Smart Assistance for Blind

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Abstract— The principal medium for human communication is speech and writing. To access the information in a text a person needs vision. Those with poor vision, however, can collect information from speech. High performance and portable digital imaging technologies have created a huge opportunity for blind or visually disabled people and the growing availability of cost savings to replace conventional scanning for document image acquisition. This project proposes a camera-based text-based assistive reading to assist visually impaired people in reading the text present on the image taken. The faces can also be detected when the mode control inputs a person into the frame. The proposed concept involves extracting text from scanned image using Tesseract Optical Character Recognition (OCR) and translating the text through e-Speak method into speech, a process that lets people with visual impairments interpret the text. This is a project for blind people to identify real world goods by extracting the text on the image and translating it into expression. Imaginative and prescient, by GOD, is a beautiful gift to humanity. Imaginative and prescient let people experience and comprehend the global environment. Blind human beings struggle too hard to keep their wretched lives until date. A simple, cheap, friendly consumer, virtual eye is designed and implemented within the work provided to enhance the mobility of every blind and visually impaired human in a particular region. The paintings given consist of a portable gadget with head hat, mini hand stick and foot shoes to help the blind person move effectively and to prevent any persistent or mobile limitations that may be encountered.

Keywords: Internet of things, Raspberry Pi. Arduino, Microcontroller, OCR

I. INTRODUCTION

In order to develop the ability of blind or visually impaired people to be able to independently access, understand, and explore indoor and outdoor environments, the purpose of a new single-camera system is to detect and receive signals, text and audio-rendering issues such as issue. Extracting and knowing text details associated with the material found. The first circuits have been removed from the multi-colored home signs.

Text character processing and text string analysis are used to filter background distortions. Object type, position, and location can be shown as a speech for blind travelers. In order to discriminate similar objects in the interior, the text details associated with the objects are extracted.

Optical Character Recognition (OCR) is a process that converts scanning or printed images, handwritten text into editable text for further processing

Speech design is an integral combination of human speech. Tex-To-Speech (TTS) synthesizer is a computer-based program that should be able to read any text aloud, whether it is presented directly to the computer by an operator or scanner and installed on the Optical Character Recognition (OCR) system. Device testing was performed on the raspberry pi platform. The Raspberry Pi is a basic and low-cost single board computer used to reduce the complexity of real-time applications and the second module uses an embedded five-way ultrasonic sensing and five-way ultrasonic sensors and collectively delivers all light alerts for Arduino encoding Microcontroller. He can only put on a shoe, mini handbag (pen size) and footwear similar to others fit in real-time packaging.

II. EXISTING SYSTEM

In Existing System, Text block, facial recognition module and block detection module available separately on the market, t s difficult for them to manage a separate module with them. Fingerprints and orcam instruments are used for visually impaired people by reading newspaper and text. Both devices can add to the disruption and increase their market costs.

Disadvantages:

- In Existing System, Text extractor block, face recognition module and obstacle detection module are separately available n market, t s difficult for them to carry different module with them.
- Finger reader and orcam devices s used for the visually impaired people for reading newspaper and text. Both device add to the inconvenience and increases its market cost.

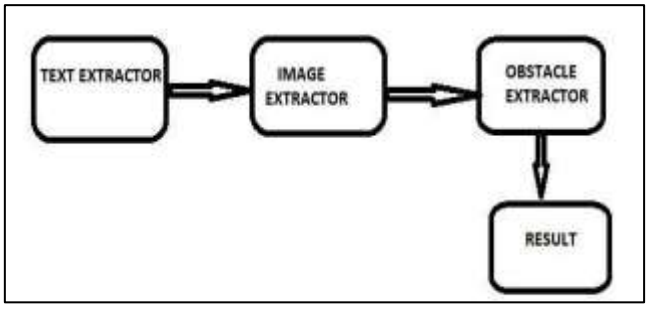


Fig 1: Block Diagram

III. PROPOSED SYSTEM

In this way object identification, facial recognition text detection block, obstacle detection module are integrated into one telephone. The use of a finger to read text s overcome by the camera module. The purpose of the new framework s to use a single camera to find and detect signals, text and issues to provide sound as output.

It can be extracted and view text details associated with the objects found. We begin by subtracting the regions of the text in multi-colored home signs. To improve the ability of people who are blind or have significant impairments to independently access, understand, and explore indoor

environments, we propose a new framework using a single camera to detect and recognize faces, obstacles, signatures that include text information related to the object found.

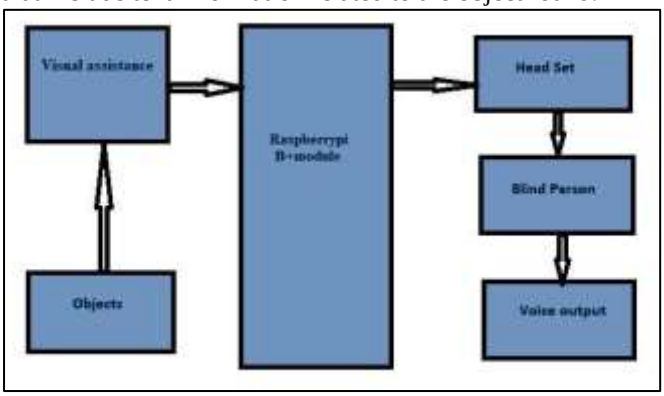


Fig0 2: Block Diagram

This project presents a recognition system for the recognition of the text in the mage using the raspberry pi. As mentioned in the block diagram the program outline consists of five functional elements: mage acquisition, pre-image processing, text extraction, text conversion and speech output.

Text mages were taken using a Raspberry Pi camera or high resolution HD web camera. The used receiver is used for the pre-processing step to reduce unwanted noise. In image processing defined as the act of retrieving an image from a particular source usually a hardware-based source for using it is the first step in the workflow because without the mage no processing is possible. Acquired receiver s completely missing. Now the incoming energy s converted nto volume by the combination of the input voltage and the material reacting to the specific energy source. The output waveform s the sensor response (s) and the digital value s obtained for each sensor by making its response digital.

Advantages:

- Low cost
- Consistent board format &10x faster processing
- The main advantage of the raspberry pi module over another processor s raspberry pi is a fully functional Linux computer and also compact n size.
- As the main intention of the project s to help people who travels around the globe and to help the blind by assisting them in reading text.
- User friendly (easy to use).
- It is very compact to the user.
- High rate of translation: The speed of translation s much higher than the human translation t takes more than an hour for translating 10,000 words for human whereas few seconds are enough for the device to translation.

A. Text to Speech (TTS) Converter

In this step the extracted text is first converted to speech using a speech synthesizer called TTS engine that can convert text to speech using pre-defined libraries.

A text-to-speech device consists of two main modules, a photo-printing module and a word-processing module. Printing a photo module uses a camera that converts the image into text. The voice processing module converts text into sound and processes it with certain body language so that the sound can be understood. The diagram shows a block diagram of a text-to-speech device, the first block is an image processing module, where OCR converts a .jpg to a .txt form. The second is a voice resolution module that converts .txt into speech.

The first block is the image startup area, where OCR converts .jpg into a .txt format. The second is a voice resolution module that converts .txt into speech. OCR is an essential element of this module.

OCR or Optical Character Recognition is a technology that automatically detects a character through optical equipment, this technology mimics the ability of the visual senses, where the camera becomes the focal point of the visual processing and image processing is performed on a computer engine as a placeholder. in the human mind. Tesseract OCR is a type of OCR engine that has a matrix similarity. The choice of the Tesseract engine is due to its flexibility and increased machinery and the fact that many communities are active researchers to develop this OCR engine and because the Tesseract OCR can support 149 languages. In this project we show the names of the English letters. Before zoom in on OCR, it is converted to binary image to increase the accuracy of recognition. Binary image transformations are made using Image software, which is another open source tool for image manipulation. OCR results are text, stored in file (expression.txt). The machines still have features such as edge distortion and light output, so it's still difficult for many OCR engines to get high accuracy text. It needs support and conditioning to be able to find the smallest feature. Use of Tesseract OCR.

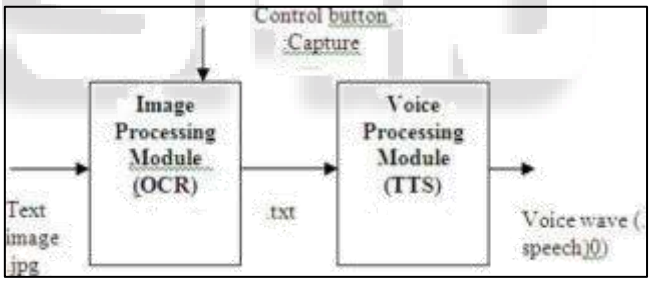


Fig. 3: Block diagram of text-to-speech device.

B. Image Processing Module (OCR)

Character recognition software detects text letters in electronic files, often scans documents that are saved as images and are quickly available. Character recognition software is also known as character recognition or OCR, because it uses text formatting to identify characters. Character recognition improves the processing of scanned images by allowing for the automatic detection and removal of content in a variety of detail fields. When scanning a form and using the imaging software to process it, OCR allows the transfer of information directly from the document to electronic data.

For a powerful image printing tool, a powerful, highly accurate OCR and a range of other capabilities, check out Trapeze from soft AI functions. Trapeze is able to recognize printed and handwritten text, and has features for processing unsigned documents.

C. Voice, processing, module, (TTS)

In this module the text is converted into an expression. OCR results are text, stored in file (expression.txt). Here, Festival software is used to convert text to speech. The festival is an open source Text To Speech (TTS) program, available in many languages. For this project, the English TTS program is used to read the text.

D. Optical, text, recognition

Data extraction tools work well for all account auditors to make sure that they do not waste their time in logging data. To make this happen, they need to understand what OCR is and how it works to read and understand cost related documents. Like reading, they reveal the complexity of how a liability releases data on invoices and receipts. Simply put, OCR (Optical Character Recognition) is a process used to convert an image file into a text file. It can treat the process as a form of compression as text documents require much less space than image files such as JPEG, PDF, etc. OCR techniques are already being used in many different fields.

E. How does OCR work?

Step 1: A unique API key is generated when the first integrate optical character recognition software with mobile or desktop. Even for a trial use, our representatives offer, this key so that all set of scanned documents.
Step 2: Upload any document in the format of PDF, JPEG, TIFF, PNG etc. to the software. It can be used as Infrared's software as a white-labeled mobile app, on the desktop or as a cloud solution to start scanning.
Step 3: Our software starts extracting line items and other key fields such as logo, expense type, merchant name, date of the transaction, amount, currency VAT/GST, business name etc. It can even customize it to extract any other information that might need. The OCR software provides character-level and word-level confidence scores. These scores are indicators of whether the OCR software believes the extracted information to be accurate.
Step 4: The extracted data is made available to them in formats like XML, CSV, and JSON etc. as per their requirement.

IV. DESIGN

This System consist of two Modules, One is Simulation and another is hardware Module.
Module 1: Block Diagram

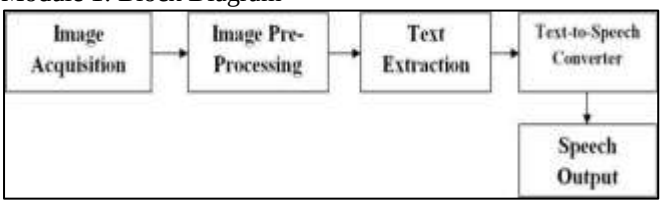


Fig. 4: Block Diagram

A. Image Acquisition

In this step the text mage s captured using a raspberry pi camera or high resolution HD web camera. The acquired mage is then used in the mage correction step to reduce unwanted noise.

In image processing, defined as the act of saving an image from a particular source, usually a hardware-based basis for using t is the first step in the workflow because without the mage, no processing s possible. Acquired receiver s completely missing.

Now the incoming energy s converted nto volume by the combination of the input voltage and the material reacting to the specific energy source. The output waveform s the sensor response (s) and the digital value s obtained for each sensor by making its response digital.

B. Image pre-processing

In the preceding mage the unwanted noise processing n the mage s eliminated by the use of the appropriate limit (OTSU), behavior change such as shift and black hat change, cosine intelligence adjustment, generate required reports and draw interactive boxes in the text content required for the mage. Initially a curved mage s enlarged to the right size and converted to a gray scale for further use.

Subsequently a destine cosine alter is applied to the gray mage to compress the mage that helps improve the performance ratio. Then by underestimating the horizontal and horizontal aspect, the most common elements at the top of the mage are eliminated.

C. Text Extraction

In this step the respected text n the mage s extracted using OCR engines. In this project the Tesseract OCR engine helps to produce a well-known text.

The purpose of Optical Character Recognition (OCR) is to distinguish optical patterns (usually containing digital imagery) associated with alphanumeric or other characters. The OCR process involves several steps including segmentation, feature extraction, and segmentation. By law, any standard OCR software can now be used to recognize text in segmented frames. However, a closer look at the locations of the selected independent character fields or in the imagery reveals that most OCR software packages will have great difficulty in identifying the text.

Module 2: Block Diagram

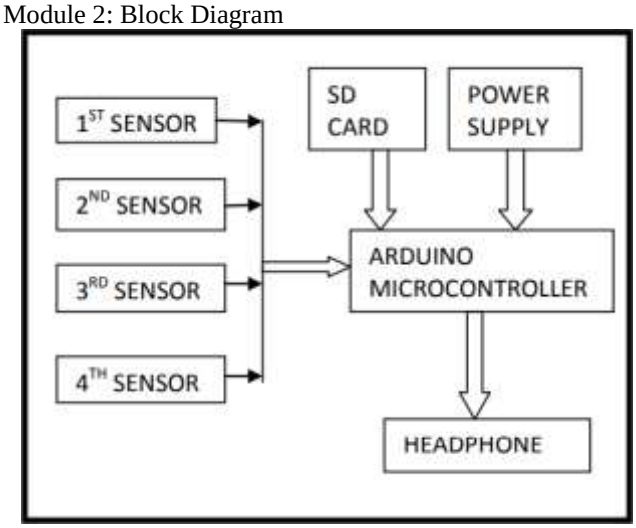


Fig. 5: Block Diagram

D. Ultrasonic Sensors Module

The Prototype Hardware contains of four ultrasonic sensors. It includes a wearable equipment contains of head hat, mini hand stick and foot shoes to help the blind person to navigate alone safely and to avoid any obstacles that may be encountered, whether fixed or mobile, to avoid any possible accident.

1) First sensor is located on a mini hand stick to scan a front area upto a distance of 400cm. It also let the blind people recognize about the object when it comes closer at 100cm and more closer at 50cm
2) Second sensor is placed on a hat to scan a back area upto a distance of 400cm.
3) Third sensor is placed on a left shoe to scan the left area upto a distance of 400cm.
4) Fourth sensor is placed on a right shoe to scan the left area upto a distance of 400cm.

E. Arduino Module

Arduino microcontroller based control module receives instruction and command from remote system guidance through ultrasonic sensors. The Arduino microcontroller process enables executing issued commands and communicating in the form of a given application or device that returns to the ears using the SD Card module. Provides the necessary connection between audio signals and the audio system. Now you go to learn the basics in writing, and read from scratch on the SD card. SD cards are a cheap and cheap way to store data, and the Arduino can easily communicate with one another using its SPI interface. You will learn enough to be able to create a new file, install an existing file, install a temporary file, and record information in that file. This will allow you to use the SD Card and Arduino as a data input tool to enter any desired data.

F. SD Card

Access with the ARDUINO the extant application note deals with the implementation of the SPI-based access mode to read data from/write data to a SDSC (standard SD) card using an Arduino microcontroller. Figure 7 shows the SD card pinout and Table 3 the pin associates for both SD and SPI modes Flowchart.

V. RESULTS

The presented system is designed and arranged for practical use. The system is able to handle 7 states that may face the blind people. The system will respond to each state rendering to a specific program which is code and installed in the Arduino microcontroller.

Case 1: When object is in the left direction of the blind, then the speaker will give the audio, “obstacle in left”.

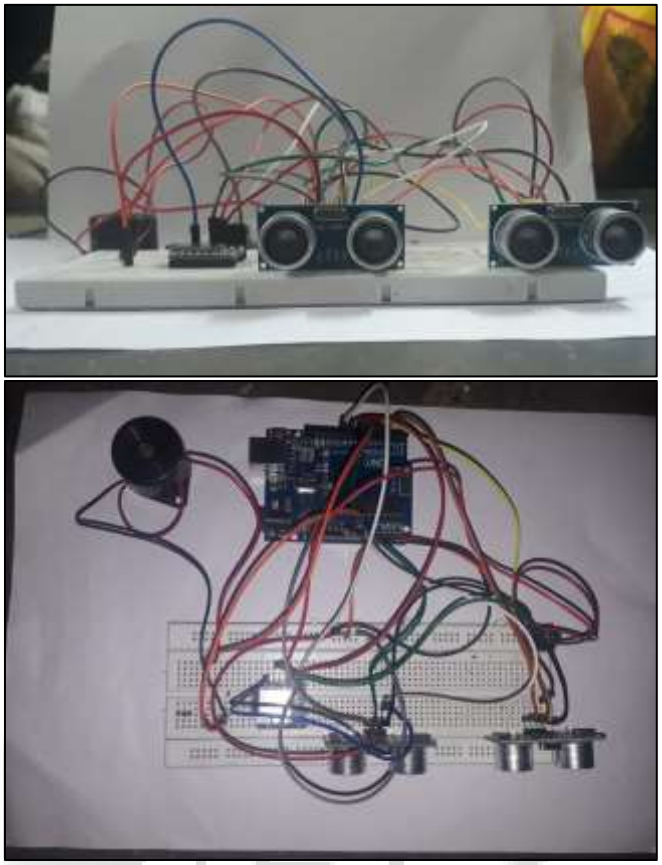
Case 2: When object is in the right direction of the blind, then the speaker will give the audio, “obstacle in right”.

Case 3: When object is in the front direction of the blind, then the speaker will give the speech, “obstacle in front”.

Case 4: When object is in the back direction of the blind, then the speaker will give the sound, “obstacle in back”.

Case 5: When object is in the bottom that is in the slightly above the ground level of the blind, then the buzzer will give the beep sound in order to avoid the confusion to the blind.

A. Hardware Module



VI. CONCLUSION

A design on face and text recognition based on raspberry pi, which is primarily planned for the purpose of blind navigation. Our future work will focus on detecting the emotions of the persons and recognizing more types of indoor objects and icons on signage in addition to text for indoor way finding aid to assist blind people travel independently. We will also study the significant human boundary issues including hearing output and spatial updating of object location, orientation, and distance. With real-time updates, blind users will be able to better use spatial memory to understand the surrounding environment, obstacles and signs.

Simple, reasonably-priced, configurable, smooth to deal with digital guidance device is proposed to offer optimistic assistant and help for blind and visually impaired men and women. The gadget is designed, carried out, tested, and tested. The real-time results of the system are encouraging; it discovered an accuracy of 93% in detecting distances. The outcomes suggest that the system is green and specific in its functionality in specifying the supply and distance of the objects which can come upon the blind. it can experiment areas left, right, again and in front of the blind character regardless of its height or depth.

Therefore, it turned into favored with the aid of folks who participated inside the test. The ultrasonic sensor has been completely utilized with a purpose to increase the

mobility of the blind and visible impaired humans in safe and independent way. This machine does not require a huge tool to be hold for a protracted distance, and it also does not require any unique training. This gadget also resolves boundaries that are associated with the most of the motion issues that can impact the blind people of their surroundings.

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