

# Assistive Communication for Blind

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## Abstract

One of the foremost precious gifts to somebody's being is a capability to determine, listen, speak and respond in line with the situations. But there are some unfortunate ones who are bereft of this. Making one compact device for people with Visual, Hearing and Vocal impairment could be a tough job. Communication between deaf-dumb and normal person are always a thought-provoking chore. This paper proposes an innovative communication framework for deaf, dumb and blind people in an exceedingly single compact device. we offer a method for a visually handicapped person to read a text and it will be achieved by capturing a picture through a camera and which will be converted that text to speech (TTS). The blind people will be ready to read the words using by Tesseract OCR (Online Character Recognition), the dumb people can communicate their message through text which is able to be read out by espeak, the deaf people will be ready to hear others speech from text.

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## 1. Introduction

We live in a digital era with development in information and communication technology. To communicate between normal and deaf-dumb people sign language is used as an expressive way so as to enhance the life variety of their lives. To achieve this the proposed scheme is settled.

In the world around 285 million people are visually weakened in which 39 million are blind and 246 million have short visualization. Blind people can only read Braille script to enhance the educational process of blind people. We've got developed an innovative device for them which capture the image through a camera and convert the image not only into text but also into speech form. By using this device, a blind man can easily be ready to read the text.

About 9.1 billion people are deaf and dumb within the world. They face lots of problem in communication in existence. The deaf and dumb people aren't attached the social world due to their disabilities. Unintentionally, they're treated in an unusual manner by the remainder of the society. Language could be a communication skill that is used to convey a meaning of a speaker's thought

using gesture. It is a well-structured code gesture; each gesture contains a meaning assigned to that. The gesture could be a non-verbal communication which incorporates the movement of the hand and other body parts. The two fundamental methods for recognition are image and sensor based. Abundant study was on image-based approach due to a plus of no must wear devices such as hand gloves and helmet etc., as in in sensor-based approach. In several applications such as communicating within people, multimedia and security gesture recognition is achieving a vital role.

Normal person face problem in communication with disabled people because they cannot understand linguistic communication. There don't seem to many linguistic communication institutions in our society. So, many of dumb people use usual style of linguistic communication to speak and that they don't have a customized linguistic communication. It is also unfeasible for the masses to find out linguistic communication. Therefore, an oversized communication gap still exists between dumb, deaf and normal people.

Despite the massive number of dumb and deaf people few research is finished so as to scale back the

communication barrier. We propose a scheme which aids normal and deaf dumb people to efficiently communicate with one another. The complications of such visually and vocally disabled people can be solved using this device. For visually impaired people, the image is captured using Logitech camera which is converted into text using Tesseract OCR. Then the resulted text is converted into speech by means of espeak which is predicted out by speaker and also the text is additionally displayed. The communication between hearing impaired people with normal people is achieved when the text written by dumb is brought out by the speaker which might be comprehensible by normal people. For hearing impaired people the speech is converted into text by employing a website called [speechtexter.com](http://speechtexter.com).

In literature survey we have briefly explained about two papers where which are published on the same topic and the advantages and the disadvantages of the papers. In proposed scheme we have explained about our project work flow and overview of our methodology. In the methodology we have explained our project methodology briefly with the help of flow chart step by step. In results we have given brief explanation about our end product and the last outcome of our project. And lastly, we have given the conclusion and reference papers in the reference in the references section which we have referred for our project.

## 2. Literature Survey

In this chapter we would like to discuss about the authors who have worked on the concepts of converting the text to speech. Few of them are listed below.

The authors in [7] have discussed about designing and implementing Text to Speech converter. In this paper an application is developed which aids in the conversion of text to word using Text-to-speech (TTS) synthesizer. Then the evaluation and handling of the text is performed by means of Natural language Processing (NLP) with the aid of Digital Signal Processing knowledge. The conversion of this handled text into synthesized speech is achieved. With the aid of a modest application the text to speech synthesizer is performed. This synthesizer will get text as its input and converted into speech which could be read by the user and then finally saved as mp3 file. This TTS synthesizer has provided an immense benefit to visually impaired people creating through the vast capacity of text stress-free.

The authors in [8] have discussed on the brink of design a desktop human computer interface application that is accustomed facilitate communication between normal, and visually and hearing impaired people. The two way communication between the blind and deaf/dumb people can be achieved using SVBiComm system. Primarily the processing of video to speech and mapping the gestures of animated words with the language object. Then using TTS API the applicable audio is generated. Secondly, Speech-to-Text (STT) API is used to convert the speech told by the blind into text.

The 3D graphical scheme helps in mapping the tongue of the blind people to the database of deaf/dumb using exceptionally applicable language form. The advantage of both of those papers is NLP based implementation are high in accuracy whereas it only works for stored samples.

## 3. Proposed Scheme

In our society there are many people with disabilities. Blind persons can read documents only in Braille Script. Even though now-a-days the technology is growing rapidly, not much momentous improvements are accepted for the benefit of blind people. About nine billion people within the world are deaf and dumb. It has always been a thought-provoking task to have a successful communication between hearing impaired and normal people. Linguistic communication helps hearing impaired and dumb people to speak with others. But everyone cannot understand linguistic communication

❑ The proposed system consists of:

► **input** – camera to capture image, keyboard to type a message

► **output** – speaker and device screen to display the texts and the images.

❑ The user can give a reply as a text message and the device does TTS (text-to-speech) conversion, the output is obtained from a speaker.

❑ The image is captured through the camera and the reading of a text can be achieved by TTS conversion.

## 4. Methodology

As in our project we are converting text-to-speech or image-to -speech the whole flow of the process is show in Fig. 1.As shown in the figure we will start the process and then we will chose one function that is image-to-speech or text-to-speech. This given text or the image is taken as the input and then it will recognize the characters and then forms the sentence and then from that to paragraph. Next paragraph read with the help of text-to-speech function in this we use espeak to convert the text into speech and that will be recorded as the .mp3 file. The file will be played using mp3 player so that the blind people can here to that voice and according to that they can reply for so here made communication easy for the blind people. In the same way the text-to-speech will help for dumb. When a dumb person types his messages, the same text will be taken as the input and the same will be played after converting it into the speech, so that it will help the dumb people to convey their message easily.

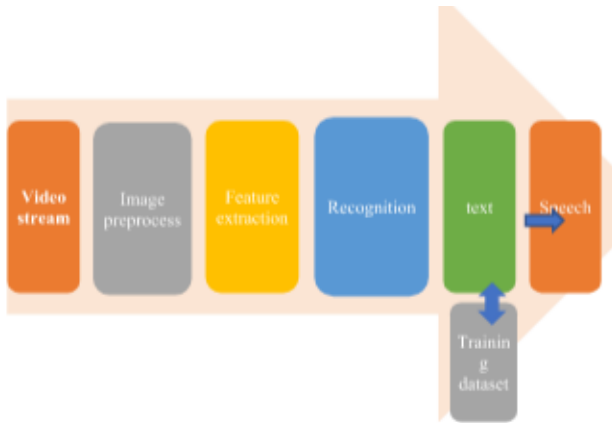


Figure 1: Block diagram to convert image to speech

When we run the program the camera will be switched on and will capture the image. Next it will remove all the unwanted things in image and crops it. Then it will recognize the characters in the image with help of training dataset. It reads them and out as .mp3 format file will be played like the speech.

### Image/Text to Speech using Camera:

- Step 1: Start
- Step 2: Choose option to convert image to speech
- Step 3: Call the function Image-to-Speech ().
- Step 4: Capture the required image.
- Step 5: Convert image to text using Tesseract OCR.
- Step 6: Split the text into paragraph.
- Step 7: Text is displayed on the screen.
- Step 8: Next, call Text-to-Speech () function.
- Step 9: Convert text to speech using e-speak synthesizer.
- Step 10: Voice is generated.
- Step 11: Stop

Fig. 2. Algorithm to convert image to speech

In this we have given the steps involved in the function which will convert image to speech.

## 5. Result Analysis

The proposed scheme is designed to assist the visually impaired people who cannot read the normal text. The interfacing of the Logitech camera to capture the image by using the OpenCV tool. The captured image is converted to text using Tesseract OCR and save the text to exit. Open the document and divide the paragraph into sentences and reserve it. In OCR, using the adaptive techniques convert the image into binary images and that they are transferred to character outlines. The converted text is read out by the espeak. For visually impaired people, the image is captured using the Logitech camera which is able to be the input for the program as shown in Fig.3. It will extract text from image and recognize them and it'll be displayed on the screen which is converted into text using Tesseract OCR. Then the resulted text is converted into speech using espeak, which is spelled out by speaker and therefore the text is additionally displayed. After the preprocessing and recognizing the

characters, the output obtained will be read out with the assistance of the speakers as shown in Fig.4. When the dumb people communicating with normal people, the text written by dumb is spelled out by the speaker which might be understandable by normal people.

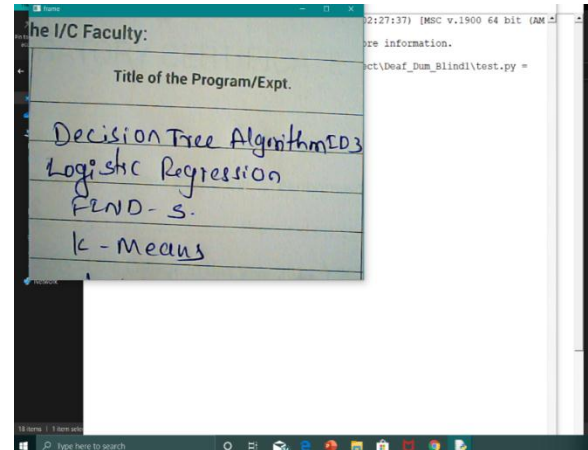


Figure 2: Capturing image by Logitech camera.

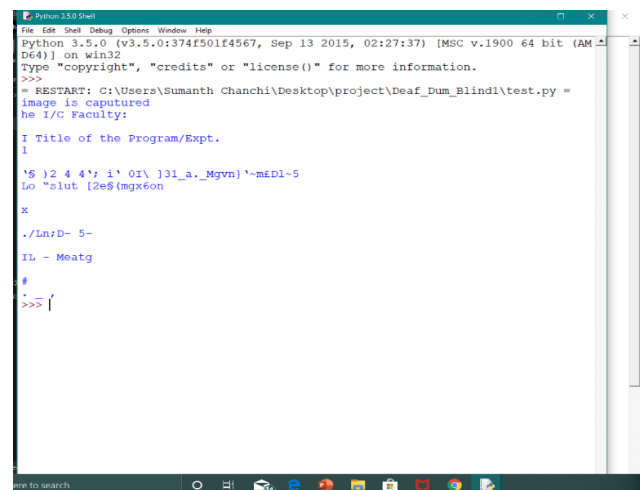


Figure 3: Recognition of text and displaying

## 6. Conclusion

We have proposed a motion based scheme to identify the objects of interest for visually impaired people wherein the user simply shows the object for a couple of seconds to the camera. To extract text regions from complex backgrounds, we have used Tesseract OCR to recognize the text and send output to espeak. Then the output of Tesseract OCR will convert text to voice with help of espeak which will produce the output in mp3 format which is finally played for blind people. Our future work will extend to process text strings with special characters and to get the proper pronunciation of that character.

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