AUDIO TO SIGN LANGUAGE TRANSLATOR

A
Project Report

submitted in partial fulfillment of the
requirements for the award of the degree of

BACHELOR OF TECHNOLOGY
in
COMPUTER SCIENCE
Specialization in
Oil And Gas Informatics

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2020-21

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CANDIDATES DECLARATION

We hereby certify that the project work entitled **AUDIO TO SIGN LANGUAGE TRANSLA-TOR** in partial fulfilment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science And Engineering with Specialization in Oil and Gas Informatics and submitted to the Department of Informatics at School of Computer Science, University of Petroleum And Energy Studies, Dehradun, is an authentic record of our work carried out during a period from **January, 2020** to **May, 2020** under the supervision of **Dr Ashish Kailashchandra Sharma, Assistant Professor in Department of Informatics UNIVERSITY OF PETROLEUM AND ENERGY STUDIES** .

The matter presented in this project has not been submitted by us for the award of any other degree of this or any other University.

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This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

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Abstract

This report presents a MOBILE-BASED SIGN LANGUAGE TRANSLATION DEVICE for programmed interpretation of Indian gesture based communication into discourse in English to help the conference and additionally discourse debilitated individuals to speak with hearing individuals. It could be utilized as an interpreter for the individuals that don't comprehend gesture based communication, maintaining a strategic distance from by along these lines the intercession of the transitional individual and permit correspondence utilizing their characteristic method for talking.

The communication through signing motion pictures are obtained utilizing the inbuilt camera of the cell phone; vision investigation capacities are acted in the working framework and give discourse yield through the inbuilt sound gadget in this way limiting equipment necessities and cost. The accomplished slack time between the communication through signing and the interpretation is little a result of equal preparing. This takes into consideration practically quick acknowledgment from the hand developments to interpretation. This can remember one gave sign portrayals of letters in order and numbers .The outcomes are seen as exceptionally slowly, reproducible, with genuinely high exactness and precision.

- **KEYWORD** :- Mobile-based sign language, vision, audio, device, instantaneous recognition.

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1   Introduction

To improve the correspondence with the individuals who have hearing troubles by utilizing any gesture based communication to communicate. At the primary sight, as a thought, it is hard to make a communication via gestures converter. After itemized inquire about gesture based communication semantics, it is made sense of around 240 communications through signing exist for communicated in dialects on the planet. To show that it is so difficult to work with any communication via gestures, the general data about gesture based communications is given quickly.

Gesture based communication (SL) is the regular method for correspondence of hearing or potentially discourse impeded individuals. A sign is a development of one or two hands, went with outward appearance, which relates to a particular significance. In spite of the fact that the hard of hearing, nearly deaf and hearing endorsers can impart without issues among themselves, there is a genuine test for the hard of hearing network attempting to incorporate into instructive, social and workplaces. The general objective of this undertaking is to build up another vision based innovation for perceiving and making an interpretation of nonstop gesture based communication to content. To paper presents a versatile intelligent application program for programmed interpretation of Indian gesture based communication into discourse in English to help the consultation or potentially discourse impeded individuals to speak with hearing individuals. This communication via gestures interpreter ought to have the option to decipher letter sets (A-Z) and numbers.

Albeit outward appearances add significant data to the enthusiastic part of the sign; yet right now they are rejected from the zone of enthusiasm, since its examination muddles the effectively troublesome issue. Our framework targets tuning in to hard of hearing, which implies that it could be utilized as an interpreter among hard of hearing and individuals that don't comprehend communication through signing, maintaining a strategic distance from by along these lines the mediation of a middle of the road individual. Both hard of hearing and individuals that don't have hearing issues would impart utilizing their common method for talking.

2   Background Study

- In this Paper [1]Taner Arsan 'Pattern Matching for Automatic Sign Language Translation System utilizing LabVIEW', International Conference on Intelligent and Advanced Systems 2007 : This paper presents a programmed gesture based communication interpreter, which can decipher Malaysian communication through signing utilizing design coordinating calculation. The communication via gestures interpreter is a dream based framework where the picture of the sign is caught by a camera, prepared and converted into English by the PC. This gesture based communication interpreter can perceive letter sets (A-Z), numbers (0-9), finger spelling, words (13 words) and sentences.

- In this paper [2] Hastie & Daniel and Nasereddin 'Using Multiple Sensors for Mobile Sign Language Recognition', ETH-Swiss Federal Institute of Technology Wearable Computing Laboratory 8092 Zurich, Switzerland g@ife.ee.ethz.ch : We build upon a constrained, lab-based sign language recognition system with a goal of making it a mobile associative technology. We examine using multiple sensors for disambiguation of data to improve recognition accuracy. Our experiment compares the result of training a small gesture vocabulary using noisy vision data, accelerometer data and both data sets combined.

- In this paper [3] Gesture based communication is a visual language that is utilized by hard of hearing individuals as their first language. Not at all like acoustically passed on sound examples, gesture based communication utilizes non-verbal communication and manual correspondence to smoothly pass on the contemplations of an individual. It is accomplished by all the while joining hand shapes, direction and development of the hands, arms or body, and outward appearances.

- In this paper [4]As of late, inquire about has advanced consistently with respect to the utilization of PCs to perceive and render gesture based communication. Innovation is quickly changing and improving the manner in which the world works. Boundaries for individuals who are hard hearing are lessening as tasks of the previous two decades have unfurled. Using picture handling, computerized reasoning and example coordinating systems. These individuals discover trouble in speaking with typical individuals. Our paper examines answer for this issue and proposed a framework for interpretation of communication via gestures utilizing mic in workstations or interactive media brilliant cell phones.

3   Problem Statement

Since deaf people are usually deprived of normal communication with other people, they have to rely on an interpreter or some visual communication. Now the interpreter cannot be available always, so this project can help eliminate the dependency on the interpreter.

4   Objectives

- To provide information access and services to deaf people in Indian sign language.

- To develop a scalable project which can be extended to capture whole vocabulary of ISL through manual and non-manual signs

5   Methodology

- Audio input on a Personal Digital Assistant(PDA) using python PyAudio module.

- Conversion of audio to text using Google Speech API.

- Dependency parser for analysing grammatical structure of the sentence and establishing relationship between words.

- ISL Generator: ISL of input sentence using ISL grammar rules.

- Generation of Sign language with signing Avatar.
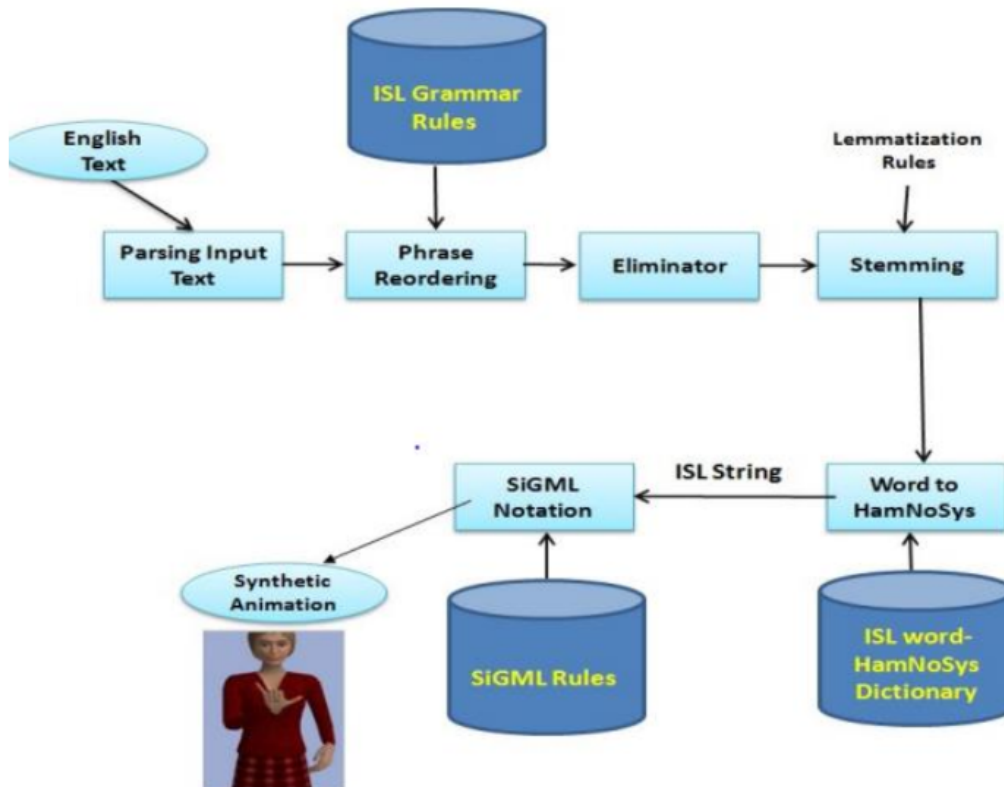
Figure 1: Workflow

5.1 Process Flow
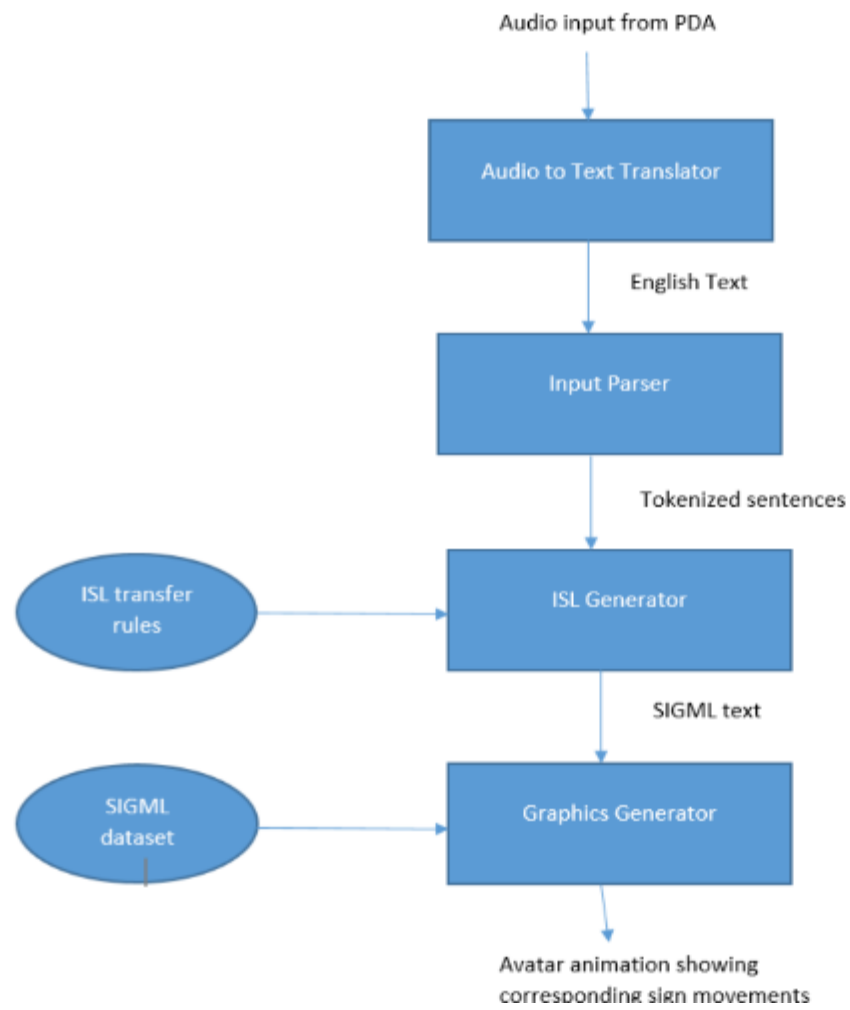
Figure 2: Process Flow

6 Implementation

6.1 Output Screen
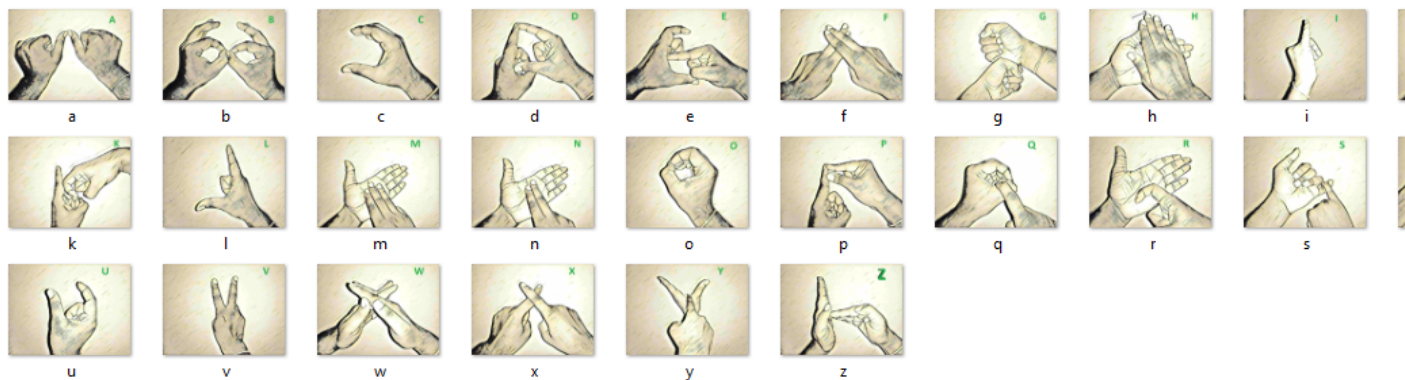
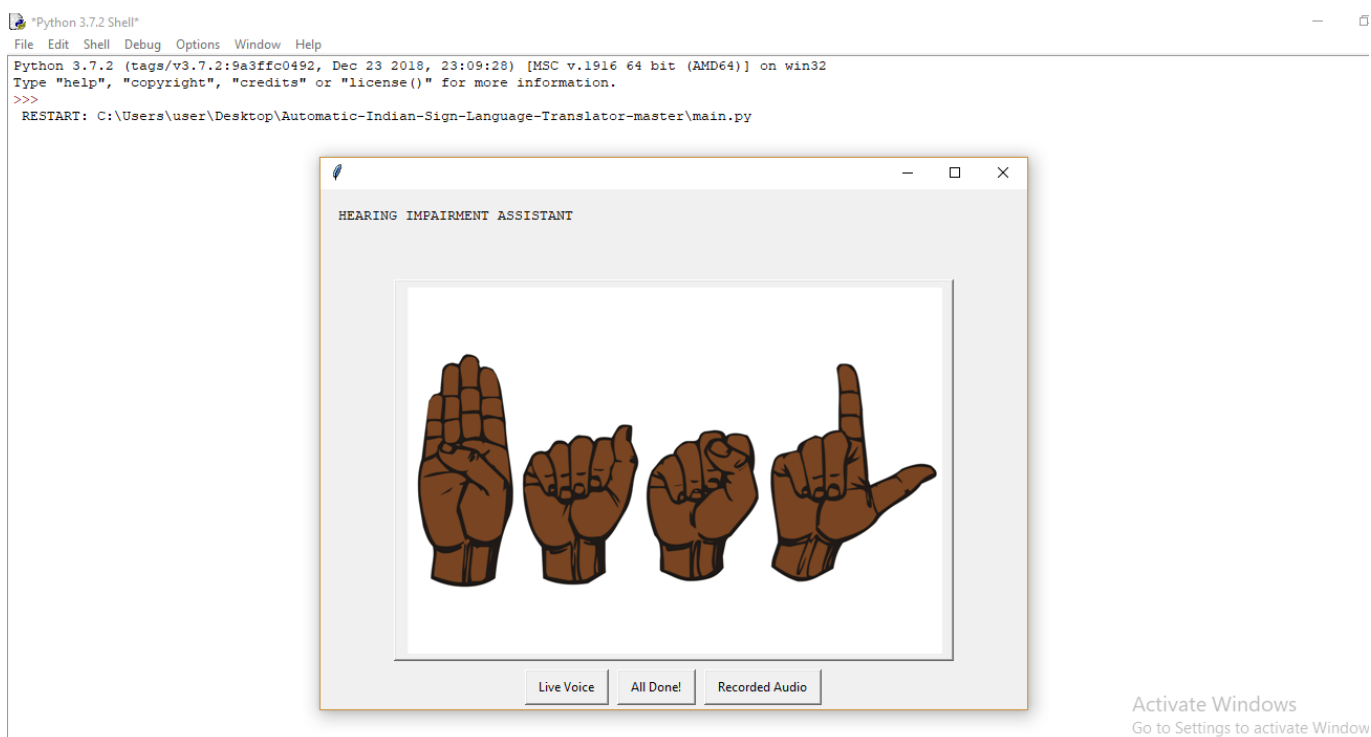Figure 3: Alphabet Representation

Figure 4: Hearing imapirment Assistant
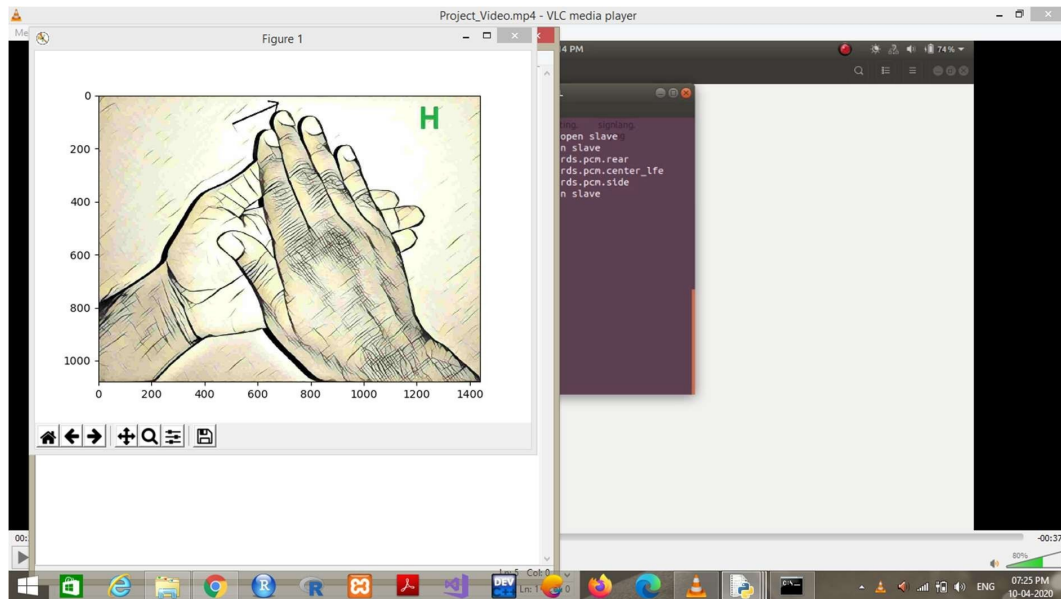
- **Suppose you Say "HELLO"**
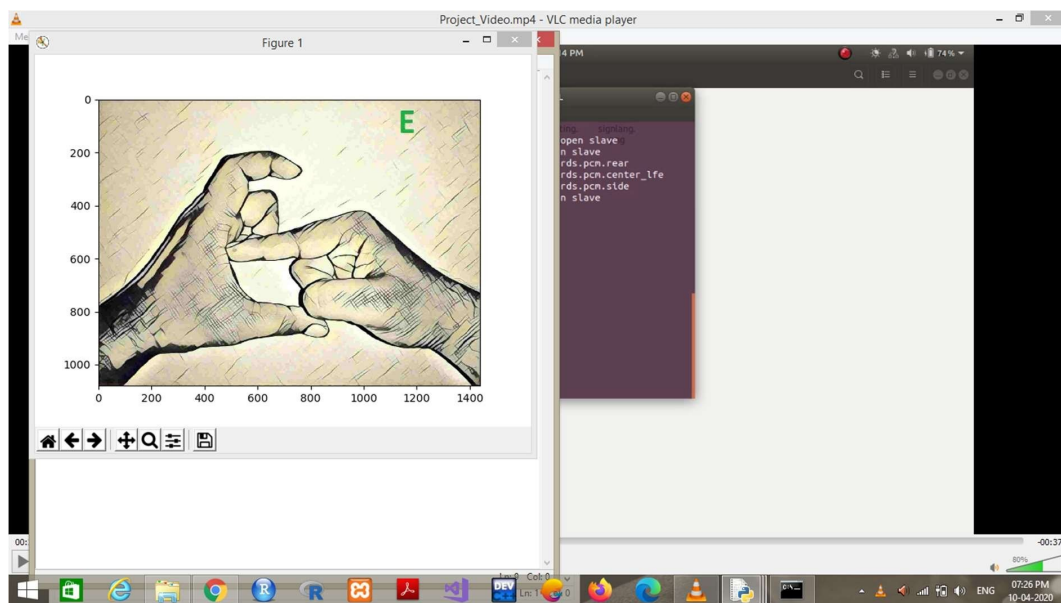

Figure 5: ISL Representation of 'H'
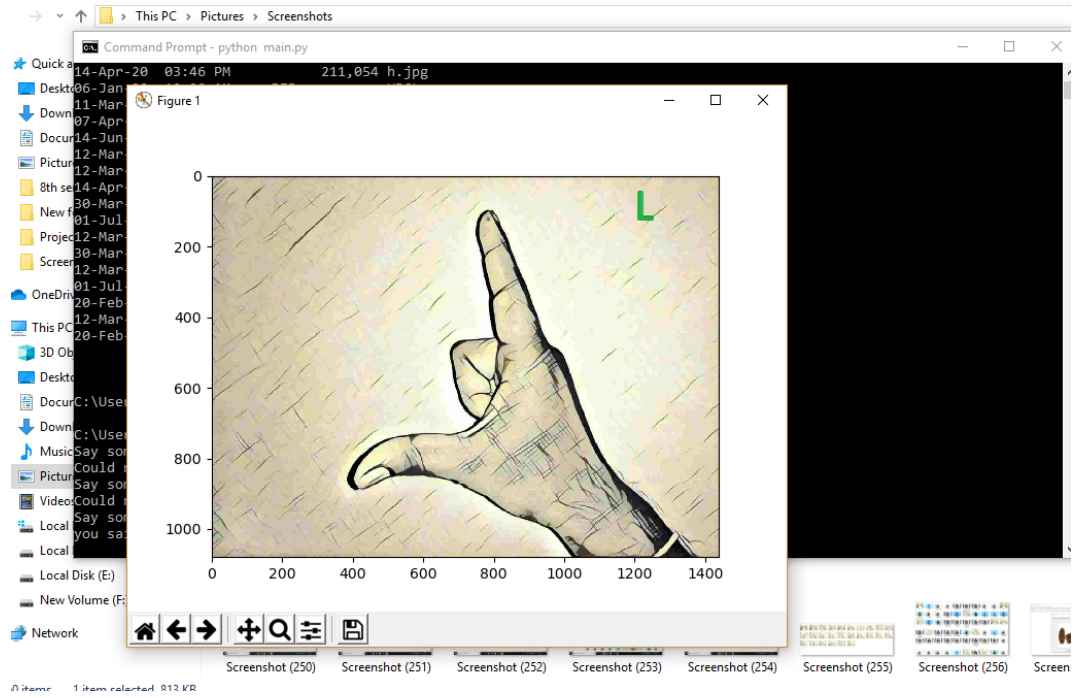

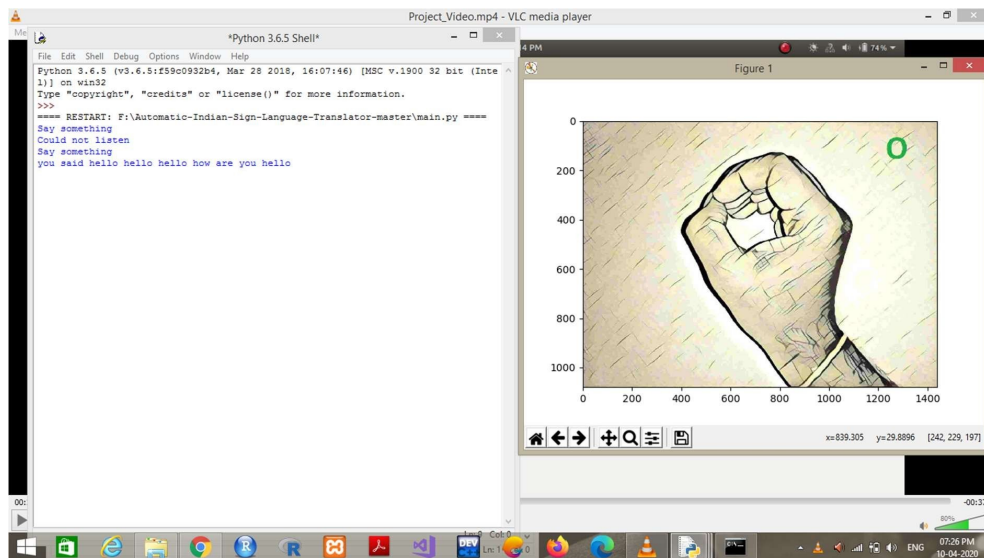Figure 6: ISL Representation of 'E'

Figure 7: ISL Representation of 'L'

Figure 8: ISL Representation of 'O'

- **Some GIF are - Good Morning**

Figure 9: Good Morning

- **Some GIF are - Stand up**

Figure 10: Stand up

- **Some GIF are - Don't Worry**

Figure 11: Don't Worry

- **Some GIF are - Let's go for Lunch**

Figure 12: Let's go for Lunch

6.2 Result Analysis

- **There are 26 Alphabet and lots of Gif videos if the representation is from below mention set then the gif video will play.**

Figure 13: Gif set

- **If not then the representation through the alphabet**

Figure 14: Through alphabet representation

- **We can add lots of gif to the set**

- **There is about 70% accuracy we get the correct result**

7   Conclusion and Future Scope

Since deaf people are usually deprived of normal communication with others, they have to depend on a translator or some visual correspondence. Presently the mediator can't be accessible continuously, so this task can help dispose of the reliance on the mediator. The framework can be stretched out to consolidate the information on outward appearances and non-verbal communication as well so that there is a finished comprehension of the unique situation and tone of the information discourse.

Right now, productive English sound to ISL gesture based communication has been proposed.. Interestingly for Indian Sign Language there is no specific syntactic principle which makes it hard for the grammar and semantic investigation as there are no standards to think about the English content with. In this manner fitting interpretation of the English content isn't plausible. In ISL, facial articulations mean negative and inquisitive sentences. In the following phase of our work, we might want to deal with non-manual segments for the sentence in general, ISL for expressions will be remembered for word reference.

References

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[2] H. Hastie, D. Mart, H. H. O. Nasereddin, S. Pramada, D. Saylee, N. Pranita, N. Samiksha, A. S. Vaidya, and K. Symeonidis, "PROJECT FINAL REPORT Public Document," vol. 3, no. 2, pp. 10–12, 2012.

[3] T. Arsan and O. Ulgen, "Sign Language Converter," *International Journal of Computer Science & Engineering Survey*, vol. 6, no. 4, pp. 39–51, 2015.

[4] F. G. Destreza, "Sign language to voice translator," no. October, pp. 4–9, 2012.

8 APPENDIX I PROJECT CODE

```
import speech_recognition as sr
import numpy as np
import matplotlib.pyplot as plt
import cv2
from easygui import *
import os
from PIL import Image, ImageTk
from itertools import count
import tkinter as tk
import string
import selecting each one
obtain the audio from the microphone
def func():
r = sr.Recognizer()
isl_gif = [' best of luck', 'any questions do you have', 'are you angry of me', 'are you busy now', 'are
you hungry now', 'are you sick now', 'be careful of the thief', 'can we meet', 'did you book your tickets',
'did you finish your homework', 'do you go to office daily', 'do you have money', 'do you want something
to eat', 'do you want tea or coffee', 'do you watch TVor not', 'dont worry', 'Rose is beautiful', 'good
afternoon', 'good evening to you', 'good morning have a nice day', 'good night', 'good question', 'Did you
had your lunch', 'happy journey', ' what is his name', 'how many people are you', 'i am a superman',
'i am bore of doing nothing', 'i am fine not always', 'i am sorry will not hapen again', 'i am thinking
of my mistake', 'i am tired of doing this work', 'i dont understand anything', 'i go to a theatre every
sunday', 'i love to shop everytime', 'i had to say something but i forgot', 'i have headache', 'i like pink
colour', 'i live in Delhi', 'lets go out for lunch', 'my mother is a homemaker', 'my name is Ankit', 'nice
to meet you', 'no smoking please', 'open the door let them come', 'please call an ambulance', 'please call
me later for the work', 'please clean the room asap', 'please give me your pen now', 'please use dustbin
dont throw garbage here and there', 'please wait for sometime', 'shall I help you if you required', 'shall
we go together tommorow everytime', 'sign language interpreter', 'sit down when i said', 'stand up when
i said', 'tc', 'there was traffic jam in the evening', 'wait I am thinking about it', 'what are you doing
nowdays', 'what is the problem can i help', 'what is todays date ', 'what is your age of your brother',
'what does your father do', 'what is your job nowdays', 'what is your brother mobile number', 'what
is your name', 'when is your interview', 'when we will go', 'where do you stay in Mumbai', 'where is
the bathroom', 'where is the police station in Bandra', 'you are wrong not always', 'address', 'agra',
'ahemdabad', 'all', 'april', 'assam', 'august', 'australia', 'badoda', 'banana', 'banaras', 'banglore', 'bihar',
'bihar', 'bridge', 'cat', 'chandigarh', 'chennai', 'Happy christmas Day', 'church', 'Is clinic open', 'coconut',
'crocodile', 'dasara', 'deaf', 'december', 'deer', 'delhi', 'dollar', 'duck', 'febuary', 'friday', 'fruits', 'glass',
'grapes', 'gujrat', 'hello', 'hindu', 'hyderabad', 'india', 'january', 'jesus', 'job', 'july', 'july', 'karnataka',
'kerala is a nice place', 'krishna', five 'litre of water', 'I love mango', 'may', 'mile', 'monday', 'mumbai',
'museum', 'muslim', 'nagpur', 'october', 'orange', 'pakistan', 'pass', 'police station', 'post office', 'pune',
'punjab', 'rajasthan', 'Jairam', 'restaurant', 'saturday', 'september', 'shop', 'sleep', 'southafrica', 'story',
'sunday', 'tamil nadu', 'Todays temperature is high', 'Lets go to temple', 'thursday', 'toilet', 'tomato',
'town', 'tuesday', 'usa', 'village', 'Your voice is so sweet', 'Today iswednesday', 'weight']
arr = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'o', 'p', 'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y', 'z']
with sr.Microphone() as source:
r.adjust_for_ambient_noise(source)
i = 0
while True:
print('Say something')
audio = r.listen(source)
recognize speech using Sphinx
try:
a = r.recognize_google(audio)
print("you said " + a.lower())
for c in string.punctuation:
a = a.replace(c, "")
if (a.lower() == 'goodbye'):
```

```python
print("oops!Time To say good bye")
break
elif (a.lower() in isl_gif):
class ImageLabel(tk.Label):
"""a label that displays images, and plays them if they are gifs"""
def load(self, im):
if isinstance(im, str):
im = Image.open(im)
self.loc = 0
self.frames = []
try:
for i in count(1):
self.frames.append(ImageTk.PhotoImage(im.copy()))
im.seek(i)
except EOFError:
pass
try:
self.delay = im.info['duration']
except:
self.delay = 100
if len(self.frames) == 1:
self.config(image=self.frames[0])
else:
self.next_frame()
def unload(self):
self.config(image=None)
self.frames = None
def next_frame(self):
if self.frames:
self.loc += 1
self.loc
self.config(image=self.frames[self.loc])
self.after(self.delay, self.next_frame)
root = tk.Tk()
lbl = ImageLabel(root)
lbl.pack()
lbl.load(r'/home/shubh/Videos/ISL_CODE/ISL/ISL_Gifs/0.gif'.format(a.lower()))
root.mainloop()
else:
for i in range(len(a)):
a[i]=a[i].lower()
if (a[i] in arr):
ImageAddress = 'letters/' + a[i] + '.jpg'
ImageItself = Image.open(ImageAddress)
ImageNumpyFormat = np.asarray(ImageItself)
plt.imshow(ImageNumpyFormat)
plt.draw()
plt.pause(0.8)
plt.close()
else:
continue
except:
print("Could not listen")
plt.close()
func()
while 1:
image = "signlang.png"
msg = "HEARING IMPAIRMENT ASSISTANT"
```

```
choices = ["Live Voice", "All Done!", "Recorded Audio"]
reply = buttonbox(msg, image=image, choices=choices)
if reply == choices[0]:
func()
if reply == choices[1]:
quit()
if reply == choices[2]:
os.system("selecting.py")
```