Recognition Guidance for Visually Impaired

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ABSTRACT

Vision is one in all the foremost necessary senses. It helps individuals navigate our world. Ordinarily the blind individuals develop their different senses to be ready to feel its surroundings, however in sure cases this is often not enough. The senses may be disturbed by noise or diseases. For this reason, several artifacts to assist this cluster of individuals. Artifacts like white canes or guide dogs facilitate blind individuals to maneuver around. this text proposes the employment of a system that detects and acknowledges close obstacles, giving a hearable feedback to the user, avoiding a collision. May be a wireless system to create it comfy for the user. His system helps individuals with handicap to maneuver in indoor or outside eventualities. The objectives of the system is find obstacles that white canes or guide dogs they'll not, increasing their detection vary. Vision is one in all the foremost necessary Senses .That helps individuals act with the $64000 world. Ordinarily visually impaired develop their different senses to feel their surroundings, however in sure cases, this is often not enough. The senses may be disturbed by noise or sickness .For this reason, several artifacts are developed to assist this cluster of individuals. Artifacts like white dogs or guide dogs facilitate unsighted to maneuver around in their surroundings this text proposes the employment of a system that detects and acknowledges close obstacle, giving A hearable warning so as to avoid a collision. The model is wireless with the aim to be comfy for the user. The system helps unsighted to maneuver around in indoor or outside environments. The objectives of the system ar to find obstacles that white dogs guide dogs can't, increasing their vary of detection.

Keyword: *Obstacle Avoidance, Obstacle Detection, Collision Avoidance, Visually Impaired, Face Identification, Home Automation, MRP Detection, Voice Command Control, Raspberry Pi*.

1. INTRODUCTION

According to WHO truth sheet of 2013, thirty-nine million folks are blind and 246 million have low vision. With eighty-two of the blind population being fifty years previous or higher than, their ar many that have lived the majority of their lives with associate degree inability to try to tasks like scan, write or walk while not facilitate. Finger Reader projected by Roy et al is that the style that is nearest to the projected aid during this paper however with added prices of Smartphone that is needed for the device to perform. To use Finger Reader, the user should be conversant in the usage of bit screens and mobile phones that adds to the inconvenience. Or Cam is another commercially out there product that permits the user to scan newspaper texts beside several different functions however the technologies used will increase its market price exponentially. The contribution of this paper is threefold. an endeavor to reduce the dependence of the user on the folks around him whereas completing chores on a usual. The thought of a wearable device, that supports the overall human tendency to informing at objects to act with the setting. A paradigm to a coffee price answer to the issues long-faced by the visually impaired whereas interacting with their setting. Historically white cane and guide dogs are employed by blind folks to avoid obstacles in their walking path. White will can observe obstacles solely from an in-depth distance and guide dogs ar terribly high-priced to breed and train furthermore as maintain. Solutions like Smart cane and Ultra cane will improve the detection distance for cane and might conjointly warn the user of a possible obstacle 3-4 meters ahead. However, they're ineffective to classify obstacles supported potential danger and conjointly don't support navigation. Recent good solutions designed mistreatment Google Glass or Microsoft's seeing AI use a cloud server to perform all the process, limiting their usability in areas while not property. Moreover, so as to avoid wasting energy, such solutions tend to be user-triggered and not spontaneous, proscribing their usage in safe navigation applications.

2. EXISTING SYSTEM

In previous approaches solely switches area unit won't to management the 230v devices. This is often the balk. As a result of generally blind folks bit the most wire, that point is going to be an electrical shock is happen. Another one downside once looking the visually impaired those that time can frustrate them in a tradesman. As a result of not notable the valid MRP rate in shopping for things. Existing system obstacle detection solely enforced.

3. PROPOSED SYSTEM

In this paper, projected to voice command based device management and portable computer vision based MRP rate and GPS location and construction detection and face detection and recognition. If the blind people navigate to the out of doors GPS location detection is useful to them. Face recognition module is utilized there to person interacting state, known or unknown.

Wearable Kit Block Diagram:
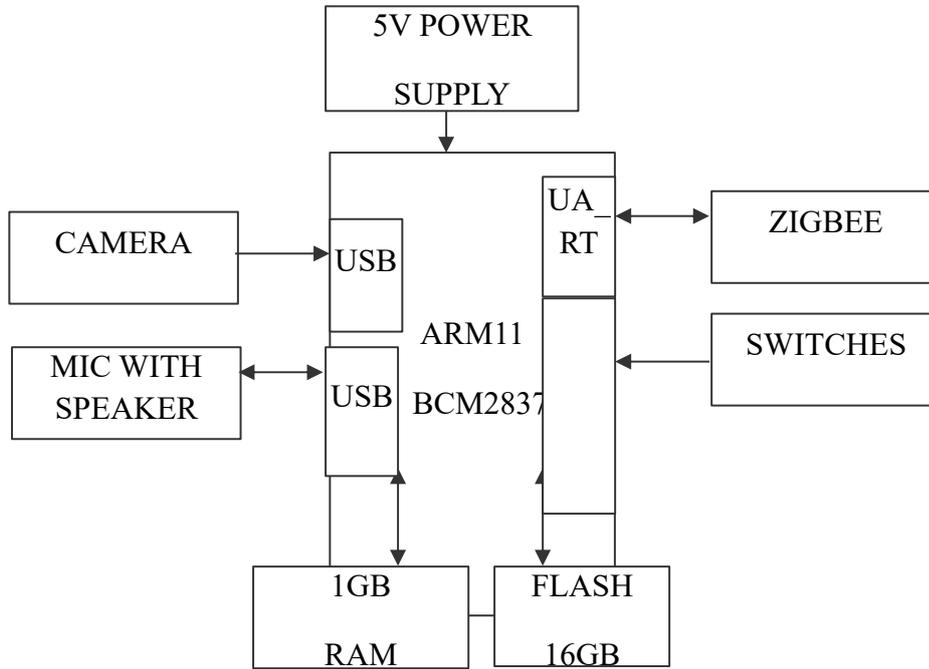
Indoor Kit Block Diagram:
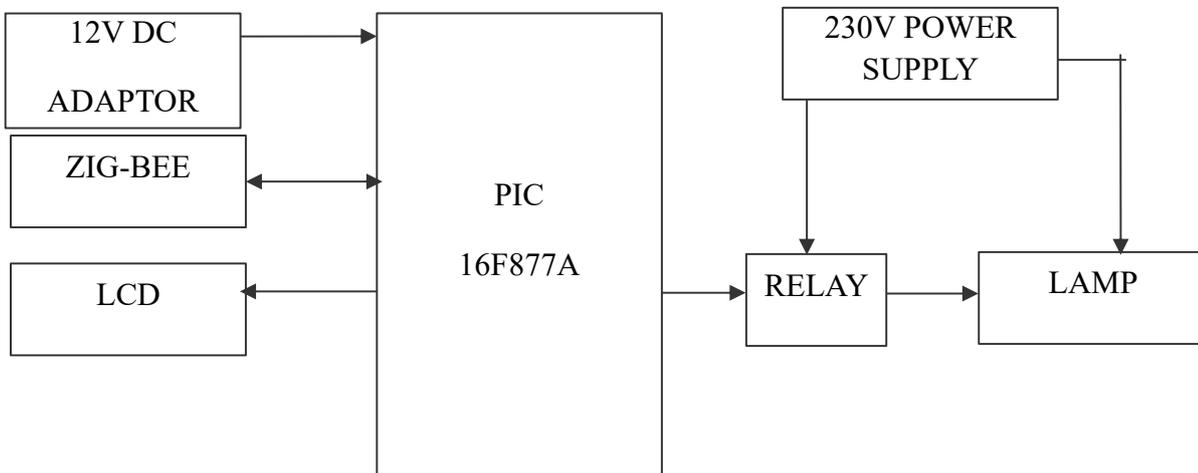
4. MODULE DESCRIPTION

4.1 Face Identification Module

The faces can be detected when a person enters into the frame using haar cascade algorithm. The core basis for Haar classifier object detection is that the Haar-like options. These options, instead of using the intensity values of a picture element, use the amendment in distinction values between adjacent rectangular teams of pixels. The distinction variances between the areas. 2 or 3 adjacent teams with a relative distinction variance kind a Haar-like feature. First, we'd like to load the specified XML classifiers. OpenCV comes with a trainer additionally as a detector. OpenCV already contains several pre-trained classifiers for face, eyes, smile etc. Those XML files square measure hold on in opencv/data/haarcascades/ folder. Detected faces are identified using LBP algorithm. The live streams are compared with the previously stored image. If the result is matched, then it will inform the user through the speaker.

4.2 Road Sign Detection Module

A Raspberry Pi is capable of capturing a sequence of pictures speedily by utilizing its video- capture port with JPEG encoder but many problems have to be compelled to be considered:

• The video port of raspberry pi processor has captured the road signs within the time of traveling. The actual sign is processed by the subsequent parameters to do the proposed system operation.

•The JPEG encoded captured pictures don't have exit information (no coordinates, time, not exchangeable).

• The video-port captured pictures area unit usually" more fragmented" than the still port capture pictures, so before we undergo pre-processed pictures may have to use more denoising algorithms.

• All capture ways found in OpenCV (capture, capture continuous, and capture sequence) need to be considered according to their use and talents. In this system, the capture sequence methodology was chosen, as it is the quickest methodology out and away.

The system looks into the photographs of speed signs, the most shaping feature of a speed sign is a rectangular shape with largely spherical edges. Before finding the rectangles during a captured image, the system retrieves the contours, therefore the form detection formula employed loops through a set of contours and checks if the contour form is a parallelogram. The shape detection is predicated on the OpenCV's Python implementation preceded by filtering and edge detection. The obtainable road signs square measure classified into four shapes. Like sq., rectangular, spherical and triangular. During the movement time, the camera port notice the road sign suggests that forthwith that signal given into the processor. The automated breaking system is applied for the vehicle once entered into the restricted zone. The shape signs square measure given the additional importance than the opposite form signs. Once the spherical shaped signs square measure received by the camera suggests that the vehicle speed is reduced to the notified price. The other formed signs square measure situated suggests that the system given the notification via buzzer. The image process technique takes the necessary action once the bar chart price may be equalized with the initial image.

4.3 MRP Detection Module

The MRP detection system undergoes the following process,

- Capture the image.
- Localize the text region.
- Crop the text from the image.
- Recognize the price.
- Converting the text to speech by the e-Speak tool

4.4 GPS Location Identification Module

The planned transportable system that captures the images and text written that area unit placed before of the camera often scans out or proclaimed out victimisation speakers. These details were verified victimisation Raspberry Pi processor for authentication and alert visually impaired or blind man through voice messages victimisation speakers or head phones. The location is identified using the GPS module. The location information is given to the user using the speaker.

4.5 Electrical Appliance Module

The users will management the house appliances by exploitation voice recognition. The management unit is Associate in Nursing interface program that has got to satisfy the subsequent 2 conditions (a) the output from the interface program is forwarded to a wireless transmitter and sent to a receiver through wireless channel, and (b) the receiver at the appliances settle for the receive signal to show ON or OFF the device. The system operation is often delineate supported this front panel within the following steps:

• The voice command is captured by employing a mike and sent to the pc.

• Voice recognition is performed by exploitation Lab View with the assistance of Microsoft's made speech library.

• Upon recognition of the voice command management characters are generated and sent through ZigBee wireless communication protocol to such application address.

• At receiver aspect, the application will activate or OFF a relay dominant circuit counting on the received controlled characters.

• A hardware switch toggle circuit is additional to modify the switch method and to allow for ON/ OFF switch with one-word voice command.

• As an extra feature, the system is often controlled exploitation sensible devices. Using voice commands the user can able to control the electrical appliance like a fan, lamp etc.

5. HARDWARE COMPONENTS DESCRIPTION

5.1 Raspberry PI (BCM2837)

The Raspberry Pi 3 Model B – a robust single-board laptop computer with wireless native space network and Bluetooth capabilities and versatile property decisions. The Raspberry Pi 3 Model B comes equipped with powerful quad-core Broadcom BCM2837 64-bit ARMv8 processor (1.2GHz) and 1GB RAM for spectacular computing performance. It choices on-board BCM43438 radio chip for wonderful Wi-Fi and Bluetooth Low Energy capabilities, whereas providing an outsized vary of property selections for easy respect to compatible peripherals.
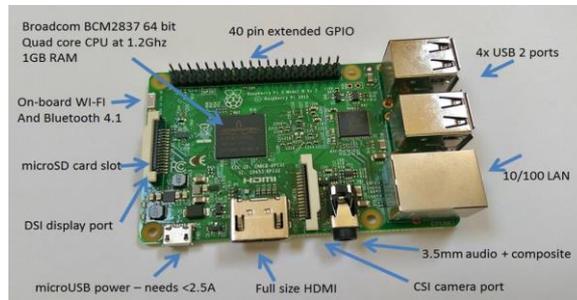

Figure-4. BCM2837

5.2 Camera Specifications

A digital camera could be a video camera that feeds or streams its image in real time to or through a laptop to an electronic network. Once "captured" by the pc, the video stream is also saved, viewed or sent on to different networks via systems like the net, Associate in Nursing emailed as an attachment. Once sent to a foreign location, the video stream is also saved, viewed or on sent there. in contrast to Associate in Nursing information science camera (which connects exploitation local area network or Wi-Fi), a digital camera is mostly connected by a USB cable, or similar cable, or designed into constituent, like laptops.

5.3 GPS Module

For this component, we have a tendency to square measure employing a space station GPS Module MT3329 SKM53. This has —an embedded GPS antenna and relies on MediaTek3329 single-chip architecture. The GPS is employed to provide point information like latitude and great circle. For this analysis, we have used the open supply Google Maps API to resolve the latitude and longitudinal info. The latitude and longitude info is regenerate to street addresses for ease of detection by the user.

5.4 Microphone with Speaker

An electro-acoustic {transducer} is an electrical sensing element or transducer that converts voice signal to electrical signal. The Electromagnetic transducers convert acoustic signals to an electrical signal.

5.5 Relay

Relays area unit used wherever it's necessary to manage a circuit by a low-power signal (with complete electrical isolation between management and controlled circuits), or wherever many circuits should be controlled by one signal [3]. In our system, the output from raspberry pi three is directly provided to relay circuit. If GPIO pin is high then the corresponding relay can activate and makes its device operating. We are employing a NPN semiconductor unit in the relay and it works supported construct of electromotive force.

5.6 Pic16f877a Micro controller

Micro controllers square measure used for a lot of specific applications. Within the small controller family, PIC16F877A is a lot of wide used device within the recent times. the explanations for its wide usage square measure it's giant memory capability, it's adequate input /output ports etc. the subsequent square measure the main points concerning the PIC small controller.PIC16F874A/877A devices square measure offered in 40-pin and 44-pin packages.

5.7 Zig-bee Pair

Zigbee is associate IEEE 802.15.4-based specification for a collection of high-level communication protocols accustomed produce personal space networks with little, low-power digital radios, like for home automation, medical device information assortment, and alternative low-power low-bandwidth wants, designed for tiny scale comes which require wireless association. Hence, Zigbee could be a low-power, low rate, and shut proximity (i.e., personal area) wireless unintended network.

NC840
CC2650 Zigbee & BLE4.0 module

5.10 LCD

LCD (Liquid Crystal Display) screen is associate degree electronic show module and realizes a good vary of applications. A 16x2 {lcd|liquid crystal show|LCD|digital display|alphanumeric display} display is extremely basic module and is extremely ordinarily utilized in varied devices and circuits. These modules square measure most well-liked over seven phases and alternative multi-segment LEDs. The explanations being: LCDs square measure economical; simply programmable; don't have any limitation of displaying special & even custom characters (unlike in seven segments), animations and soon.

6. SOFTWARE REQUIREMENTS

6.1 OpenCV

OpenCv could be a set of libraries oriented to digital image process. It permits the user to hold out wide used neutering, morphological and color transformations, and frequency domain operations over digital pictures. The algorithms square measure quick enough to figure on video process. For a lot of details check. What is more, OpenCv comes with a series of drivers to capture video from completely different camera models and it works with C++, C and Python.

6.2 LINUX OS

Linux software package is an associate degree open supply software package that's supported UNIX. Since UNIX system is open supply, it's accessible for developing and private use, therefore, having varied corporations that contribute to the event of UNIX system. Some samples of Linux-based systems are Ubuntu, CentOS, and Raspberry Pi.

7. CONCLUSION

In this paper, we've enforced a voice-controlled Zigbee-based home automation system. We tend to used speech recognition system to implement this work. The system is meant disabled individuals so they'll monitor and management the house appliances with their restricted ability. And then next, the projected work for road sign detection is split into 2 components. It is called as "detection" and "recognition". Within the detection half, edge detection algorithms were used as a result of color based mostly segmentation in nighttime is far less reliable than shape-based segmentation. The designed system ought to have the good potency and fewer weights compared to the recent one. Next, the GPS location is also detected that is applicable for each the indoor and outside environment. This method is capable of mistreatment publicly places. It makes visually impaired individuals capable of moving to his/her willing place safely while not seeking to facilitate from others. Whereas reaching to the destination the system detects obstacles on their approach and helps them to do their day-after-day work with ease. Next, the face recognition and detection which is employed there to person interacting state acknowledged or unknown so the MRP rate detection that is extremely economical for sand-blind. Hence, the system is extremely economical and it consumes low power.

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