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COMMUNICATION SYSTEM FOR BLIND, DEAF AND DUMB PEOPLE USING INTERNET OF THINGS

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Abstract - ***Addressing the issues of people who are blind, deaf and dumb within a single system is a tough job. Nowadays researches concentrate only on one of the above issues but not the combination of all. The proposed system concentrates on addressing the different technique that solves the blind people problems by capturing the image then that image will be converted to text as well as speech. It solves the problem of a deaf person by converting speech to text. And also for dumb people, the system supports by converting gestures to text as well as speech. All these problems can be solved by using single system.***

***Key Words*: blind, deaf, dumb, issues, guestures, image, text speech**

1. INTRODUCTION

Communication is the best medium by way of which we can proportion our mind or carry the message but for a person with disability (blind, deaf and dumb) faces issue in verbal exchange with normal individual. The blind, deaf and dumb people aren't concerned with the social world due to their disabilities. Unintentionally, they may be handled in an uncommon way through the rest of the society. Nevertheless of the massive number of blind, dumb and deaf people very much less study is done so to reduce the communication barrier. Sign language is a communication skill this is used to convey a meaning of a speaker's thought the use of gesture. It is a effectively-structured code gesture, each gesture has a meaning assigned to it. The gesture is a non-verbal communication which includes the motion of the hand. Primarily, there may be two main sign language recognition method namely, picture- based and sensor based. The proposed system facilitates blind, deaf and dumb people to effectively share their thoughts with each other. Solution is provided for blind deaf and dumb people with the aid of the usage of the system. For blind people, the image is captured using Logitech digital camera that's converted into text by using Tesseract OCR and the resulted text is transformed into speech using espeak which is spelled out through speaker and the textual content is likewise displayed. Dumb people can use hand gesture to communicate with normal people. For deaf people the speech is transformed into textual content by means of the usage of a internet site known as speechtexter.com

1.1 Objective

- The main goal of this paper is to offer a standard lifestyle for deaf dumb and blind peoples as normal ones.
- Through this the visually impaired people can able to recognize the phrases without difficulty.
- The vocally impaired humans can communicate their message through text and gestures.
- The deaf people can able to understand others speech from the text that is displayed. This helps them to experience the independent life.

2. ARCHITECTURE

System architecture is a conceptual model that defines the structure, behavior, and extra perspectives of a system. An architecture description is a formal description and representation of a system, prepared in a way that helps reasoning approximately the systems and behaviors of the system.

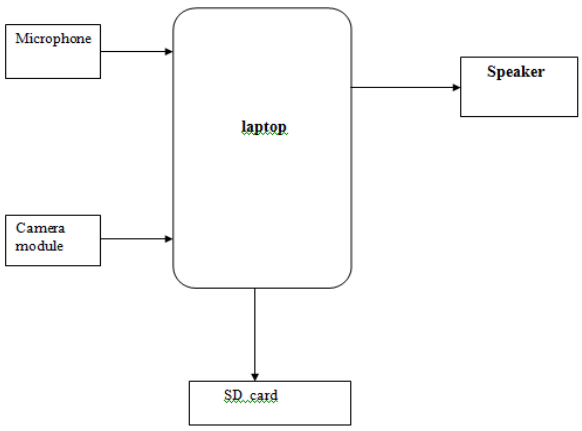

Fig -1: System Architecture

This system architecture consists of

- Logitech camera
- Speaker
- Microphone
- S D card

Logitech camera

It is a plug and play setup which is simple to apply. This can easily make video calls on predominant IMs. It has a 25MP camera with high resolution. It has built in mikes with proper sounds offers you a better communique with none noise. We are using a Logitech camera which is capturing the image and gesture control function.

Speakers

Speakers are one of the maximum commonplace output tool used with pc systems. Irrespective of their design the purpose of speaker is to provide audio output that can be heard by way of the listener. Audio system is transducer that converts electromagnetic waves into sound waves.

Microphone

A microphone is a device that captures audio by means of changing sound waves into an electrical alert .The signal can be amplified as analog indicators or may be converted to a digital signal, which may be processed by means of a computer or other digital audio device

3. IMPLEMENTATION

Implementation is nothing but executing one's own plan, idea, model, design, specification, application, standard, algorithm, or policy. Another way of defining, an implementation is analysation of a technical and procedure or algorithm as a program, software devices, or other computer system through programming and deployment. for a given standard and specification many implementation may exist and a user can choose the desired one.

There are many different ways of implementing the project; the designed model is chosen Python because python is a widely and nowadays it is the most commonly used high-level, general-purpose, interpreted, dynamic programming language. This language facilitates the user to understandability and readability of code in a easier manner. Compared to other programming languages like C++ or JAVA, python syntax allows user to write code flexible in fewer lines. The language intension is to enable user to construct a clear programs on both small and large scale. multiple programming paradigms, including object-oriented, imperative and functional programming or procedural concepts is provided in python. It enables a dynamic type system and automatic memory management and has a huge and systematic standard library. Python interpreters are flexible so that installation on many operating systems and execute the Python code on a wide variety of systems. With the help of third-party tools, such as Py2exe or Pyinstaller, Python code can be packaged python code can be made into stand-alone executable programs for some of the most widely used popular operating systems, without using any installation of a Python interpreter for the downloading any of the python softwares.

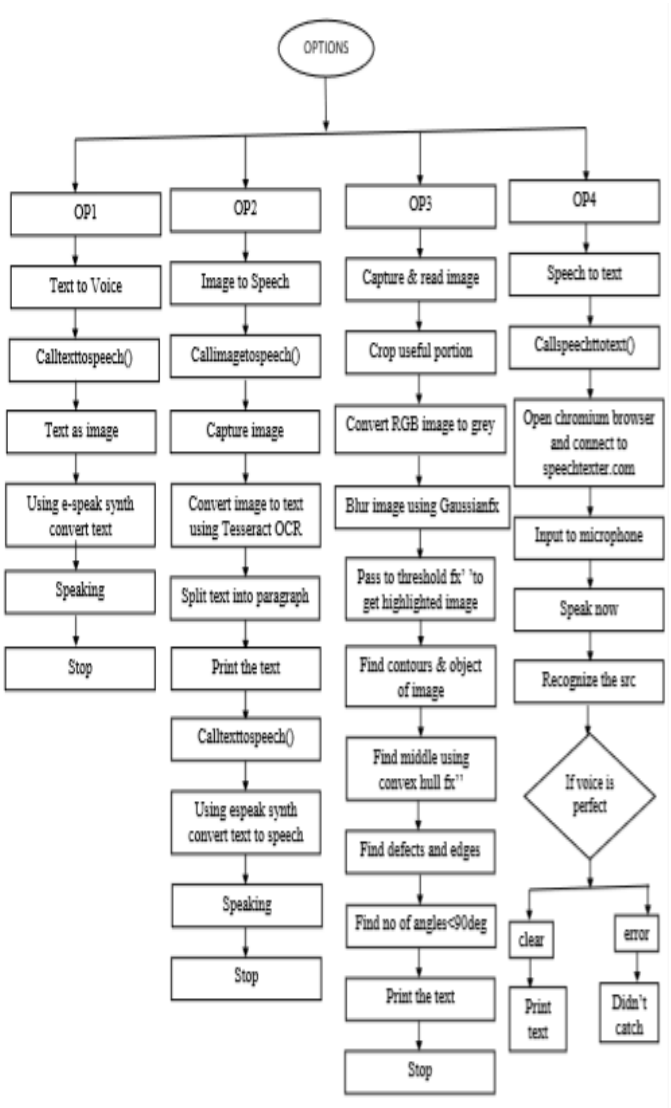

Fig- 2:Flow Chart

4. RESULTS AND DISCUSSION

The Paper is divided into 4 different modules:

- Text-to-Speech
- Image-to-Speech
- Gesture-to-Speech
- Speech-Text

4.1 Text to speech : -

Conversion of Text to speech is done for the dumb people who are not able to share their thoughts. The people who are not able to speak convert their thoughts to text as well as speech. The converted voice message is spoken out by espeak synthesizer. the operating system and sub process will be imported after selecting the option1. text to speech function will be called and input the text. After receiving the text from keyboard, the espeak synthesizer transform the textual content to voice. Refer Figure 2.

4.2 Image to speech : -

The image to speech conversion is developed for people who are not able to see and cannot analyse text. To aid blind persons, we have associated the Logitech digicam to record the image using OpenCV software. The recorded image is transformed to text with help of Tesseract OCR and In Tesseract OCR, the modifiable thresholding approaches are used to convert the image into binary forms and the result will be in character outlines. The espeak synthesizer checks the converted text.

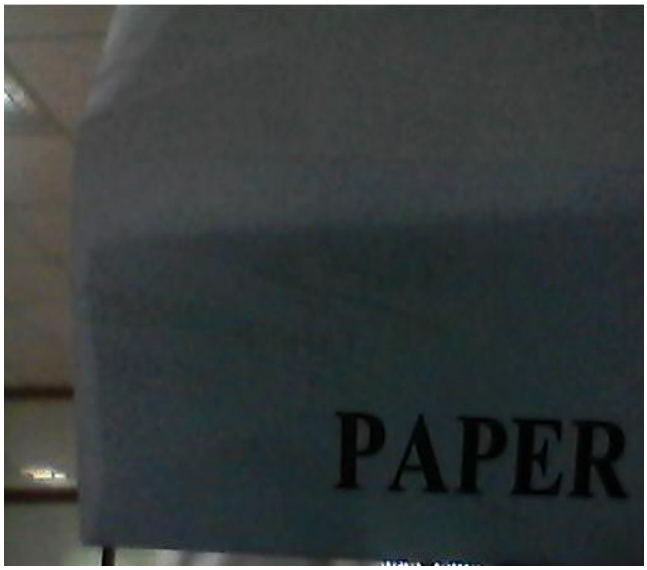

Fig-2: Image to speech

4.3. Gesture to speech: -

To help the deaf people those who cannot communicate their thoughts with normal ones, This Gesture to speech strategy is developed. The gestures used by Dumb people to talk is difficult to understand by normal people. Initially, it records the image and preferred portion is considered. for finer performance the RGB image will be converted into gray scale image. using Gaussian blur algorithm unfocus the cropped picture and highlight the focused portion of image .identify the outline and angle between two fingers. with the help of convex hull feature, finger point is implemented .Calculate the number of angles which is less than 90 degree that results number of faults. The text is printed on the display neglecting the number of faults and read out through speaker.

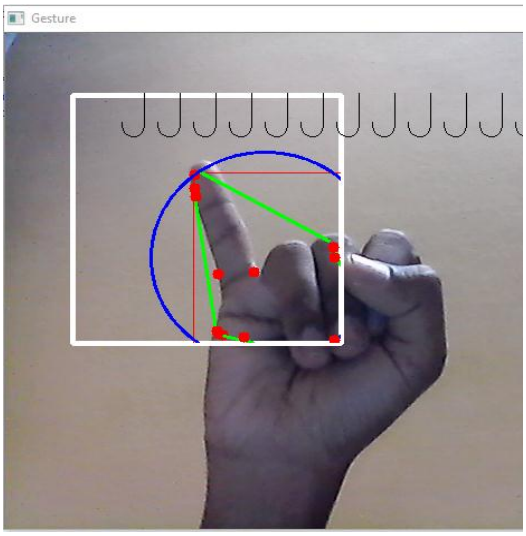

Fig-3: Gesture to speech

4.4. Speech to text: -

The speech to text procedure is provided to people who are unable to understand the thoughts of normal people which is conveyed through speech. To convert the voice of normal people to text which can be understood by deaf people in their local language? An URL speechtexter.com link is used in web browser which automatically converts the voice to speech. through a microphone that is converted into a text format . The variety of local languages is supported by the given URL. If the voice signal is recognised correctly without any noise then it is printed as the text content on the display else, it gives the error signal . The printed text can also subjected to modification such as changing font colour ,size and can be downloaded if necessary.

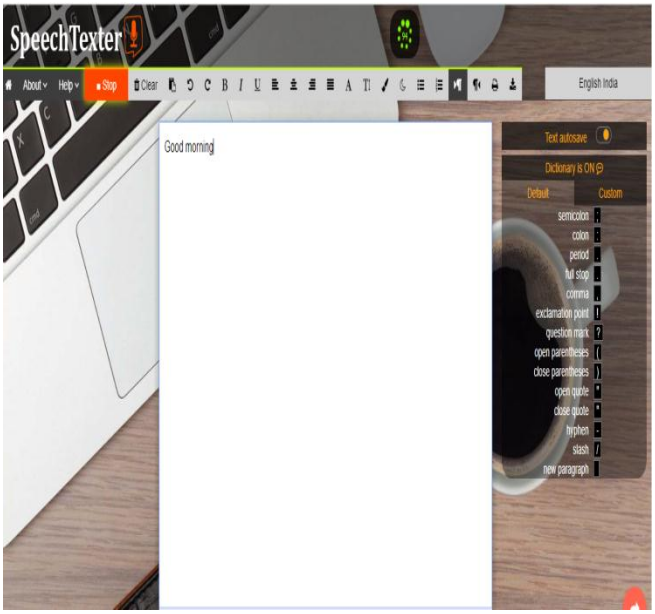

Fig-4: Speech to text

4. CONCLUSION

This paper aims to minimize the communication bridge between the deaf, dumb and blind community and the normal world, help them to lead preferred lifestyle. The device is used to convert text/image to voice for blind, speech to textual content conversion for deaf and conversion of hand gestures to text for dumb people. A typical and simple model for blind, deaf and dumb people into a single compact device. The advantage of this device is that it can be easily carried (transportable) because of its less weight and size. The device can be used as smart assistant for specially abled people to communicate with others and it is a language independent system.

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