Gesture Image and Espeak Assistance for Deaf, Dumb and Blind

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Abstract:- Among the most precious gifts to a human is an ability to see things, listen sounds, speak and react according to the circumstances. But there are some unfortunate ones who are unable to do this. To make a single device for people with these disabilities is a hectic task. Deaf, Dumb and Blind people can have a conversation like normal person is the motive of this system. This paper proposes an innovative system architecture to provide a communication device or a software system for blind, deaf and dumb people. The system application come up with a procedure for a blind person to read a text and this can be possible by taking an image of thing through a webcam which will change the written text on the thing to a voice through Text-To-Speech (TTS) conversion. It also deliver a way for the deaf people who can read the text but can't hear it by Speech-To-Text conversion technology. By the same technique used for blind people of text to speech conversion, the system present a solution for dumb people to hear the text. The system is provided with six options and each option has a different function. By using Tesseract Optical Character Recognition engine technology we can make blind people to read any text with the help of their ears. With the use of eSpeak assistance the dumb people can speak. The deaf people can also change their fate by hearing the word through TTS.

Keywords: Tesseract OCR, Espeak, Deaf-dumb communication, Web camera.

I. INTRODUCTION

According to a report given by World Health Organization around 6.1% people of total world population have hear loss, at least 2.2 billion people have a vision impairment. The above statistics shows that, there is a large population who are deprived of normal life due to there disabilities. Living in a digital era with advancement in information and communication technology, these misfortunate people can be helped to live a better life. People can use sign language for communication with normal and these disabilities people. To improve the standards of living the life for these not fateful people the system is developed. A large communication gap exists between blind, dumb, deaf and normal people because lack of proper way of communication. Despite the large number of dumb and deaf people very less research is done in order to reduce the communication barrier. There are many individual devices invented in the recent past to make a change in the lives of these people but there is not a single device or a software application which can help to solve the communication problem between deaf, dumb and blind on a single platform.

The system proposed in this paper can help deaf, dumb and blind people to communicate with each other as well as with normal people. To resolve the difficulties faced by people who cannot speak, hear and see this system is offered. For deaf, dumb and blind people it presents a solution on a single platform.. For those people who cannot see things , the image is captured of that thing using Logitech camera and further it get converted into text using Tesseract Optical Character Recognition engine and then whatever the result we get is changed to speech with the help of espeak assistant which can be spelled out through a speaker and the text can be displayed on the screen. When any text is written by person who cannot speak on the screen, it gets converted to voice and spelled out with the use of speaker so that it can be heard by blind and normal person. Also with the help of hand gestures dumb and deaf people can communicate with people with no disabilities. By using a website speechtexter.com the deaf can communicate by converting the speech to text technology. The proposed system provides communication by converting Text and Images to Voice, Voice to Text and Gesture to Text. An Emergency option is included in order to contact the concerned person in case of any urgency. And

lastly, the software is having a quit option, which enables to directly come out of the software.

II. SOFTWARE REQUIREMENTS

A. Python3

Python is created by Guido van Rossum in the year 1991. It is a high-level language that has dynamically type variable assigned and garbage collect feature in this. It is well known as an interpreted programming language; whose interpreter is available in many operating systems. It provides so many import packages that are very helpful in functional programming. Python is easy to learn languages to the new learner and it is platform independent. Python 3 released in the year 2008 with its backward compatibility.


B.Tesseract OCR

Python Tesseract is an optical character recognition (OCR) engine for various OS. Tesseract OCR is an electronic process of extracting text from images and helps to reuse it in different ways like document editing, and searching of text without any cost, etc. OCR is a technical software that can transform documents such as scanned papers, PDF files and captured image into editable data. Tesseract OCR installation process has two parts-

(1) The engine (2) Training data.The latest stable version of tesseract OCR is 3.05.00. In this paper the captured image text is converted into text format using Tesseract OCR.

B.Open CV

It is a library of programming functions mainly aimed at real-time computer vision. It is used in diverse purpose for facial recognition, gesture recognition, object identification, mobile robotics, segmentation etc. It is a combination of OpenCV C++ API and Python language. In this project we are using OpenCV version 2 OpenCV is used to gesture control to open a camera and capture the image. It is also used in the image to text and voice conversion technique.
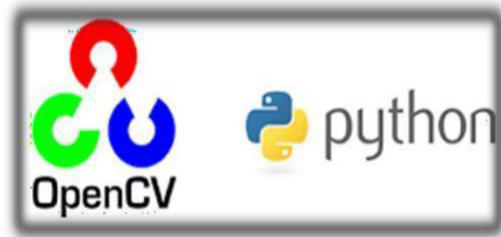

B. Espeak

It is a compact open source software for Windows and Linux platform. The software is a speech synthesizer that supports 12 languages. It is used in the conversion of text to voice. It is having the speaking speed of 180 words per minute which makes the software fast and comprehensible.

C. Speechtexter.com

Speechtexter.com is a powerful voice to text software, that is capable of providing uninterrupted recognition of speech with the use of custom dictionary (phone numbers, address, punctuation marks, etc.), that can even convert long posts, essays into text just by using our voice only**.**
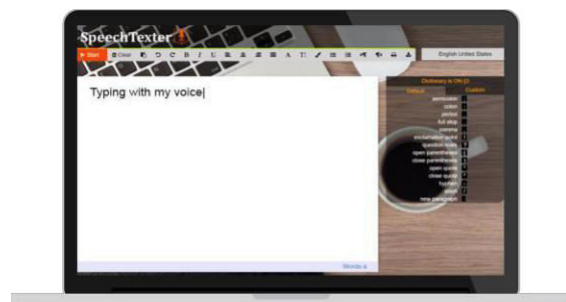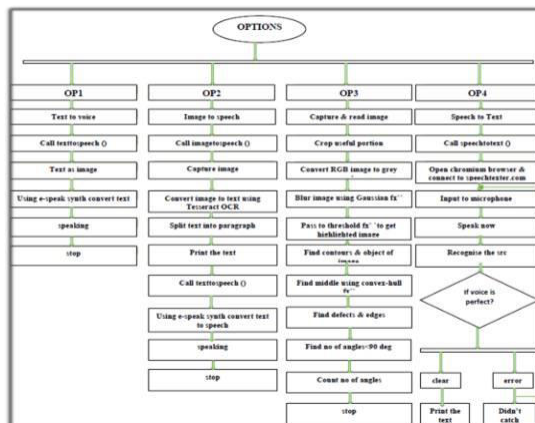

D. Twilio

Twilio is a cloud communications platform as a service (CPaaS) company. This is software that let the programmers to perform various communication functions such as make and receive phone calls, send and receive text messages through its web service APIs.

III.METHODOLOGY

FLOWCHART

The proposed system will have 6 options that will be displayed on the front page. The first option includes the text to voice module which will help the deaf/dumb person to convey the message to the blind person. The second option consists of the images to voice module which will convert the gesture image of the deaf/dumb person to voice. The third option comprises of the third module i.e., voice to text conversion that helps the blind person to communicate with the deaf/dumb person. The fourth option includes the gesture to voice conversion. The fifth option is an emergency button, which can send a message to the concerned person in case of urgency and finally the quit button which closes the software.


MODULE DESCRIPTION

Text to Voice:

After selecting the option OP1 the OS and sub process imported. Call text to speech function and enter the text as input. After entering the text from keyboard, the espeak synthesizer converts text to speech. The process also provided with the keyboard interrupt ctrl+C.


Image-to-speech:

For the people who cannot see, we used a Logitech camera through which the images will get captured with the help of Open Source Computer Vision Library tool. The image which get captured should be an image with embedded text in it. The processed image is changed to a written text displayed on the screen by the use of Tesseract Optical Character Recognition engine with result name out.txt. The text file get opened and the paragraphs will be splitted into sentences. While using Optical Character Recognition technology we must be aware that the threshold technique is used in which the image captured is transformed to binary image and further get transferred to character outlines. The espeak assistant then help further to speak the word through the speaker.
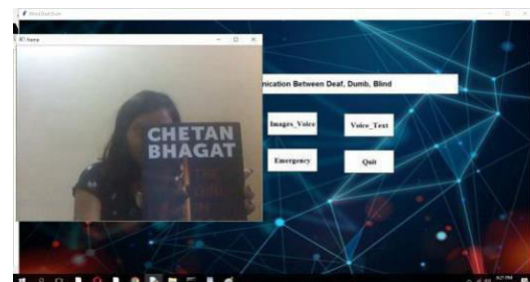

Gesture-to-speech:

The process starts with the capturing of image and crops the useful portion. Convert the RGB image into gray scale image for better functioning, Blur the cropped image through Gaussian blur function and pass it to the threshold function to get the highlighted part of the image.

Find the contours and an angle between two fingers. By using convex hull function, finger point can be implemented and counts the number of angles which is less than 90 degree which gives the number of defects. According to the number of defects, the text is printed on display and read out by the Speaker.
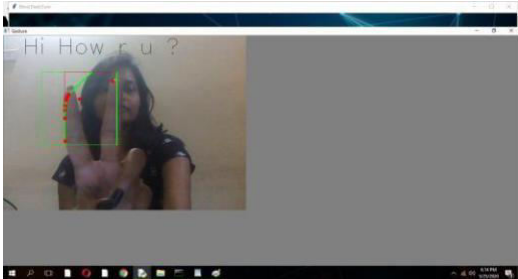
Speech-to-Text:

The system has used a chromium browser which is automatically connected to URL speechtexter.com. The process is performed by assigning a minimum threshold voltage to recognize the voice signal. The input is given through a microphone which is converted into a text format. The URL supports a variety of languages. If the voice signals recognizable it will print the text else it gives the error signal.
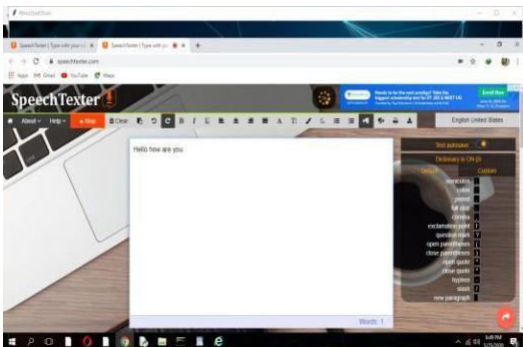
IV.CONCLUSION

This paper aims to lower the communication gap between the deaf, blind or dumb community and the normal world, to help them lead a standard lifestyle. The software is used to convert text/image to voice

for blind, speech to text conversion for deaf and conversion of hand gestures to text for dumb people. A prototype model for blind, deaf and dumb people into a single compact device has been designed. The software can be used as smart

assistant for disabled people to communicate with others

V.FUTURE WORK

A number of progress in the future that can be made related to this project work and few of them are listed below.

- Grammatical structure for sign language can also be added.
- The system can be converted to applications that can run through mobile phones.

  A product for blind people that converts the information in any hand- written notes, newspaper or books into an audio signal that these people can hear can be produced.

- The system can be further extended for the numbers, alphabets in gesture control.

- The system can be implemented for all different languages.
- The input given by user can also be in videos format and they are divided into frames and then it is converted into text.

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