**AI PROJECT**

**TOPIC: Basic Chatbot (speech to text and speech to text)**

**Specifications:**

* **This project is performed on MacOS**
* **The language used is Python 3.8**
* **The IDE used is Anaconda in jupyter notebook**
* **This document will consist description of the project, code and a brief video about the working of the project.**
* **The technology used is Artificial Intelligence, Deep Learning, Speech recognition and Natural Language Processing.**

**About the Project**

**Artificial Intelligence:**

**Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.**

**Speech Recognition:**

**Speech recognition, or speech-to-text, is the ability for a machine or**[**program**](https://searchsoftwarequality.techtarget.com/definition/program)**to identify words spoken aloud and convert them into readable text. Rudimentary speech recognition software has a limited vocabulary of words and phrases, and it may only identify these if they are spoken very clearly. Speech recognition incorporates different fields of research in computer science, linguistics and computer engineering. Many modern devices or text-focused programs may have speech recognition functions in them to allow for easier or hands-free use of a device. Speech recognition works using algorithms through acoustic and language modelling. Acoustic modelling represents the relationship between linguistic units of speech and audio signals; language modelling matches sounds with word sequences to help distinguish between words that sound similar.**

**AI using Speech Recognition:**

**When based on AI models, speech recognition becomes more accurate and makes it easier to identify and understand the components of natural language. Further, speech recognition AI models can be used for voice recognition services, making an NLP service well-rounded and more efficient.**

**What is a Chatbot?**

**A chatbot is an artificial intelligence**[**(AI) software that can simulate a conversation**](https://expertsystem.com/learning-center/technology/)**(or a chat) with a user in natural language through messaging applications, websites, mobile apps or through the telephone.**

**Why are chatbots so important?**

**A chatbot is often described as one of the most advanced and promising expressions of interaction between humans and machines. However, from a technological point of view, a chatbot only represents the natural evolution of a Question Answering system leveraging Natural Language Processing (NLP). Chatbot applications streamline interactions between people and services, enhancing customer experience. At the same time, they offer companies new opportunities to improve the customers engagement process and operational efficiency by reducing the typical cost of customer service.**

**Advantages of using a Chatbot**

1. **SAVE MONEY**
2. **SAVE TIME**
3. **PROVIDES BETTER CUSTOMER SATISFACTION**
4. **INCREASES CUSTOMER BASE**
5. **CUTS DOWN ON ERRORS**
6. **ACCURATE**
7. **USER FRIENDLY**
8. **24X7 AVAILABLE**
9. **MULTITASKING**
10. **EASY TO BUILD AND ADMINISTER**

**Applications and Industry Relevance of a Chatbot**

1. **Siri: Siri(or Siri chatbot) is a virtual assistant (provides support services virtually) which uses voice queries to answer questions, perform actions and make recommendations according to the user's needs. It has been developed by Apple Inc.**
2. **Alexa: Amazon Alexa, also known simply as Alexa, is a virtual assistant AI technology developed by Amazon, first used in the Amazon Echo smart speakers developed by Amazon Lab126. It is developed by Amazon.**
3. **Google Assistant: Google Assistant is an artificial intelligence–powered virtual assistant developed by Google that is primarily available on mobile and smart home devices.**
4. **Cortana: Cortana is a virtual assistant developed by Microsoft, which uses the Bing search engine to perform tasks such as setting reminders and answering questions for the user.**

* **Chatbots are now widely used around the industry from healthcare platforms to e commerce platforms. Basically wherever there is a customer interaction a chatbot can be deployed to achieve better outcomes and experiences. Chatbots are also very cost effective because employing a chatbot reduces the pressure on human customer service providers.**
* **Many companies have developed their own platforms to make chatbots with hassle free and less time. Some examples of such platforms include:**
  + **IBM Watson**
  + **Amazon Lex**
  + **Dialogueflow by google**
  + **Azure Chatbot services**

**These platforms help in building chatbots with pre defined expressions to save time. Chatbots made on these platforms are also High Level AI enabled.**

**Methodology**

**Every Chatbot has three parts:**

* **Intent: Within a chatbot, intent refers to the goal the customer has in mind when typing in a question or comment. While entity refers to the modifier the customer uses to describe their issue, intent is what they really mean.**
* **Entity: Within a chatbot, an entity, or slot, modifies user intent. Chatbot entities are connected to knowledge repositories in order to provide more personal and accurate responses on user search. An entity in a chatbot is used to add values to the search intent.**
* **Dialogue: A dialog performs a task that can represent part of or a complete conversational thread. It can span just one turn or many, and can span a short or long period of time.**

**Libraries/API**

**During this project we used the following libraries and API’s:**

1. **GTTS API. The GTTS API stands for “”Google text to Speech Application programming Interface””. This is an API by google which can be used in python for speech recognition applications. The GTTS API is able to convert the text given to it into speech.**
2. **Google Speech Recognition: Google Cloud Speech API enables developers to convert audio to text by applying powerful neural network models in an easy to use API. The API recognizes over 80 languages and variants, to support your global user base. You can transcribe the text.**
3. **PYAUDIO: PyAudio provides Python bindings for PortAudio, the cross-platform audio I/O library. With PyAudio, you can easily use Python to play and record audio on a variety of platforms**
4. **PYTTSX3: Pyttsx3 is a text-to-speech conversion library in Python. Unlike alternative libraries, it works offline, and is compatible with both Python 2 and 3.**

**Flowchart:**

1. **Text to Speech Model:**

Start

Use GTTS API to build the Program

Execute the Program and download the MP3 file of the program

Enter the text you want the chatbot to speak

Listen or Play the MP3 file and you can listen to the text that has been converted to speech

1. **Speech to text Model:**

Start

Say a dialogue and see if your model works

Create a function Speech Text

Allow the speaker the microphone

Use and install speech recognition, pyttsx 3,pyaudio

**Code of the Program:**

1. **Speech to Text:**

pip install speechrecognition

pip install pyttsx3

pip install pyaudio

import speech\_recognition as sr

import pyttsx3

# Initialize the recognizer

r = sr.Recognizer()

# Function to convert text to

# speech

def SpeakText(command):

# Initialize the engine

engine = pyttsx3.init()

engine.say(command)

engine.runAndWait()

# Loop infinitely for user to

# speak

while(1):

# Exception handling to handle

# exceptions at the runtime

try:

# use the microphone as source for input.

with sr.Microphone() as source2:

# wait for a second to let the recognizer

# adjust the energy threshold based on

# the surrounding noise level

r.adjust\_for\_ambient\_noise(source2, duration=0.2)

#listens for the user's input

audio2 = r.listen(source2)



# Using ggogle to recognize audio

MyText = r.recognize\_google(audio2)

MyText = MyText.lower()

print("Did you say "+MyText)

SpeakText(MyText)

except sr.RequestError as e:

print("Could not request results; {0}".format(e))

except sr.UnknownValueError:

print("unknown error occured")

1. **Text to Speech:**

! pip install gTTS

from gtts import gTTS

# Text Data

text = "Hi My name is Rahil and this is my AI mini project I have made use of the GTTP API to convert text to speech Hope you like it "

text

language="en"

# Creating the object; Passing the text data through the language

myObj = gTTS(text=text, lang=language, slow=False)

myObj.save("demo.mp3")

#to show the current directory

#pwd

# to play on colab notebook

import os

os.system("demo.mp3")