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Assistive System for Blind, Deaf and Dumb Peoples

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ABSTRACT:

Focusing and addressing the troubles faced through the specialized people, such as visually, audibly and vocally challenged, through a single system is a challenging job. A lot of lookups has been executed on every hassle and solutions have been proposed separately. But no longer are all of them addressed together. The aim of the mission is to create a single solution in such a way that is simple, fast, correct and cost-effective. The essential motive of the project is to make the specialized people, sense unbiased confident through seeing, hearing and speaking for them. The system paper based resource for the blind, deaf and dumb people. The proposed device enables visually challenged human beings to study by way of taking an image. Further, Image to textual content conversion and speech synthesis is done, changing it into an audio layout that reads out the extracted textual content translating documents, books and different handy materials in daily life. For the audibly challenged, speech taken in by means of the microphone and recorded audio is then transformed into text which is displayed in the structure of a pop-up window for the user in the screen of the device. The vocally impaired are aided by taking the input through the user as textual content through the built-in personalized on-screen keyboard where the textual content is identified, text into speech conversion is carried out, and the speaker gives the speech output. And additionally for the blind human beings object detection helps in figuring out the objects that are present in their way and also color detection is used by segmenting and extracting the RGB colors to identify the traffic color. Twilio is used to ship an emergency message with actual time location for guardians of specialized people. This is all need to be implemented to assist them.

Keywords: Image to textual convertor, Speech to text, Object detection, Color detection, Segmentation, Twilio.

INTRODUCTION:

The challenge of visible impairment and schooling has evolving methods on how a blind student must be treated. Louis Braille quoted as, Access to verbal exchange in the widest feel is got entry to knowledge, and that is vitally essential for us, if we are not to go on being despised or patronized by way of sighted people. We do not need pity, nor do we want to be reminded that we are vulnerable. We have to be handled as equal, and conversation is the way this can be delivered about.

There are about 12.3 million people in India with reasonable to complete listening to loss. There are 478 colleges receiving authorities funding and about 372 non-public colleges for the deaf scattered in the course of India. Science and Technology have made Human lifestyles addictive to comfort, but nonetheless there exists an underprivileged crew of people who are conflict for discovering a revolutionary way that can make the manner of verbal exchange less complicated

for them. Conversations between a person who lacks the ability to discuss and hear with a regular character have usually been a challenging venture. There is a system which objectives to solve the trouble of person with hearing and speech impairment called a deaf-mute conversation interpreter system. The glove is outfitted with 5 flex sensors, tactile sensors and accelerometer attached internally. For each particular gesture, the flex sensor creates a proportional variation in resistance and the accelerometer measures the orientation of the hand. The processing of these hand gestures is achieved in Arduino. The glove consists of two modes of operation – a training mode and an operational mode. The chain of letters to structure phrases is additionally performed in Arduino. In addition, the gadget additionally consists of a textual content to speech conversion (TTS) block which interprets the matched gestures i.e. text to voice output. There are devices referred to as Braille's that permit to compose a message for a blind individual to read. Sometimes these can be very expensive. Companies are even creating Braille technological know-how for clever phones. However, these devices are not able to eliminate the complete disability of an individual as this may additionally help the regular man or woman to understand them, however if the everyday man or woman wishes to communicate lower back he must be aware of the above language. Hence, these gadgets will furnish only one way communication. The present gadgets will not be beneficial in the case if the receiver is blind, deaf and dumb.

EXISTING SYSTEM:

In the previously days, blind people can solely read Braille script. Braille is a tactile writing gadget used by way of human beings who1are blind people. It is habitually written with embossed paper. Now a days Braille user can read computer screens and different electronics assist using refreshable braille displays. Traditionally, gesture awareness approach was once divided into two classes, particularly imaginative and prescient based and sensor primarily based method. In vision based totally method, the laptop digital camera is an input gadget for varies gestures of arms and figures. In sensor based systems, gloves are used to achieve the correct positions of hand gesture. Lots of studies have been finished on sensor-based strategies like gloves, helmets etc. But sporting it always is not possible. Therefore, in addition work is focused on image-based approaches. The paper "intelligent sign language recognition the usage of photo processing" offers with the computer device in which sign language is captured and processed and translated to audio format. For deaf humans' speech is analyzed and transformed to sign language on screen. The sign languages can be understood through gadgets such as signal language translator and electronics gloves.

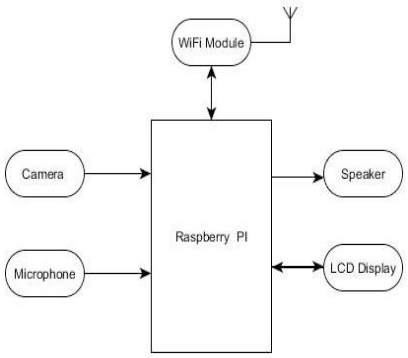

Figure of existing system flow diagram.

Disadvantages of Existing System:

- There is sensor worried in detection of objects.
- There is no Machine Learning digital primarily based object detection.
- Separate equipment is used for each problem.
- Braille in software program is nevertheless not available. Communication in Braille is so difficult due to the fact it stores solely few letters.

- Transportation of hardware elements is so risky.
- There is no coloration detections are used.

RELATED WORKS:

Development of user centered interfaces and technologies have become crucial in the process of designing for the differently abled people. Adding an extra element is just not enough to assist the use of technology for the visually disabled [5-7]. Many device-based hardware and software technologies exist to assist the visually disabled. They have functions like reading printed or written text, expanding characters on Braille systems and machines based on computer vision [3]. Prototypes that works with cell phone, cameras, help in processing images to identify patterns of movement, are applied for musicians who are blind [8,9].

Audio MUD [4] is a multiuser virtual environment exclusively designed for the blind people and is associated with spoken cues. The original MUDs (Multi User Dimension) are generally text based and do not contain any sort of graphical interfaces. Users generally use MUD (Multi User Dimension) style games to perform a set of actions in a virtual environment with a navigable space in the presence of direction, orientation and restrictions. There is high potential for the description of spaces and interactions due to its possible types of interaction and text based interface between players and virtual environment in AudioMUD with collaborative aspects. Their project mainly focused on the development of a client and server from scratch where the state of the world and it is stored in the server in such a way that when the server connects to the client, the state of the virtual game is received and players can enter or exit when they need. The game starts when the blind user enters the IP name and server in the client, the player comes inside the respiratory system in a random location with attributes and can explore the system. L. Gonzalez etal. [2] suggest a system for the visually disabled to enhance the quality of their life. The wearable system consists of facial recognition to recognize people's faces and can identify a person through prior system training using fisher faces algorithm, obstacles detection where the user wears the device which uses ultrasonic sensors to generate vibration signals that indicate an obstacle, email reader which accesses the user's email using POP3 protocol and enables the user to listen to the email using headphones, medication reminder used to remind about the medication prescribed, MP3 player as a source of entertainment enabling the user to listen to music. Anusha Bhagavan et al. [3] suggest a system using Raspberry Pi that uses image acquisition using interfacing a webcam, the region of interest will be obtained after processing the image, template identification to detect characters and objects, converting image to text using OCR algorithm which scans image and gives a corresponding output text , and save the text data in a text file, and convert text to speech using E-speak for the blind user to hear the given input text format.

Sign language, which principally uses manual communication including hand movements, facial expressions to express, connects with people and convey their messages. Lorenzo Monti et al [10] come up with a wearing device for the deaf-blind called Glove Pi to identify the person, number and position of people, and their facial expressions. It mainly consists of a gardener glove which is attached to a capacitive touch sensor with Raspberry Pi using a I2C interface. Using many to much architecture in order to include maximum amount of users into an account, the Glove enables the user to register on the server usually by sending an HTTP request and eventually the it is added on the server after which the server sends a updated list of all the connected users and.

Amro Mukhtar Hussain et al [12] has designed a Mouth gesture recognition system using the help of an infrared sensor that collects the data from the audibly impaired person's mouth and detects the state of the mouth. They have designed three states: OSCS (Open Slow Close Slow), OSCF (Open Slow Close Fast) and OFCS (Open Fast Close Slow). When the sensor reaches its threshold, the sensor indicates and records the signal. Using different combinations, 27 patterns have been achieved which generated 26 alphabetic letters. The output of this proposed system depends on the light reflected from the object that the sensor subjected on, where the intensity supposedly gets affected by the surface color, shape and distance, after which the circuit gets the appropriate output analog voltage range.

Systems that suffice all solutions for the blind, deaf and dumb users in one compact device are rare to find. Kumar.K et al [1] have introduced an arrangement for the visually impaired can understand words using Tesseract which is an OCR (Optical Character Recognition) algorithm by python, vocally impaired can express and communicate by text which is read through E-speak, and audibly impaired can hear by speech to text conversion using Open CV. Rohit Rastogi etal. [11] have put up an ideology that consists of a Sharon bridge, which is a wearable technology that makes communication between differently abled on the extent to their capability. The Sharon Bridge comprises small units to form a complete circuit to enable them to convey messages among the differently abled and their different combinations.

It comprises a sensor glove that is made up of Arduino circuit board, tactile and flex sensors, and accelerometer which is used to convert the American sign language to audio that is further changed to text which is displayed on the LCD(Liquid Crystal Display) for the user, Arduino GSM(Global System for Mobile communications) shield to communicate over long distances using the internet and GPRS(General Packet Radio Service) wireless network, Beagle bone that converts analog to digital and vice versa. It works in a way where the message to be sent is the input as text, audio or braille language which is converted to the respective forms for the disabled to hear, speak or see. For long distances, the input in converted and sent through wireless GSM network to the receiver, but the user is supposed to possess a phone number. Sharon Bridge works for all combinations of the blind, deaf and dumb

PROPOSED SYSTEM:

The intention is for creating the prototype model for blind, dumb and deaf human beings with the aid of employing in a single compact device. The machine presents a unique answer for these human beings to manage their websites with the aid of themselves. The gadget is created with the source code of Python. It is the easiest programming language to interface with the Laptop Application. The system is run with the aid of the source code of Python to help blind dumb and deaf humans in a single gadget which is so compact and easy for them to manage. The system is supplied with 7 Applications, each of the functions has unique functions. We have to select the switch for fundamental conversion.

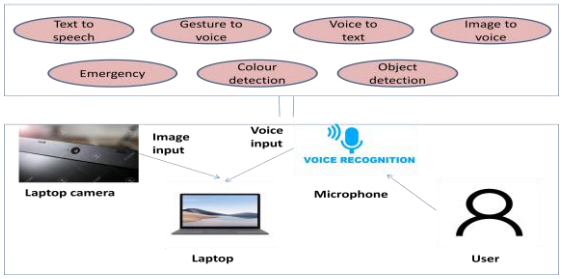

Figure shows the proposed system architecture

Advantages of the Proposed System:

- All-in-one device, where the deaf, dumb and blind can overcome their disabilities and can categorical their views to others.
- Voice to text Conversion for Deaf People.
- Image to Voice Conversion for Blind people.
- Sign to text and textual content to voice conversion for dumb humans speaking to normal person.
- It is a transportable device with a very low cost.
- Color detection is used for blind to pass the road.
- Objection cognizance is used and detection will be accomplished speak via speak and text.
- In case of any emergency impaired peoples can press the button which sends emergency message for mission members.

METHODOLOGY:

Methods used for the proposed system based on machine learning they are:

1. Tesseract OCR:

Figure shows the tesseract ocr

Python Tesseract is an optical character recognition (OCR) engine for a number of OS. Tesseract OCR is the method of electronically extracting text from photographs and reusing it in a variety of ways such as document editing, free-text searches. OCR is a technological know-how that is successful converting files such as scanned papers, PDF archives and captured photo into editable data. Tesseract can be used for Linux, Windows and macOS. It can be used by programmers to extract typed, printed textual content from pictures using an API. Tesseract can use GUI from accessible third birthday party page.

The installation manner of tesseract OCR is an aggregate of two parts-The engine and training information for a language. The trendy secure model of tesseract OCR is 3.05.00. In our mission, Tesseract is used to convert the captured image textual content into textual content format.

2. OpenCV:

Figure shows logo of OpenCV and python

It is a library of programming1functions by and large aimed at real-time1computer vision. It is developed through Intel lookup middle and due to this fact supported by1Willow Garage and now maintained via it seez. It is written in C++ and its principal interface is also in C++. Its binding is in Python, Java, and Mat lab. OpenCV runs on a variety of platform i.e. Windows, Linux, and MacOS, open BSD in computer and Android, IOS and Blackberry in mobile. It is used in diverse reason for facial recognition, gesture recognition, object identification, cell robotics, segmentation etc. It is a aggregate of OpenCV C++ API and Python language. In our assignment we are using OpenCV version 2 OpenCV is used to gesture control to open a camera and capture the image. It

is additionally used in the image to text and voice conversion technique.

3. Espeak:

Figure shows the Espeak

It is compact open supply software program speech synthesizer for English and other languages for Linux and Windows platform. It is used to convert textual content to voice.

It helps many languages in a small size. It helps SSML. It can be modified by means of voice variant.

These are text documents which can change1characteristics such as pitch range, add effects1such as echo, whisper and croaky voice, or make systematic adjustments to formant frequencies to trade the sound of the voice.

The default for talking pace of one hundred eighty words per minute is too fast to be intelligible. In our undertaking Espeak is used to convert the textual content to voice signal.

4. Twilio:

Figure shows Twilio logo

Twilio was centered in 2008 through Jeff Lawson, Evan Cooke, and John Wolthuis and was once at the beginning based in both Seattle, Washington, and San Francisco, California.

On November 20, 2008, the business enterprise launched Twilio Voice, an API to make and obtain telephone calls definitely hosted in the cloud. Twilio's text messaging API was once launched in February 2010, and SMS shortcodes had been launched in public beta in July 2011.

Twilio (/ˈtwɪlioʊ/) is an American organisation based in San Francisco, California, which provides programmable verbal exchange tools for making and receiving phone calls, sending and receiving text messages, and performing other communication functions the use of its web service APIs.

CONCLUSION:

This mission aims to decrease the verbal exchange gap between the deaf or mute neighborhood and the normal world, assist them to lead fashionable lifestyle. The device is used to convert text/image to voice for blind, speech to text conversion for deaf and conversion of hand gestures to text (Kannada words) for dumb people. We have designed the prototype model for blind, deaf and dumb humans into a single compact device. The advantage of this system is that it can be without difficulty carried (portable) due to its much less weight and size. The device can be used as a clever assistant for differently specialized people to communicate with others, and it is a language unbiased system.

FUTURE ENHANCEMENT:

There can be a number of future developments that can be associated with this undertaking work and some of which are described as follows:

- The machine can be further expanded for the alphabets, numbers in gesture control.
- We can give the input as videos, and they are segmented into frames and later converted into text forms.

- We can additionally add grammatical structure for signal language.
- The machine can be made on hand by using incorporating it into a mobile phone.
- We can produce a product for blind people that converts the data in any handwritten notes, newspaper or books into an audio signal that these humans can here.
- System can be greater environment friendly for all languages.

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