Retraction

Retraction: Pineal Eye for Blind using Ultrasonic sensors (J. Phys.: Conf. Ser. 1916 012005)

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This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the Problematic Paper Screener [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:2107.06751v1

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Pineal Eye for Blind using Ultrasonic sensors

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Abstract. In regular day to day existence, blind individuals face various issues for their navigation. The fundamental aim is to acquire a gadget which is suitable for the entire visually impaired community. Ongoing occasions, they have developed various gadgets to help. However, most of them have certain issues and limitations, and it needs a lot of training to utilise. The normally existing strategies are difficult to utilise, so as to defeat with their confines we have to propose another framework that gives less reliance on their day-by-day exercises. This system is proposed to build a device that helps the blind navigate and use public transport with ease and certainty.

Keywords: Distance measurement, Global positioning system, Headphones, Image Databases, Indoor environments, Navigation.

1. Introduction
With the headway of innovation, we are ignorant about the trouble’s blind finds in their everyday life. As indicated by the most recent study, 40 million people are assessed as blinds around the world. Blind and outwardly hindered individuals are constantly reliant on others for their development. Consequently, it is a major test for them to head over to better places unquestionably. The current techniques have ended up being inefficient as they have a lot of limitations, for example, white sticks, guided dogs, or human guides.

Subsequently, it is important to plan a more cost proficient and profitable framework for the oblivious to assist them with handling everyday issues and move with more noteworthy trust in the general public. Hence the “Pineal Eye for Blind”, is designed to help the blind to overcome their lack of visual sense. Here ultrasonic sensors are used to detect the objects and alert the user with audio signals. The system even consists of a feature of GPS tracking in case of an emergency. The system is also equipped with a camera module to know the type of object, and also assists the blind for using public transport. Thus, this system helps to ease the navigation process for the needy and help the user to move with greater comfort, speed, and confidence.

2. Literature Survey
Numerous explores have been performed for the new gadgets and innovations to structure an increasingly productive, dependable, and straightforward framework for the outwardly debilitated individuals for their headway. Be that as it may, the present frameworks have certain restrictions and are complicated to utilize.
[1] has discussed a handheld device with ultrasonic sensors which are 5 in number. As the object is detected the user is signalled by vibration and beep sound as the distance between the user and the obstacle decreases the vibration signal rate increases. This system is designed to be worn like a band or cloth, which is placed at 5 different parts of the body for sensing. It also senses the objects in different directions and alerts the user accordingly. This device helps blind to avoid the use of cane which is awkward to use.

[2] has discussed the system consisting of ultrasonic sensors linked with Micro-controller along with SD card, earphones, power supply. Firstly, it senses the object through ultrasonic sensors if the object is detected, it computes the distance, and the signal is converted to speech, and through speakers, the user is alerted. The drawback is after computing the distance it does not tell in which direction to move.

[3], they have proposed a system using IR Sensor, Sonar Sensor, Camera module to the raspberry pi microcontroller and the distance calculated is converted to speech and transmitted using headphones, the camera module captures the object's image and compares it with the already existing images in the module. The closest image is detected and send to users using headphones, but this system proves to be inefficient because sometimes the images captured do not match the existing images.

[4] In this paper they have designed a smart stick that can detect obstacles, stairs, and puddles. They have used two ultrasonic sensors, an Infrared sensor, a water sensor, and a microcontroller. Firstly, microcontroller initialization is done and then the ultrasonic sensor triggers the ultrasonic waves, IR sensor transmits the pulsed signal once when the ultrasonic sensor detects the obstacle ultrasonic sensor-2 calculates the height of the obstacle if the height is less than 50 cm it plays an appropriate message. If ultrasonic-1 is detected it calculates the distance, if the distance is less than the threshold it plays the message, if not threshold updating is done. If the IR sensor detects the obstacle it calculates the average of their signal and also detects the stair type and then plays the message.

[5], have proposed a framework where RFID labels are actualized on a stone path that is fixed on the trail. The server utilized for the route is associated with the internet. The working is depicted as once the input(destination point) is taken care of through discourse it peruses the beginning stage at that point sends the information to the server by GPRS. At that point the server finds the shortest course by perusing the point along the route, if the flow point is in the course it checks on the off chance that it is the goal point and restarts, else the new most limited way is looked and the procedure proceeds.

[6] have proposed a stick utilizing RFID data framework for blind route and Wayfinding which focuses on route and area assurance utilizing an RFID label matrix and each label contains the data of the surrounding. It is customized for both indoor and outside route infrastructures. It likewise has room and way mapping where each tag is modified, and once the way of RFID labels is introduced, a space analysis is completed to decide the exact facilitate of one reference RFID tag in the space. The highlights of the room are found dependent on this secure stay. Then with a design and portrayal of the room, all the RFID tag is then customized with position data and depictions of items in the room.

[7], they have built up a paper that depicts the framework utilizing a convenient pocket PC to produce 3D tests from multidirectional sonar framework that distinguishes hindrances around a visually impaired person. The nearest protests in 6 ways are consistently decided to utilize 6 sonar run meters. The article recognized is made aware of the client with the 3D sound by utilizing headphones. The fundamental downside of this framework is that it just identifies the items, doesn't advise where to move.

[8] have proposed Trembling and vocal sound worked route framework meant for an outwardly impeded person. This framework is executed as a cane. This framework checks for the front of the direction left and right and if the obstruction is recognized the vibrator engine for the individual side vibrates and the speaker declares for the impediment on the forthcoming way like the front, left, or right.

[9] portrays, Third Eye for the incognizant in regards to recognize objects utilizing Human controlled technology. This paper gives insights regarding building up an IOS versatile application that assists blind
with people in the distinguishing proof assignment with any encompassing items utilizing human fueled technology. After building up this application, the ease of use is tested and the outcome shows the 'Third eye' is an application that is easy to use.

[10], have built up a shopping aide for outwardly debilitated through a mix of wearable cameras, equipment quickening agents, calculations, a dream dependent on programmed shopping right-hand permits client with constrained or no sign to choose items from basic food item retires that utilizes SHELF video catch extraction and coordinating to direct the closer to the SHELF area that contains wanted items. This framework comprises of Ultrasonic sensors that ceaselessly transmit and gets ultrasonic influxes of recurrence 40KHz, on the discovery of a hindrance the data is given to the microcontroller, which is controlled by a 9V power supply. The bell and vibration modules are initiated to alarm the client and the discourse module changes over the information from content to discourse and gives it to the earphones, through which the client is cautioned utilizing sound signs.

3. Proposed System

Figure 1. Block diagram of proposed system.

The figure 1 illustrates block diagram of proposed system consisting of ultrasonic sensors to detect the obstacles, a panic button that can be used in case of any emergencies, Pi camera for capturing images, and using image processing detecting the kind of object is in front of the blind person. The system also consists of an RFID transmitter and receiver which helps blind people to use public transport like buses easily. The sensor senses the obstacles sends the signals to the microcontroller. Then the microcontroller converts it into speech using text to speech converter and conveys to the blind using headphones. And moreover, there is a panic button that can be used in case of any emergencies that send the location to the registered numbers.

4. Methodology

This system consists of Ultrasonic sensors which continuously transmits and receives ultrasonic waves of frequency 40KHz, and Pi camera supports capture resolutions (up to 1080p at 30 frames per second), on detection of an obstacle the information is provided to the Raspberry Pi-3 Model B and this runs by the power supply and the speech module converts the data from text to speech and provides it to the headphones, through which the user is alerted using audio signals.
Figure 2. Photographic camera board attached the Raspberry Pi.

Figure 2 shows the ribbon cable that attaches camera board to the Raspberry Pi. Both ends of the cable is connected to Raspberry Pi hardware and camera PCB. On the camera board, the blue colour supporter on the cable should be facing opposite to the board and on the Raspberry Pi hardware, the blue colour supporter on the cable should be facing towards the Ethernet connection.

This system also consists of modules like GPS tracking and GSM, this module helps to track the user location. The GPS tracking module will be sending the location information uninterruptedly to the microcontroller. The same are going to be routed to the GSM modem through the controller. The GSM modem will forward the location information to the chosen mobile numbers. If the person who received the message wants to find the location of the blind man, that person need to send one message like “TRACK IMMEDIATELY” he will get the blind man location coordinates. This is done using the SIM900 in this project.

In case of emergency, the Raspberry Pi-3 Model B can be used to locate blind person location and will send a SMS to all the saved numbers. Turn ON the entire kit including Raspberry Pi-3 by giving the power supply through the regulated power supply.

4.1. Ultrasonic sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. The speed of discernible sound is faster than that of Ultrasonic waves.

Ultrasonic sensor is included in the system. The Figure 3 shows HC-SR04 Module contains of four pins Ground, VCC, Trig, and Echo. The VCC pins need to be connected to the Raspberry Pi-3 Model B. The Ground pin and 5V pins are to be connected to the Ground. The trig and echo pins need to be connected to Digital Input/Output pin on the Raspberry Pi-3 Model B.
The ultrasonic sensor produces 40,000 Hz of ultrasound that travels through the air. If any obstacle is found in its path, it will rebound back to the module as shown in figure 4. By using the formula equation (1) given below, the distance can be calculated by making use of travelling time and the speed of the sound. By lining up the Trig on a high state of 10 μs, the ultrasound can be generated. An eight cycles of sound burst will be sent and the Echo pin will receive it. The output generated by Echo pin will be in microseconds.

\[
\text{Distance} = \text{Speed} \times \text{Time}
\]

\[
\text{Time} = \frac{\text{Distance}}{\text{Speed}}
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\[
\text{Speed} = \frac{\text{Distance}}{\text{Time}}
\]

(1)

To see an example, if the body is at a distance of 5 centimeters away the sensor and the speed of the sound is 260 m/s, the sound wave should be 192 μs/seconds. As the sound wave has to move forward and rebound back, the output of the Echo pin need to be doubled the number. By multiplying the rebounded time valve received from echo pin by 0.034 and it as to be multiplied by 2, in order to get the distance in centimeter.

The complete specifications are as follows:

- Operating Frequency: 40KHz
- Max Range: 4m
- Trigger Input Signal: 10μS TTL pulse
- Dimension: 45 x 20 x 15mm
- Min Range: 2cm
- Ranging Accuracy: 3mm
- Operating Voltage: 5V DC
- Operating Current: 15mA
- Measuring Angle: 15 degree
4.2. RFID

Figure 5 shows in order to find the object automatically the RFID will make use of electromagnetic fields to identify the tags attached to objects automatically. An RFID tag comprises of a transmitter, radio transponder and a collector. The RFID reader is ceaselessly sending radio waves. In this way, the RFID tag transmit its feedback signal back to the reader. It is fundamentally the same as the innovation which is utilized in a standardized tag. In any case, if there should arise an occurrence of a standardized identification, the article and the scanner must be in the sight line. The RFID Technology can even track many objects at the same time.

For the most part, RFID tags are operated at three different frequencies like low, high, and the Ultra high-frequency range. The low-frequency range is up to 10 centimeter, the high-frequency radio waves range up to 1 meter and the Ultra High-Frequency radio waves can travel even longer. So, the Ultra high frequency used by RFID tags can travel up to 10 meters to 15 meters.

![Figure 5. Working of RFID tag.](image)

4.3. Raspberry Pi Camera

Make using of 15-way ribbon cable, the Raspberry Pi is connected camera board. The pi camera capture resolutions up to 1080p at 30 frames per second. When an obstacle is detected, the information is provided to the Model. There are two connections that are to made: the first one is the camera PCB connected to ribbon cable and the second one is to the Raspberry Pi itself. The cable connections need to made correctly or else the camera won’t work. The Figure 6 shows camera module.

![Figure 6. Raspberry Pi Camera.](image)  
![Figure 7. Camera module port in Raspberry Pi.](image)
The Figure 7 shows camera module port in Raspberry Pi. The following steps need to be followed in order to Connect the Camera Module correctly. Firstly, make sure to turn off the Raspberry Pi, then place the Camera Module port and then startup the Raspberry Pi. Open the Raspberry Pi Configuration tool, make sure that the camera is enabled and Open a terminal window. Then to take still image write the command and then save it. Finally Press Enter to run the command. The camera preview opens a still picture. Find the picture icon on the Desktop and open the picture.

4.4. Raspberry Pi 3 Model B
Figure 18 shows the newest Model version is Raspberry Pi 3 Model B. The Pi isn't like a typical machine, it is lot smaller than the credit-card sized electric board in a personal computer or laptop. It consists of improvised 64bit processor and WiFi / Bluetooth support. Raspberry Pi 3 Model B is very useful board for Creators, Engineering designers, and Students.

4.5. Panic Button
The alarm control button is been directly linked to panic buttons that sends an emergency message to the monitoring center, whenever this panic button is pressed.

The single press button sensor can be utilized as a signal for Personal emergency response (PERS). Push Button is a switch that works on a mechanism "Push-to-make"as shown in figure 9. At first, it stays in off state or ordinarily open state however when it is pressed it permits the current to go through it or we can say it makes the circuit when pressed.

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**Figure 8.** Raspberry Pi 3 Model B.

**Figure 9.** Panic Button.
4.6. NEO 6M GPS module
Figure 10 shows the NEO-6M GPS module is a well performing total GPS receiver with an implicit 25 x 25 x 4mm ceramic antenna, which gives a solid satellite inquiry ability. With the power and signal indicators, you can screen the status of the module. The working voltage of the NEO-6M chip is from 2.7 to 3.6V. Yet, fortunately, the module accompanies MIC5205 ultra-low dropout 3V3.

NEO-6 modules consist of configuration pins for boot-time configuration and this becomes operative instantly after start-up. Once the NEO-6 module has started and in progress, the configuration settings can be changed with UBX configuration messages. The modified settings of the module will remain active until reset or power-down. The CFG GPS0 pin is included in NEO-6 modules, this allows the boot-time configuration of the power mode.

![NEO 6M GPS module](image)

**Figure 10.** NEO 6M GPS module

Higher timing accuracy is provided by NEO-6T using special Time Mode. This is intended for use with fixed antenna arrangements. The three unique settings feature of Time Mode are Disabled, Survey-In, and Fixed Mode. The final module of proposed system is as shown in figure 11.

![Proposed Final Module](image)

**Figure 11.** Proposed Final Module.
5. Conclusion

The proposed method is created to improve the independent portability of visually impaired people. One of the fundamental characteristics of this gadget is that it will be reasonable. The gadget is furnished with ultrasonic sensors, which comprises of modules. Utilizing the sensor, the blind person can identify the objects or substances around them and can walk or travel without any problem. Whenever the sensor detects any object it will communicate the information to the client by voice messages, through earphones. Further, it is outfitted with a signal for an emergency response to follow the visually impaired individual location. Thus, this is a mechanized gadget and will be of essentially useful for the blinds and assist them with volunteer to travel alone.

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