A

Major Project

On

An AI Enabled Toy For Interactive Communication With Kids

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

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

By

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CMR TECHNICAL CAMPUS

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2018-2022

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the project entitled **"An AI Enabled Toy For Interactive Communication With Kids"** being submitted by **GOURISHETTY SAI SAMPREETHI (187R1A0586), MERUGUMALLA RACHANA SHREE(187R1A0595), POOLA SUKUMAR BABU (187R1A05B7)** in partial fulfillment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering to the Jawaharlal Nehru Technological University Hyderabad, is a record of bonafide work carried out by him/her under our guidance and supervision during the year 2021-22.

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

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EXTERNAL EXAMINER

Submitted for viva voice Examination held on_____

ACKNOWLEGDEMENT

Apart from the efforts of us, the success of any project depends largely on the encouragement and guidelines of many others. We take this opportunity to express our gratitude to the people who have been instrumental in the successful completion of this project.

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ABSTRACT

Now a days an advancement in technology and the concept of AI and ML being incorporated in almost everything it would be exciting to have people that can speak and interact. Therefore, through NLP and some concepts of voice assistants Barbie can be trained to interact with children in logical conversation. Here we used Speech Recognition, pyaudio, pysxtt3, etc. pyaudio is a set of python bindings for portaudio by using pyaudio you can easily use python to play and record on a variety of platforms. pyttsx is a text to speech conversion libraries. Through this interactive model we are building a knowledge base in a toy Based on the keywords presentin the user query the assistance will listen and process it and performs action accordingly. It can tell the time, send email, plays music, plays rhymes, opens Wikipedia, gives first aid instructions,gives remainders, etc. It will be interactive and user-friendly Assistant. The barbie assistants helps the working parents ,baby care centre and play school to engage their children. It can take care of kids better than the care centre. The child will grow with a healthy mind. So, automatically the society will be healthy and nation will be developed.

It can teach alphabets also. It will start the conversation by greeting good morning, good afternoon, good evening according to the time. When we wants to stop then we should tell stop then it will exit. We can use this assistant whenever we want and where ever we want. This model help to handle the children in the healthcare and fulfill there requirements through logical interaction. This model help the caretakers and nurses in hospital. We embed a code in aprocessor and add it to the barbie and the microphone attached to it will take the command and process it. Assuming 95% accuracy for kids interaction.

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1. INTRODUCTION

1.INTRODUCTION

Now-a-days technology is increasing day by day. In such a era of advancement, there is a development of a voice assistant which allows the user to run any type of command without the interaction with keyboard. A voice assistant is a digital assistant that uses voice recognition, language processing algorithms and voice synthesis to listen the voice command of the user andreturns relevant information or performs any specific task as per the request of the user. The voice assistants takes voice as input and gives output through voice

1.1 PROJECT SCOPE

The toy acts as a voice assistant especially designed for kids but everyone can use it.The toy can answer any domain queries and provide the correct output. The toy builds good conversation with kids .

1.2 PROJECT FEATURE

The main features of ai enabled toy for interactive communication for kids are

- User friendly
- Interactive
- Provides the required information for users
- Hand free
- Minimal efforts
- Fast response
- Easy to use
- Cost effective

2.SYSTEM ANALYSIS

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SYSTEM ANALYSIS

System Analysis is the important phase in the system development process. The Systemis studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships withinand outside the system is done. A key question considered here is, “what must be done to solve the problem?” The system is viewed as a whole and the inputs to the system are identified. Once analysis completed the analyst has a firm understanding of what is to be done.

2.1 PROBLEM DEFINITION

The voice assistants are designed for adults only. these voice assistants areunable to understand what kids are trying say. The AI enabled toy is designed for kids and are able to understand what kids say .

2.2 EXISTING SYSTEM

There are existing systems where people can have interactive communication with devices such as siri , alexa and google. These are an AI powered voice assistant that works based on the voice commands of the user. These voice assistants requires good internet connection. Voice assistant can set alarms ,remainders, play music ,play games, search in the internet and tell jokes. These voice assistants are integrated with many devices that we use daily such as smart phones, smart speakers ....etc. this integration helps to control the smart home devices. These voice assistant can be used at anytime and anywhere

2.2.1 LIMITATIONS OF EXISTING SYSTEM

- The existing voice assistant like alexa is costly.
- Some times voice recognition may not be perfect.
- They are not specifically designed for children.
- Kids speaks differently from adults and voice assistance can not understand them.
- The voice assistant features like turning off /on lights ,fans can make kids lazy.

2.3 PROPOSED SYSTEM

Proposed solution is to create a web interface with attached microphone and it exactly works as a voice assistant which is especially designed or children. it is an interactive and user friendly assistant. This will create the interest for kids to use this voice assistant. The barbie toy starts the conversation by greeting good morning, good afternoon and good evening according to the time. And when the kids want to exist they just say stop. it tells time, plays music, plays rhyms, opens Wikipedia, play games, gives first aid instructions and can also teach alphabets, numbers etc.

2.3.1 ADVANTAGES OF THE PROPOSED SYSTEM

- Barbie assistant helps the kids to grow with a healthy minds which can also develop the society as well.
- Kids will be happy and excited to use the Barbie assistant.
- It helps the kids to learn while playing .
- This also reduces hardware space.
- Barbie assistant can fulfill the requirements of the kids.

2.4 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is done. This is to ensure that the proposed system is not a burden to the company. Three key considerations involved in the feasibilityanalysis are

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

2.4.1 ECONOMIC FEASIBILITY

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked duringinvestigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors

Since the system is developed as part of project work, there is no manual cost to spendfor the proposed system. Also all the resources are already available. it gives an indication of the system is economically possible for development.

2.4.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

2.4.3 BEHAVIORAL FEASIBILITY

This includes the following questions:

- Is there sufficient support for the users?
- Will the proposed system cause harm?

The project would be beneficial because it satisfies the objectives when developed and installed. All behavioral aspects are considered carefully and conclude that the project is behaviorally feasible.

2.5 HARDWARE & SOFTWARE REQUIREMENTS

2.5.1 HARDWARE REQUIREMENTS:

Hardware interfaces specifies the logical characteristics of each interface between the software product and the hardware components of the system. The following are some hardware requirements.

- System : I5 processor
- Hard Disk : 20 GB
- Input Devices : Keyboard, Mouse
- Ram : 8 GB
- Radeon /IRIS graphics card

2.5.2 SOFTWARE REQUIREMENTS:

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements.

- Operating system : Windows 7,8,10
- Programming Language : python
- Tool : Anaconda spyder
- Libraries : Pyaudio,pysxtt3 ,Speech recognition libraries

3.ARCHITECTURE

3.ARCHITECTURE

3.1 PROJECT ARCITECTURE

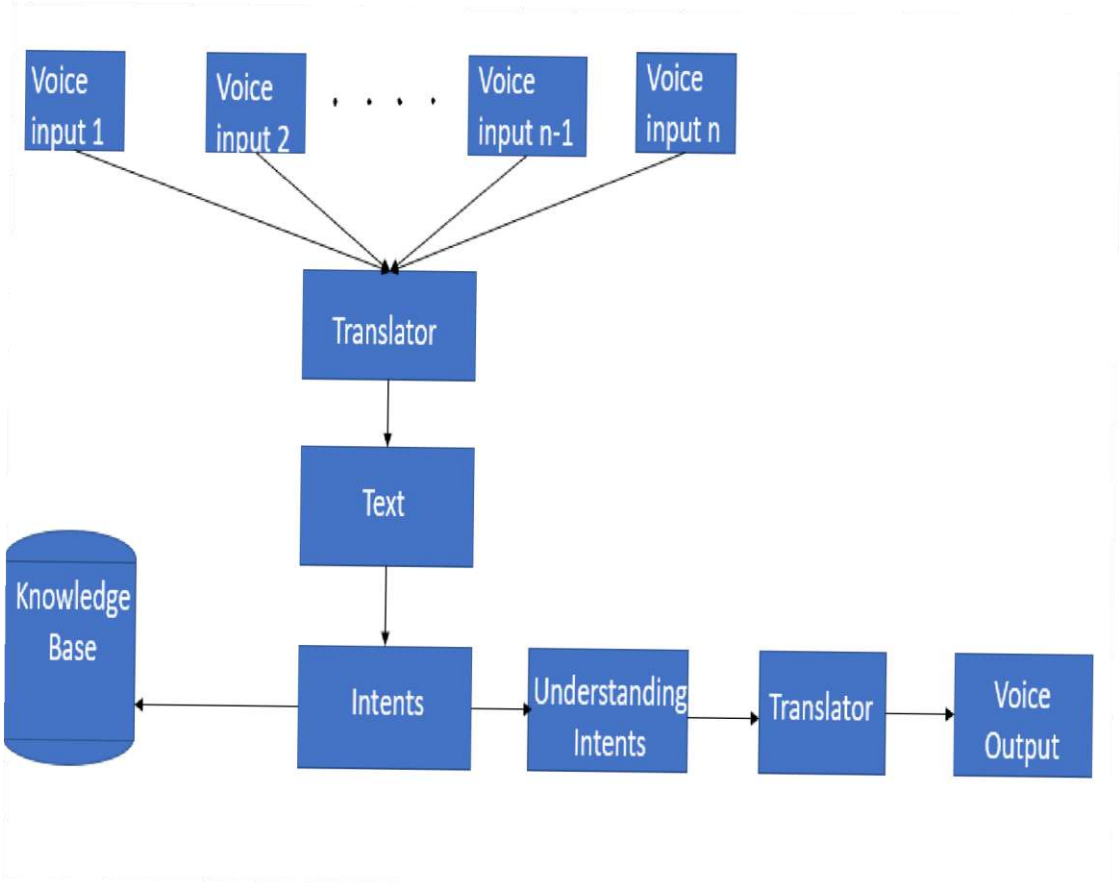


Figure 3.1 Project Architecture of AI enabled toy for interactive communication with kids

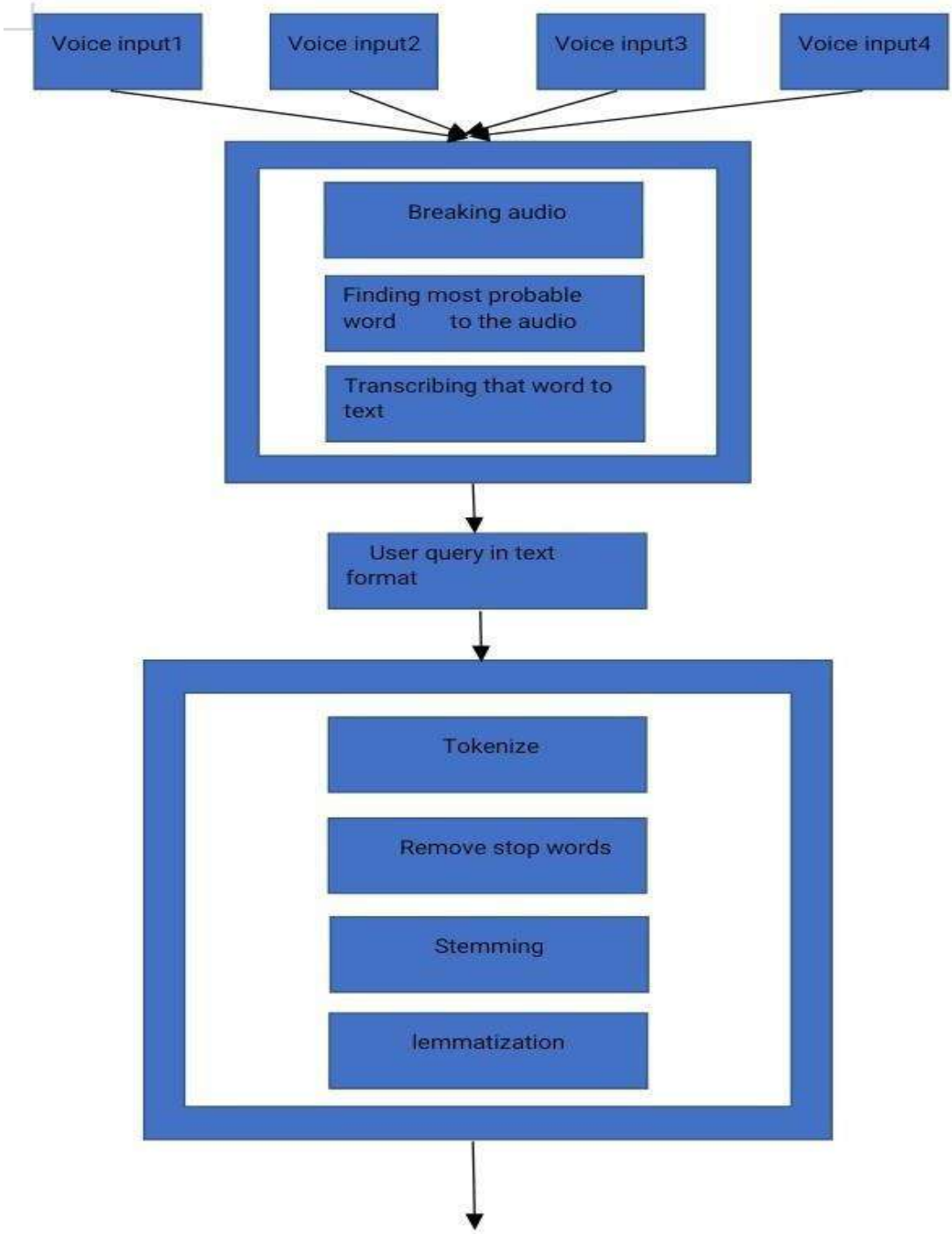


Figure 3.2 Detailed Architecture-I for An AI Enabled Toy For Interactive Communication with kids

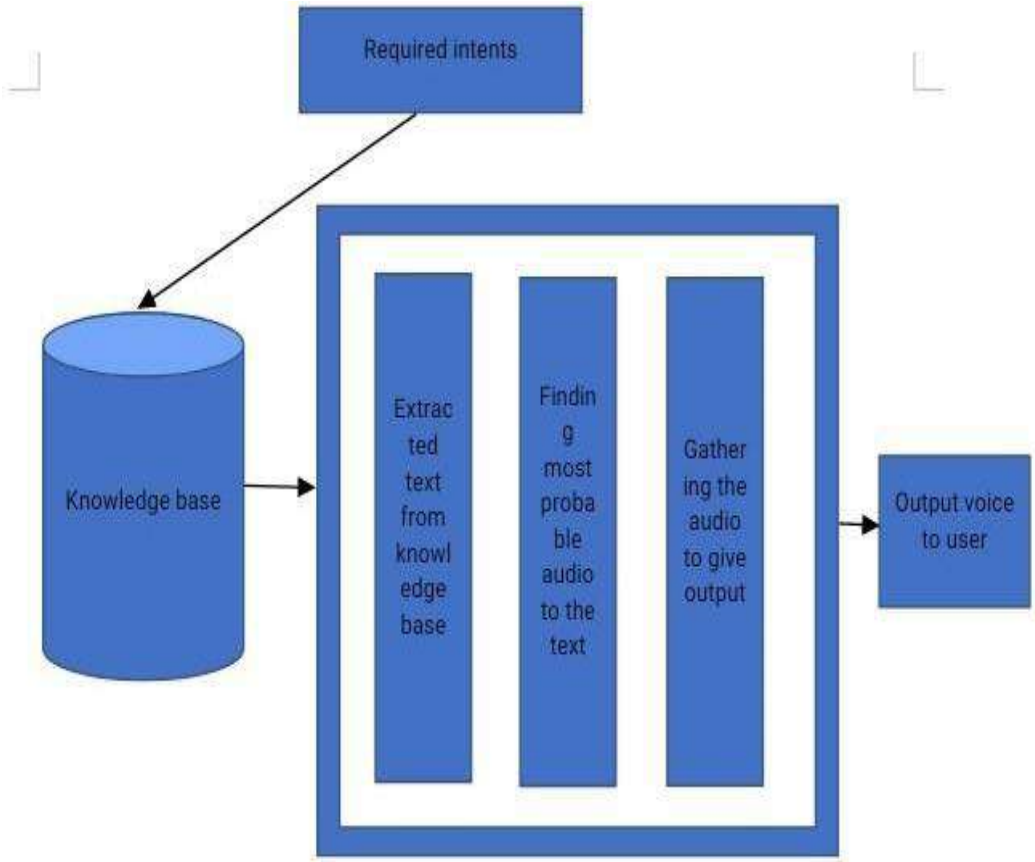


Figure 3.3 Detailed Architecture-II for An AI Enabled Toy For Interactive Communication with kids

3.2 DESCRIPTION

There are many types of input voices such as music, sound and human voice. Input voice from user is collected and then by using translator speech is converted into text. Intents are the important words. The module collects the intents from the query and understands them. For example if user asks name the colours of national flag then the module takes name , colours, national flag as intents and searches for them. Stop words such as as, is ,in , the ,an ,are will be removed from the query.

Tokenization .lemmatization and stemming is done. In the tokenization process the whole query will be divided into individual words. In the stemming process the complete word will be reduced to the root word .for example developed ,developing, developmentand the root word for these is develop. In lemmatization process it returns the base or dictionary from of word based on vocabulary. For example drive, drives, drove, driven it returns drive word.

If there is a match it returns the relevant information otherwise it says sorry can you repeat it again. The toy starts the communication by saying good morning or good afternoon or good evening by checking the system time. If it is morning the toy says “good morning ,my name is Alpha how can I help you “.it prints listening when the user clicks thespeak button .After gathering the input voice it prints recognizing.

The search process is done in the knowledge base .The knowledge base is the data center where huge amount of data can be stored and retrieve whenever information is required. The knowledge base used to store complex structured and unstructured information. Jetson nano processor where we deploy the code for further functioning .After the search process is done, it selects the selects only the related information as per the request of the user. Now again text is converted into speech and gives the output to theuser through voice .

3.3 USE-CASE DIAGRAM

In this use-case diagram there are two actors who are user and trained model.user is the person who gives the queries and trained model gives the response.

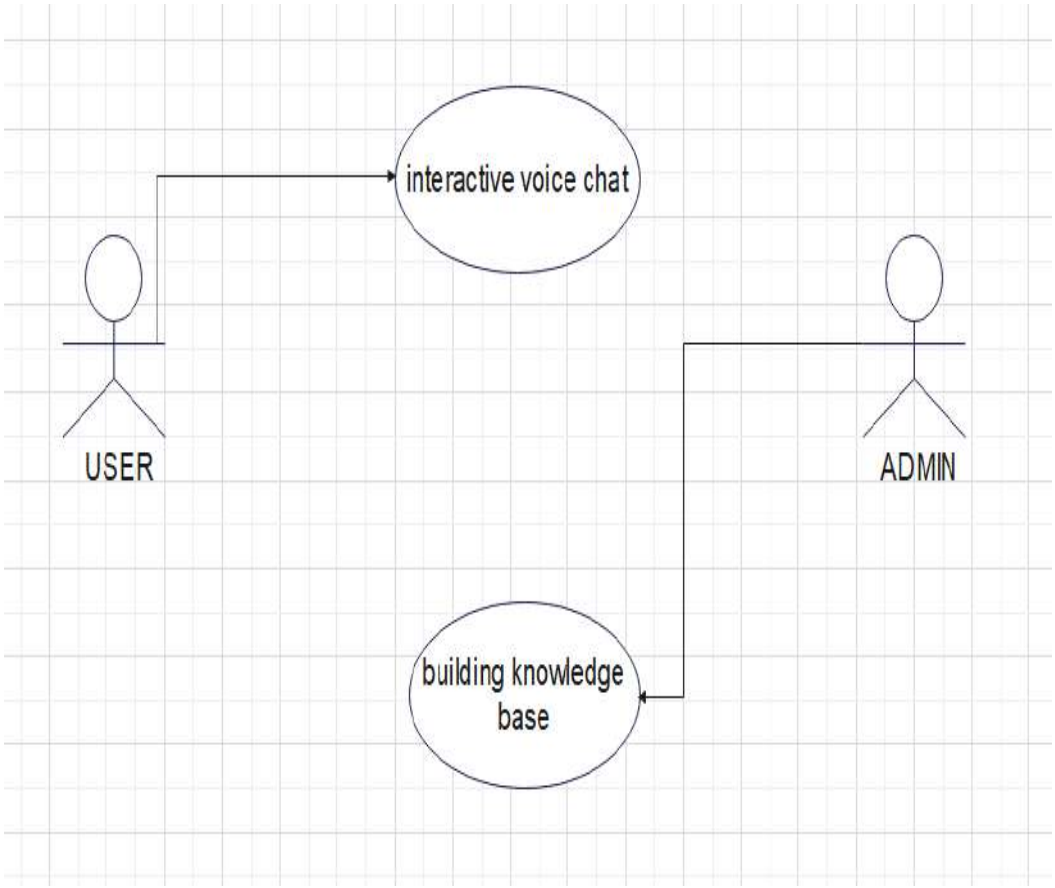


Figure 3.4 UseCase diagram between user and trained model for An AI Enabled Toy For Interactive Communication with kids

3.4 CLASS DIAGRAM

Class Diagram is a collection of classes and objects

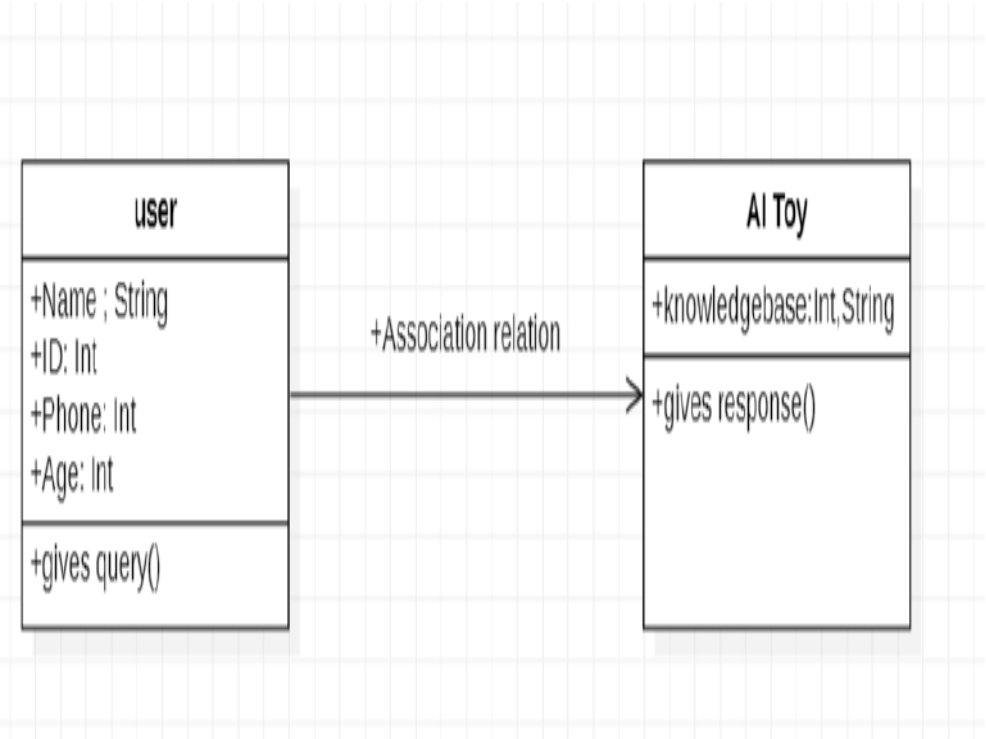


Figure 3.5 Class diagram for use and activity model

3.5 SEQUENCE DIAGRAM

The sequence diagram shows the sequence of operation between the user, system and trained model. The sequence of operation are operations which are performed one after the other

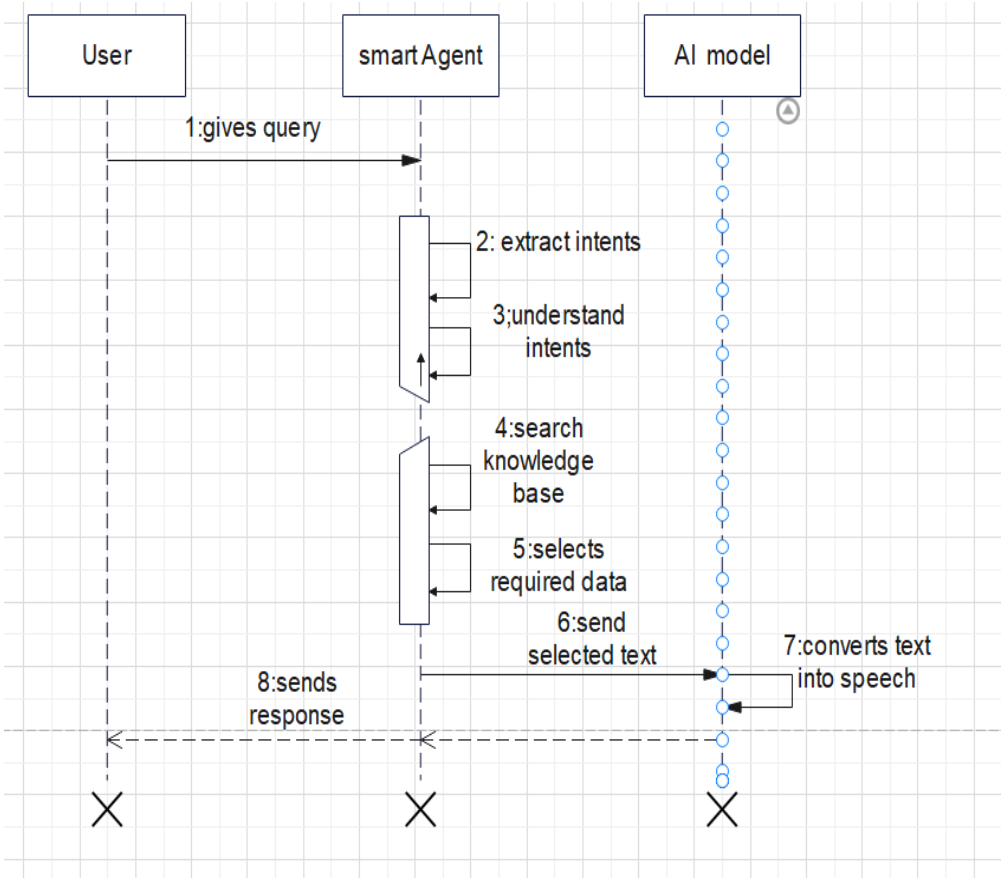


Figure 3.6 Sequence diagram for interactive communication

3.6 ACTIVITY DIAGRAM

It describes about flow of activity states.

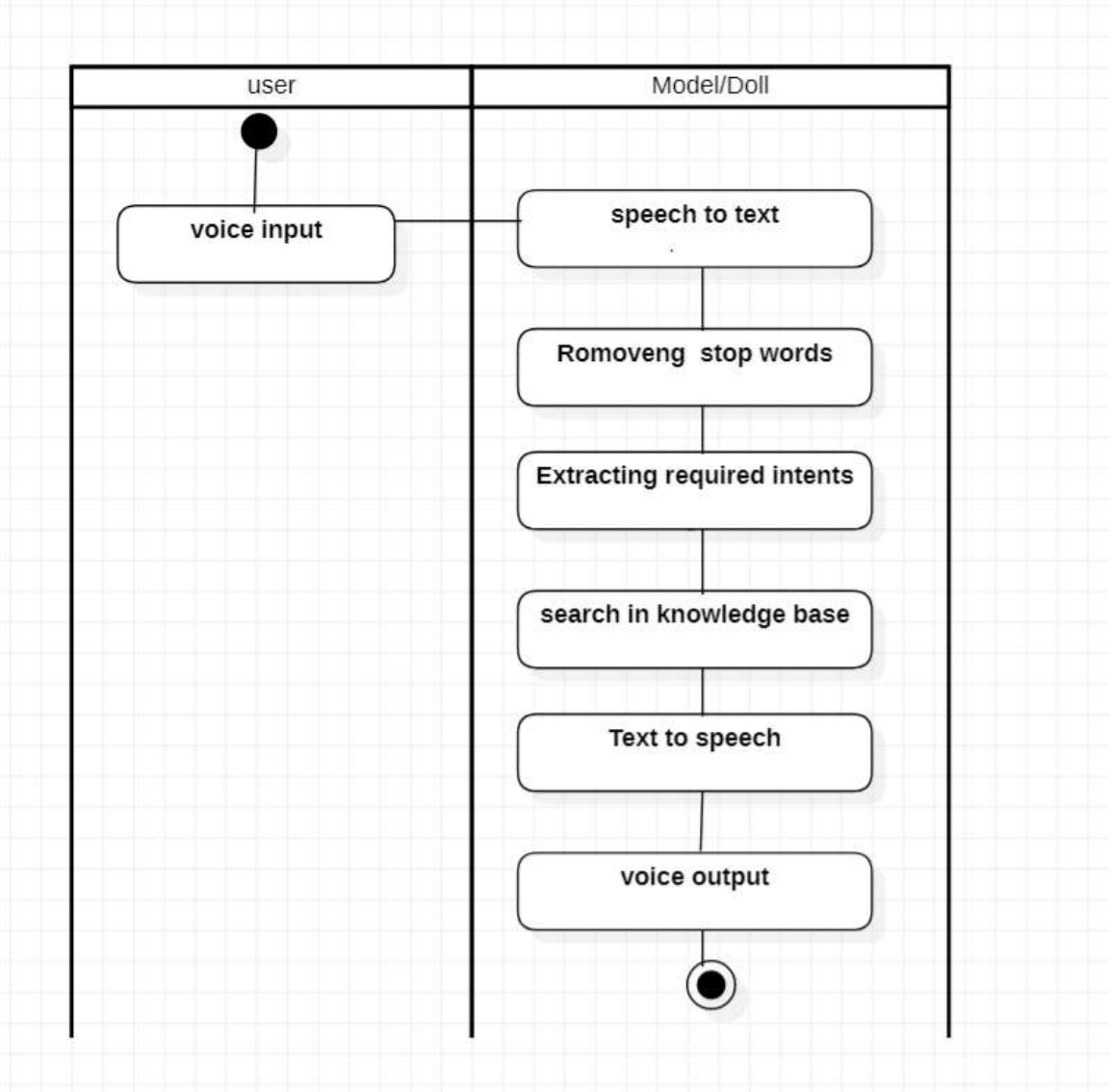


Figure 3.7 Activity diagram of user and model

4. IMPLEMENTATION

4.1 IMPLMENTATION

```
import numpy as np
import os
from keras.models import load_model
from keras.preprocessing import image
import tensorflow as tf
global graph
graph = tf.get_default_graph()
from flask import Flask , request, render_template
from werkzeug.utils import secure_filename
from gevent.pywsgi import WSGIServer
import pyttsx3
import datetime
import speech_recognition as sr
import webbrowser
import wikipedia
import random
import  os
import smtplib
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
app = Flask(_name_)
engine = pyttsx3.init('sapi5')
voices = engine.getProperty('voices')
#print(voices[0].id)
engine.setProperty('voice', voices[1].id)
@app.route('/')
def index():
```

```
    return render_template('index.html')

@app.route('/wish',methods = ['GET','POST'])
def wishMe()
    hour = int(datetime.datetime.now().hour)
    if hour>=4 and hour<12:
        speak("Good Morning!"
     elif hour>=12 and hour<18:
        speak("Good Afternoon!")
    elif hour>=18 and hour<23:
        speak("Good Evening!")

    else:

        speak("Its late sir, but I am here."
    speak("my name is Alpha. Please tell me how can I help you madam")

    while True:
        query = takeCommand().lower()
        print(query)
        if 'stop listening' or 'stop' in query:
            c = random.randrange(0,2,1)
            if c==0:
                speak("I will wait for your command")
            elif c==1:
                speak("Ok sir")
                break
        stop_words=set(stopwords.words('english'))
        word_tokens=query.split(" ")
        q=[]
```

```
        for w in word_tokens:
                if w not in stop_words and w.lower()!="this" and w.lower()!="that" and
w.lower()!="the" and w.lower()!="your" and w.lower()!="what":
            q.append(w)
        file=open(r"C:\Users\MEHER\Documents\Base.txt")
        content=[]
        k=file.readlines()
        for i in k:
            content.append(i)
        f=0
        print(q)
        #print(q,word_tokens)
        #print(content[0])

        for i in word_tokens:
            for j in content:
                if i.lower() in j.lower():
                    print(j)
                    speak(j)
                    f=1
                    break

            if f==1:
                break
def speak(audio):
    engine.say(audio)
    engine.runAndWait()
def takeCommand():
    #its takes mic input and returns string output
```

```
    r = sr.Recognizer()
    with sr.Microphone() as source:
        print("Listening...")
        r.pause_threshold = 1
        r.energy_threshold = 100
        r.adjust_for_ambient_noise(source, duration = 1)
        audio = r.listen(source)

    try:
        print("Recognizing...")
        query = r.recognize_google(audio, language='en-in')
        print(f"User said: {query}\n")
    except Exception as e:
        #print(e)
        print("Say that again please...")
        speak("Sorry, I could not get that")
        speak("Say that again please...")
        return "None"
    return query

if__name__== '__main__':
    app.run(debug = False, threaded = False)
```

HTML CODE

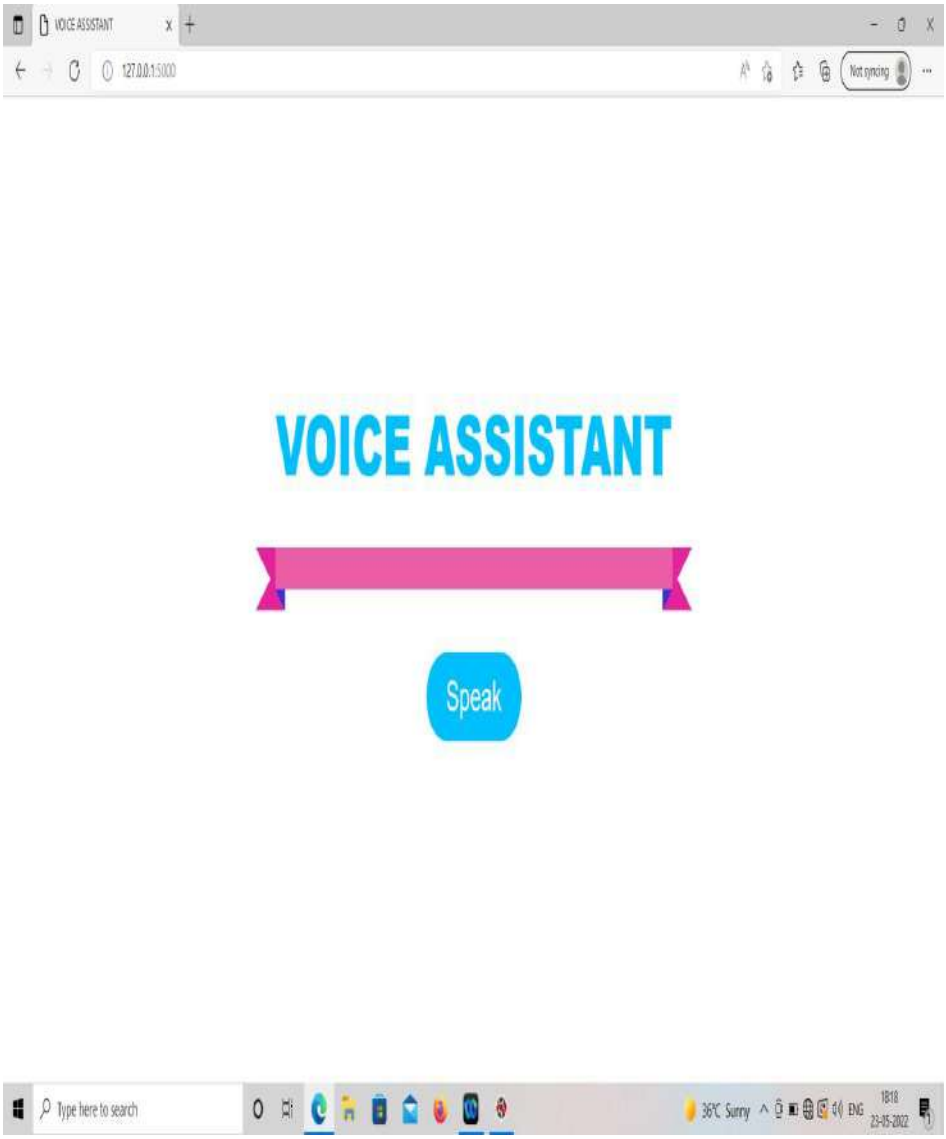
```
<html>
<head>
<link rel="stylesheet" href=
"https://unpkg.com/purecss@2.0.6/build/pure-min.css"
      integrity=
"sha384-
Uu6IeWbM+gzNVXJcM9XV3SohHtmWE+3VGi496jvgX1jyvDTXfdK+rfZc8C1Aehk5"
        crossorigin="anonymous" />
   <!-- Internal CSS -->
   <style>
   .ribbon {
 font-size: 16px !important;

 /* This ribbon is based on a 16px font side and a 24px vertical rhythm. I've used em's to position each element for scalability. If you want to use a different font size you may have to play with the position of the ribbon elements */
 width: 50%;

 position: relative;
 background: #ba89b6;
 color: #fff;
 text-align: center;
 padding: 1em 2em; /* Adjust to suit */
 margin: 2em auto 3em; /* Based on 24px vertical rhythm. 48px bottom margin - normally 24 but the ribbon 'graphics' take up 24px themselves so we double it. */
}
```

```
.ribbon:before, .ribbon:after {
 content: "";
 position: absolute;
 display: block;
 bottom: -1em;
 border: 1.5em solid #986794;
 z-index: -1;
}

.ribbon:before {
 left: -2em;
 border-right-width: 1.5em;
 border-left-color: transparent;
}

.ribbon:after {
 right: -2em;
 border-left-width: 1.5em;
 border-right-color: transparent;
}

.ribbon .ribbon-content:before, .ribbon .ribbon-content:after {
 content: "";
 position: absolute;
 display: block;
 border-style: solid;
 border-color: #804f7c transparent transparent transparent;
 bottom: -1em;
}

.ribbon .ribbon-content:before {
```

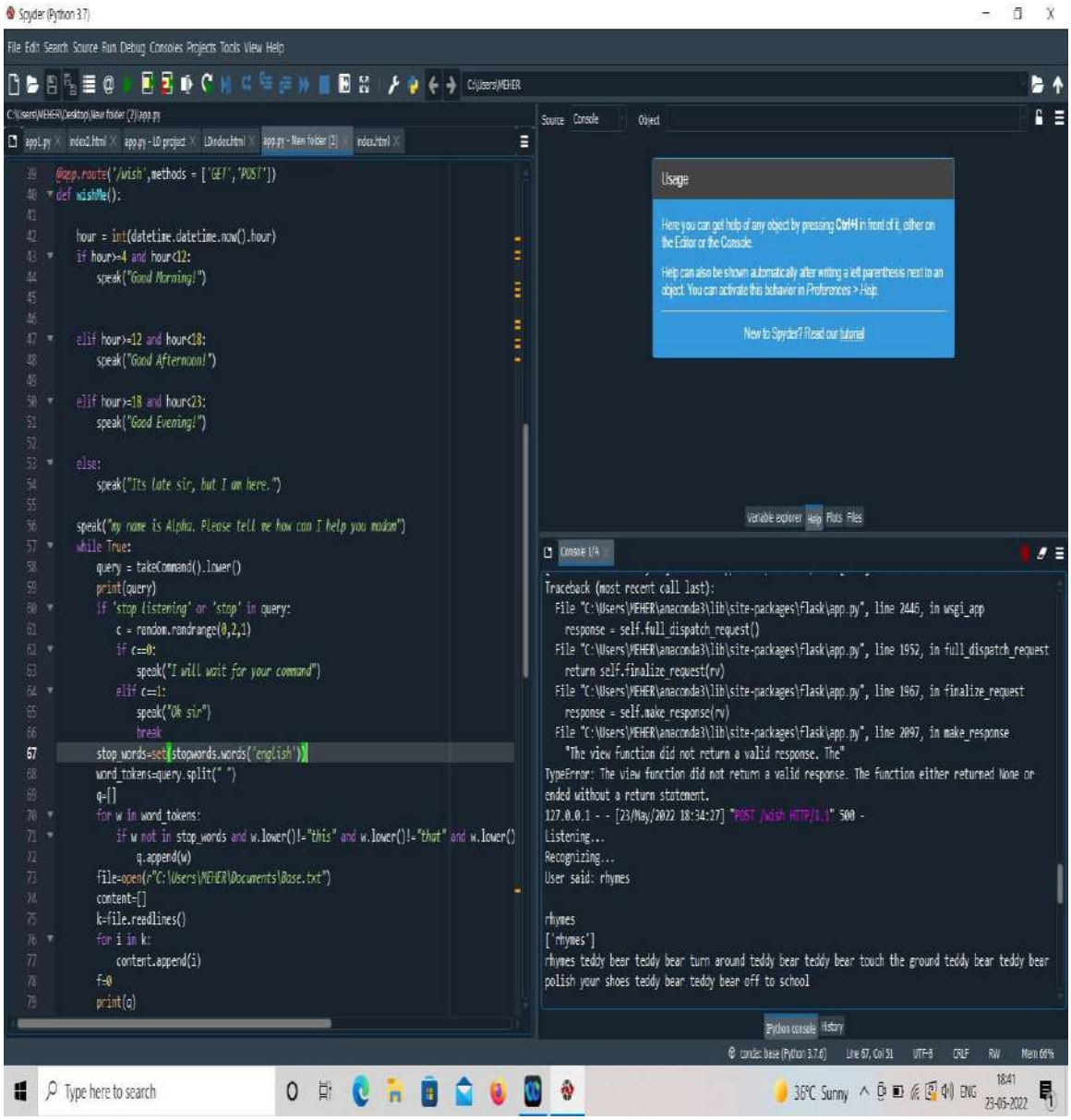
```
 left: 0;
 border-width: 1em 0 0 1em;
}

.ribbon .ribbon-content:after {
 right: 0;
 border-width: 1em 1em 0 0;
}

        /*styles for the body and h1*/
        body {
            text-align: center;
            padding: 12%;
            font-family: sans-serif;
            font-size: 2rem;
        }

        h1 {
            color: #87CEEB;
        }

        /*styles for button*/
        .button_go {
            background-color: #00BFFF;
            color: #ffffff;
            border-radius: 40px;
        }

    </style>
<title>VOICE ASSISTANT</title>
```

```
</head>
<body>
<center><h1><b>VOICE ASSISTANT</b></h1></center>
<h1 class="ribbon">
  <strong class="ribbon-content">Everybody loves ribbons</strong>
</h1>
<form action = "http://localhost:5000/wish" method="post">
<input type="submit" name="submit" value="submit" class="button_go pure-button">
</form>
</body>
</html>
```

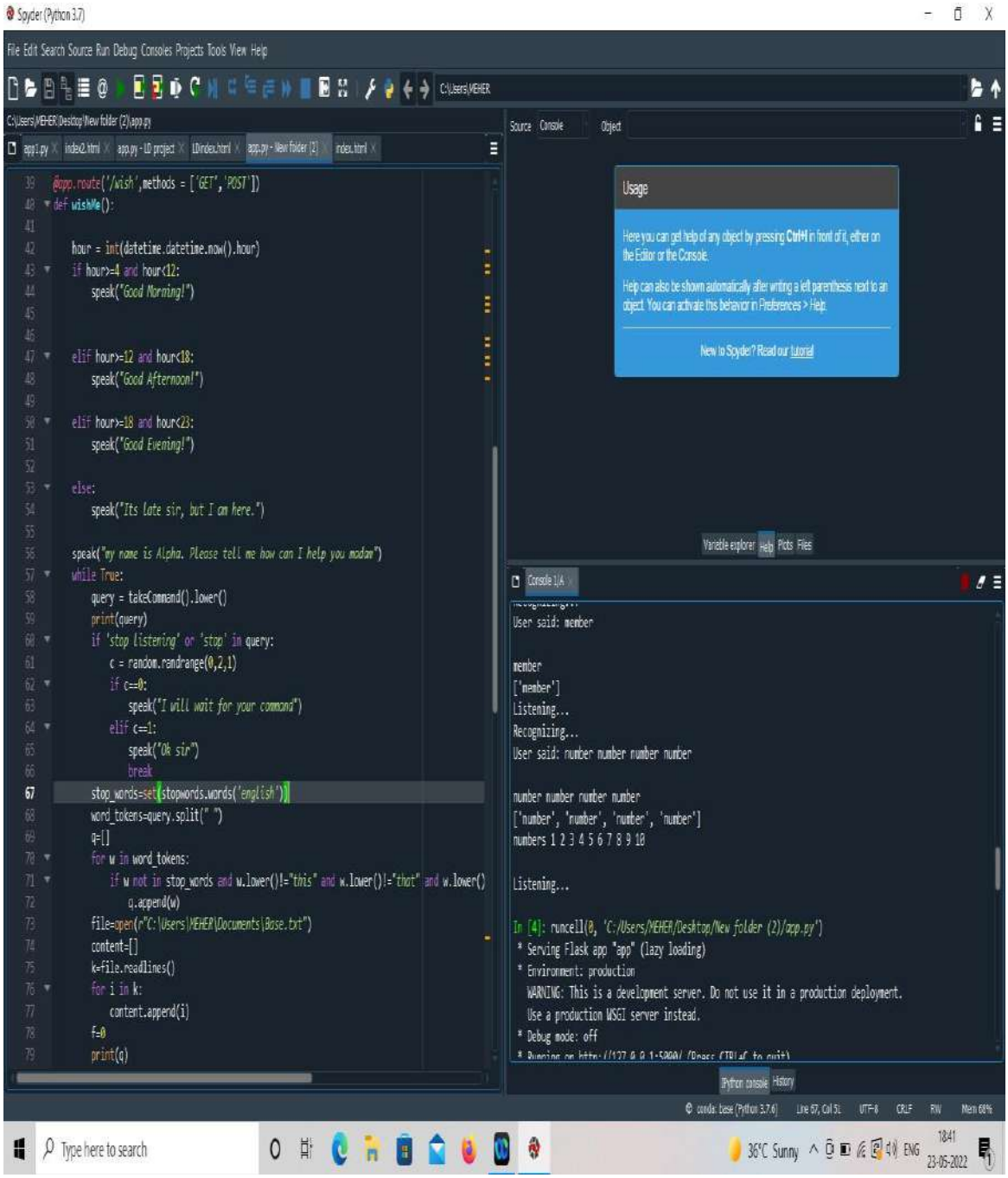
5. SCREEN SHOTS



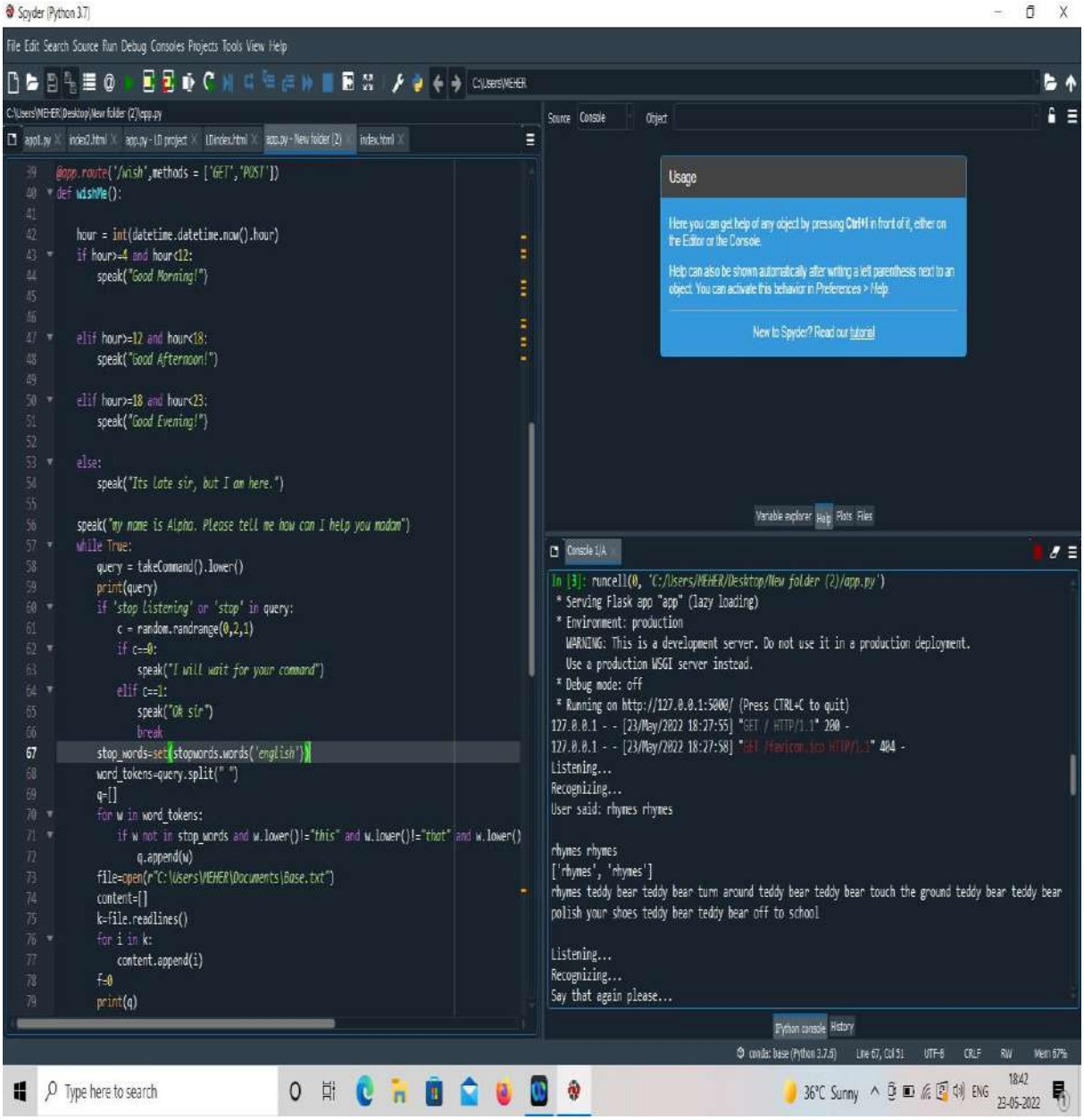
Screenshot 5.1 Web Interface for An AI Enabled Toy For Interactive Communication with kids



Screenshot 5.2 Output for Displaying Rhymes for An AI Enabled Toy For Interactive Communication with kids



Screenshot 5.3 Output for Displaying Numbers for An AI Enabled Toy For Interactive Communication with kids



Screenshot 5.4 Output for Displaying Local Host for An AI Enabled Toy For Interactive Communication with kids

6. TESTING

6.1 INTRODUCTION TO TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

6.2 TYPES OF TESTING

6.2.1UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of theapplication .it is done after the completion of an individual unit before integration.

This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business processperforms accurately to the documented specifications and contains clearly defined inputs and expected results.

6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components iscorrect and consistent. Integration testing is specifically aimed at exposing the problems that arisefrom the combination of components.

6.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals. Functional testing is centered on the following items: Valid Input : identified classes of validinput must be accepted. Invalid Input : identified classes of invalid input must be rejected. Functions : identified functions must be exercised. Output : identified classes of application outputs must be exercised. Systems/Procedures: interfacing systems or procedures must be invoked. Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes.

7.CONCLUSION

7.CONCLUSION & FUTURESCOPE

7.1 CONCLUSION

The project titled as " An AI Enabled toy for interactive communication withs kids " is a console based application. This is a software provides the facility for answering the queries of theusers. The toy collects the voice input of the user and provides the output through voice.We can use this assistant whenever we want and where ever we want. This model help to handle the children in the healthcare and fulfill there requirements through logical interaction. This model help the caretakers and nurses in hospital. We embed a code in a processor and add it to the barbie and the microphone attached to it will take the command and process it. Assuming 95% accuracy for kids interaction.

7.2 FUTURE SCOPE

There is a lot of future scope in our project.In future we can make it into Amazon echolike things with jetson nano. we can also add a small screen and show some images and even play videos. it's likely that digital assistants will be able to "learn" from their users. Based on this learning, the software can make appropriate updates and adjustments in order to personalize itselfto the user.

8.BIBILOGRAPHY

8. BIBILOGRAPHY

8.1 REFERENCES

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8.2 GITHUB LINK:

https://github.com/SaiSampreethiGourishetty/AnAIEnabledVoiceAssistantforInteractiveCommunicationforKids