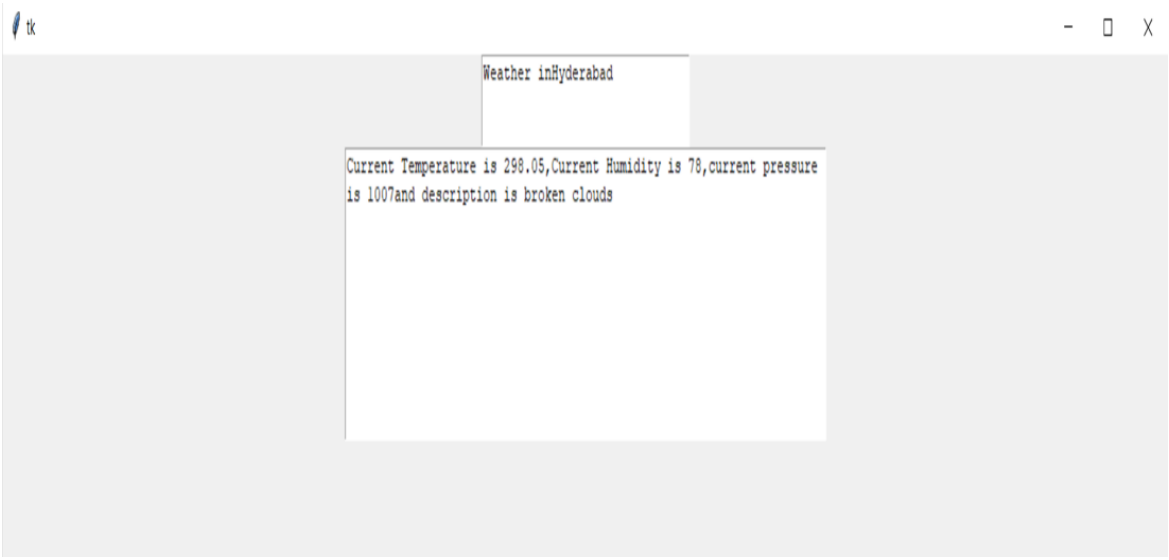
Ask Me button is pressed to ask any query. The Exit button ends the program.

Answer for a query: Search about lions in wikipedia looks like this:

The text is spoken and shown like this



The query for weather is shown like this:



E mail can also be sent to some person in this way:

```
Listening...
Recognizing...
User said: sir

Welcome sir
Listening...
Recognizing...
User said: write an email for me

Listening...
Recognizing...
User said: details

Listening...
Recognizing...
User said: hello I am Akash of CBI

Enter recipient mail id:ugs21090_cse.mayaank@cbit.org.in
Enter your mail id:ugs21091_cse.akash@cbit.org.in
Enter your password:••••••••
Listening...
Recognizing...
User said: exit
```

The current news is answered in this way:

```
Listening...
Recognizing...
User said: dudh

Welcome dudh
Listening...
Recognizing...
User said: tell me the current news

============== NEWS ============

1. Karnataka Bans Gatherings In Shivamogga After Clash Over Savarkar Poster - NDTV

A man was stabbed in Karnataka's Shivamogga district allegedly as two groups clashed over a banner featuring the photo of Vi
nayak Damodar Savarkar, whom the BJP considers one of its biggest icons.

2. Great expectations? iPhone 14 Pro storage likely to be only 128GB, new leak says - HT Tech

Apple iPhone 14 Pro models may not get the storage boost that was generally being expected, says this new leak.

3. Recent Match Report - New Zealand vs West Indies 3rd T20I 2022 - ESPNcricinfo

Stand-in captain Powell added the finishing touches after a below-par batting display from New Zealand

4. NASA Vehicle To Hit Asteroid Racing Towards Earth, Change Its Course To Save Planet - India.com

On September 26, the DART mission is going to change the direction of one such asteroid that is zipping towards the earth by
colliding with it.

5. Mahindra XUV e8 walkaround - Electrified XUV700 I OVERDRIVE - OVERDRIVE

Mahindra today made the biggest play yet by an Indian carmaker in the EV space while announcing its electrification plan for
the next decade. The company wil...

Listening...
Recognizing...
User said: exit
```

CONCLUSION

This project might have not reached standards of ideal voice assistants in terms of quality but has reached up to a point their efficiency. Throughout the project we faced one major hindrance: portability. Since the code requires many modules/packages to be imported, even if one module is not installed properly the entire code wouldn't execute. Apart from this rest of the process went on pretty smoothly. Through "Digi Bud" we were able to gain experience and understanding about how engineering works in today's world. As the code was written in python, it was necessary for us to explore the language in a deeper sense then we had originally to ensure that the project was a success. "Digi Bud" is aimed to improve productivity in day-to-day lives.

RECOMMENDATION

Accomplishing the full task needs time and resource which gives smart and persuasive output. But the time for the project and sources of information is scarce due to lack of access. Even if we don't have anything to support and we don't have any lab for practice. Therefore such obstacles should be proved for the coming final project. And if it is possible in the future the department should supply students particularly for students who are doing there B Tech. With relevant information regarding there project.

FUTURE SCOPE

Voice assistants are the latest technological advance in consumer electronics that are making their way into people's lives. These devices evidence the impressive development and capability of artificial intelligence and present a tangible contrast to the depictions of this technology in iconic films. With every tech behemoth such as Amazon and Apple now having their own voice assistants, the odds are very strong that these devices are here to say and will become more prominent in daily life.

Improvements in voice assistants aim to make an assistant that solves problems rather than introducing frustrations. These come from continued introduction and refinement of machine learning techniques. Machine learning is seen as a subset of artificial intelligence and it provides systems such as those used with voice assistants the ability to automatically learn and improve from experience without being explicitly programmed to do so.

Voice assistants do use voice recognition to convert users' speech to audio and then back to speech again. However, it is the use of AI and more specifically machine learning that enables voice assistants to become smarter, function extremely accurately and potentially drive a lot of consumer adoption.

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