Wireless Alert System For Deaf and Blind People

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Abstract

ABSTRACT: People with hearing impairment and vision impairment face everyday challenges in identifying the occurrence of household sounds like door bell. The objective of this paper is to design and implement a low cost stand-alone device for deaf and blind people to notify doorbell ringing who live alone in their house. When the visitor presses the doorbell, PIR sensor detects the human body and captures the image. The captured image is transferred to the mail of the deaf person with a message that there is a visitor which helps to know the right person at the door. Upon entering the camera view previously stored faces are identified and informed to the blind person as an audio output. Those who have poor vision can gather information from voice. This project proposes a camera based assistive text reading to help visually impaired person in reading the text labels and product packaging from hand-held objects in their daily lives. The proposed idea involves text extraction from scanned image using Tesseract Optical Character Recognition (OCR) and converting the text to speech by e-Speak tool. Also ultrasonic sensor is used to detect any obstacles on the way to help blind person. The whole system is carried out by using Raspberry pi and portability is achieved by using a battery backup. This technology helps millions of people in the world who experience a significant loss of vision.

Keywords: PIR sensor, OCR tesseract, e-Speak, raspberry pi, ultrasonic sensor, battery backup.

I.INTRODUCTION

Hearing and vision loss presents many everyday challenges. Communication may be the biggest challenge of all getting and giving information, exchanging ideas, sharing feelings-whether in one-to-one contact or in groups. With the present set of concept of deafblindness, the Census of Tamil Nadu, 2011 counted 1,179,963 people in whom vision and hearing disability existed (Males 657418 and Females 522545).

Many devices and systems are available to help deaf and hard of hearing people improve communication, adapt to their environment, and function in society more effectively. Alert systems, or simply signallers, are designed to help notify different events, such as the phone ringing, the doorbell, a baby's cry, motion, weather alerts, or smoke alarms. It usually happens that the deaf and blind people are unaware of the visitor to the home and have in walking or moving to go and see who is at the door. So it would be of great help for those people if they have alert about the visitor to home and can know who is at the door?

This project describes the study of various systems and technologies available for deaf and blind people. The proposed system here is designed to alert the hearing impaired and visually impaired people about the visitor. Due to eye diseases, age related causes, uncontrolled diabetes, accidents and other reasons the number of visually impaired persons increased every year. One of the most significant difficulty for a visually impaired person is to read. Recent developments in mobile phones, computers, and availability of digital cameras make it feasible to assist the blind person by developing camera based applications that combine computer vision tools with other existing beneficial products such as Optical Character Recognition (OCR) system. In this proposed system text recognition is done by Open Computer Vision (Open CV), a library of functions used for implementing image processing techniques. Image processing is a technique of using mathematical operations in image, any form of inputs such as image, a series of images, or a video can be used for processing. An image or a set of characteristics or parameters related to image is the output of image processing. Image processing has various applications like computer graphics, scanning, facial recognition, text recognition etc. Various features of text like its font, font size, alignment, background etc. influences in its recognition. Number plate recognition is a fair example for text extraction. This project aims to build an efficient camera based assistive text reading device. The whole system is carried out by using Raspberry pi where the portability is the main aim, which is achieved by providing a battery backup.

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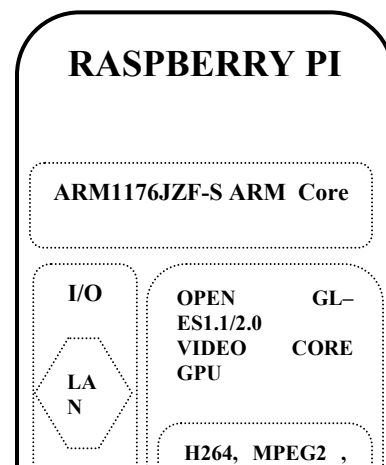*www.ijseas.com*

II. LITERATURE SURVEY

- K. L. Koay et al., (2013) [1] designed dog inspired visual communication signals. Robot was able to lead participants to the microwave door and front door sound source. Head movements and gaze directions were important for communicating the robot's intention using visual communication signals.

- Gopinath Shanmuga Sundaram et al., (2013) [2] attempted to build a low cost standalone device which transmits data using the Raspberry Pi with Bluetooth and has a resistive touch screen display providing a user interface. Error handling techniques were used to catch the exceptions and were able to retransmit till the acknowledgement was received.

- Chao-Huang Wei and Shin-An Chen (2013) [3] employed a novel power line communication chip to develop a networked digital video door phone system to replace the conventional ones. Door Phone is used to identify visitor or for simple voice interlocution. They transfer audio visual information and enhance the entrance guarding functions additionally.

- Mahdi Safaa A et al., (2012) [4] designed the handheld device for obstacle detection using ultrasonic sensor and generate voice alert for blind and vibration alert for deaf person by keeping his finger on the button at the top of the device. The device is suitable and easy for blind & deaf with 40-150cm range and can be used in three dimensions.

- Ms. Rupali et al., (2016) [5] presents a prototype for extracting text from images using Raspberry Pi. The images are captured using a web cam and are processed using Open CV and OTSU's algorithm. Initially the captured images are converted to gray scale colour mode. The images are rescaled and cosine transformations are applied by setting vertical and horizontal ratio. After applying some morphological transformations OTSU's thresholding is applied to images which is adaptive thresholding algorithm. After thresholding, contours for the images are generated using special functions in Open CV. Using these contours, bounding boxes are drawn around the objects and text in the images. Using these drawn bounding boxes each and every character present in the image is extracted which is then applied to the OCR engine to recognize the text present in the image.

- L. Nagaraja et al., (2015) [6] proposed a camera based assistive text reading framework to help visually impaired persons read text labels and product packaging from hand-held objects in daily life. The system proposes a motion based method to define a Region of Interest (ROI), for isolating the object from untidy backgrounds or other surrounding objects in the camera vision. A mixture of-Gaussians-based background subtraction technique is used to extract moving object region. To acquire text details from the ROI, text localization and recognition are conducted. Then text regions from the object ROI are automatically focused. In an Adaboost model the gradient features of stroke orientations and distributions of edge pixels are carried out by Novel Text Localization algorithm. Text characters in localized text regions are binarized and recognized by off-the-shelf optical character identification software.
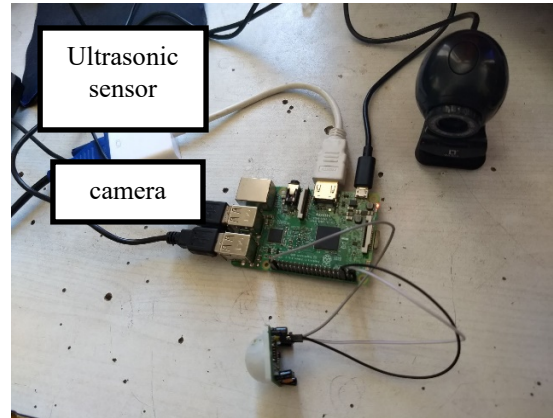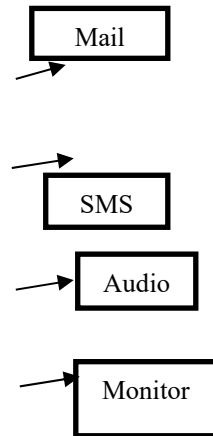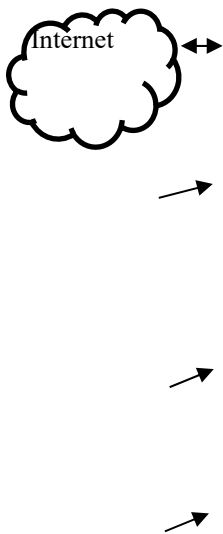
III. PROPOSED SYSTEM

This project proposes a low cost, reliable and efficient system to alert the hearing and visually impaired person. When a visitor comes in front of the door, the PIR sensor detects the presence of the human body and the camera gets ON. The camera captures the image of the person and the captured image is sent to the mail of the deaf person with a message that there is a visitor and a vibration alert is given. From the captured image, the previously stored faces are identified and informed to the blind person as an audio output.
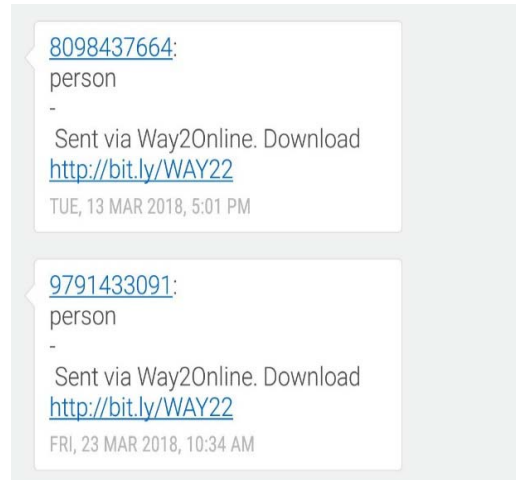
BLOCK DIAGRAM

RASPBERRY PI

ARM1176JZF-S ARM Core

I/O

LA N

OPEN GL– ES1.1/2.0 VIDEO CORE GPU

H264, MPEG2 ,

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Internet

Mail

SMS

Audio

Monitor

Snapshot 1:

Ultrasonic sensor

camera

Snapshot 2:
message to the user

8098437664:
person
-
Sent via Way2Online. Download
http://bit.ly/WAY22
TUE, 13 MAR 2018, 5:01 PM

9791433091:
person
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FRI, 23 MAR 2018, 10:34 AM

It also proposes a camera based assistive reading to help blind person in reading the text labels and product packaging from hand held objects in their daily lives. Using a minicamera, the text which the user need to read get captured as an image and have to send to the image processing platform. The text on the captured image is recognized using OCR tesseract. The recognized text is converted to voice output by e-speak algorithm. The system is good for portability, which is achieved by providing a battery backup. The ultrasonic sensor is used to help blind person to detect any obstacles on their way. The obstacle is detected and given as an audio output. The whole system used Raspberry pi. It is a small computer which could be programmed.
cannot detect it.

IV.OUTPUT

In door system, the camera is plugged directly into the CSI connector on raspberry pi board. Switch is connected with the GPIO pin of raspberry pi. PIR sensor and ultrasonic sensor is connected using GPIO switch.
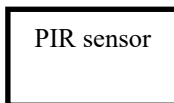
PIR sensor

When the visitor presses the doorbell, PIR sensor detects the presence of human body and Camera captures the image and transfers it to mail of the user with a message that there is visitor. The pre-stored faces are identified and informed.

V.CONCLUSION

Various existing alert systems and technologies have been reviewed. This paper describes implementation of a low cost stand-alone alert system for deaf and blind people for their safety purposes. The MATLAB is replaced with Open CV and it results in fast processing.

V.REFERENCES

[1] K. L. Koay, G. Lakatos, D.S., "Hey! There is someone at your door. A Hearing Robot using Visual Communication Signals of Hearing Dogs to Communicate Intent", 9781-4673-5863-7/13, 2013 IEEE.
[2] Gopinath Shanmuga Sundaram, Bhanuimprasad Patibandala, Harish Santhanam, Sindhura Gaddam, Vamsi Krishna Alla, Gautham Ravi Prakash, Shiva Chaitanya Vishwakarma Chandracha, Sindhu Boppana and James

M.Conrad. "Bluetooth Communication using a Touch screen Interface with the Raspberry Pi", 978-1-4799-0053-4/13, 2013 IEEE.

[3] Chao-Huang Wei and Shin-An Chen. "Video Door Phone Surveillance System Using power line Communication Channel", International Journal of Computer and Electrical Engineering, Vol. 5, No. 4, August 2013.

[4] Mahdi Safaa A., Muhsin Asaad H. and AlMosawi Ali I, "Using Ultrasonic Sensor for Blind and Deaf persons Combines Voice Alert and Vibration Properties", Research Journal of Recent Sciences ISSN 2277-2502 Vol. 1(11), 50-52, November (2012).

[5] Ms. Rupali, D Dharmale, Dr. P.V. Ingole, "Text Detection and Recognition with Speech Output for Visually Challenged Person", vol. 5, Issue 1, January 2016

[6] Nagaraja, L., et al. "Vision based text recognition using raspberry PI." National Conference on Power Systems, Industrial Automation (NCPSIA 2015).

[7] Ray Smith,"An Overview of the Tesseract OCR Engine."