Blind Person Navigation Using Ultrasonic Sensor

T.Umamaheswari[1], T.Sumalatha[2], M.Kondalu[3]

[1]Assistant Professor, Department of Electrical and Electronics Engineering, Malla Reddy Engineering College, (Affiliated to Jawaharlal Nehru Technological University, Hyderabad) Secunderabad, Hyderabad, India.
[2]M.Tech Student, Department of Electrical and Electronics Engineering, Malla Reddy Engineering College, (Affiliated to Jawaharlal Nehru Technological University, Hyderabad) Secunderabad, Hyderabad, India.
[3]Professor, Department of Electrical and Electronics Engineering, Malla Reddy Engineering College, (Affiliated to Jawaharlal Nehru Technological University, Hyderabad) Secunderabad, Hyderabad, India.

ABSTRACT: The main objective of this paper is to develop an embedded system, which is used as blind man protection system to detect the obstacles using ultrasonic sensor. A blind man protection device is to protect against misshapenness such as automobiles collisions, obstacles, and accident that leads to great loss of human lives and can have disastrous results. Technology used for this purpose worked by detecting the other automobiles, obstacles and bystanders. This project is designed for blind people to avoid obstacles.
Here, an ultrasonic sensor is used to detect any obstruction and it in turn signals the microcontroller. Whenever the obstacle comes near the stick an ultrasonic sensor senses the obstacle and signals to the microcontroller[1] and in turn the microcontroller will on the voice chip. The detector circuitry consists of two way ultrasonic integrated detection. The detector houses the transmitter as well as receiver.
The detectors are positioned on the blind man stick. Once the detector recognizes any obstacle, the microcontroller signals to sound a buzzer and in turn on the sensor which is interfaced to the microcontroller. The system uses a compact circuitry build around flash version of AT89S52 microcontroller with a non-volatile memory.

KEYWORDS: embedded system , ultrasonic sensor, buzzer, AT89S52 microcontroller .

I.INTRODUCTION

Blind stick is an innovative stick designed for visually disabled[1] people for improved navigation. We here propose an advanced blind stick that allows visually challenged[1] people to navigate with ease using advanced technology. The blind stick[2] is integrated with ultrasonic sensor along with light and water sensing. Our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the microcontroller. The microcontroller[3] then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to sound a buzzer. It also detects and sounds a different buzzer[4] if it detects water and alerts the blind. The system has one more advanced feature integrated to help the blind find their stick if they forget where they kept it. Thus this system allows for obstacle detection by visually disabled people. A blind man protection device is to protect against misshapenness such as automobiles collisions, obstacles, and accident that leads to great loss of human lives and can have disastrous results. Technology used for this purpose worked by detecting the other automobiles, obstacles and bystanders. This paper is designed for blind people to avoid obstacles. Here, an ultrasonic sensor is used to detect any obstruction and it in turn signals the microcontroller. Whenever the obstacle comes near the stick an ultrasonic sensor senses the obstacle and signals to the microcontroller and in turn the microcontroller will on the voice chip. The system facilitates blind people to navigate independently with less external help. The system is equipped with obstacle sensors such as ultrasonic and IR sensor to alert the blind person. A normal person can identify the distance of the obstacle using LCD[1].

The blind stick[5] is integrated with ultrasonic sensor along with light and water sensing. Our proposed paper first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the microcontroller. The microcontroller then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to sound a buzzer. A buzzer[4] or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It also detects and sounds a different buzzer if it detects water and alerts the blind. The system has one more advanced feature integrated to help the blind find their stick if they forget where they kept it. Thus this system allows for obstacle detection by visually disabled people. The output of the paper can be observed as follows:

Whenever an obstacle reaches the vicinity of the stick, the buzzer gives a beep sound. And we can observe the distance measurement with help of the LCD screen. Since this is just a proto-type[6], the distance for the obstacle can be changed based on the client's requirement.

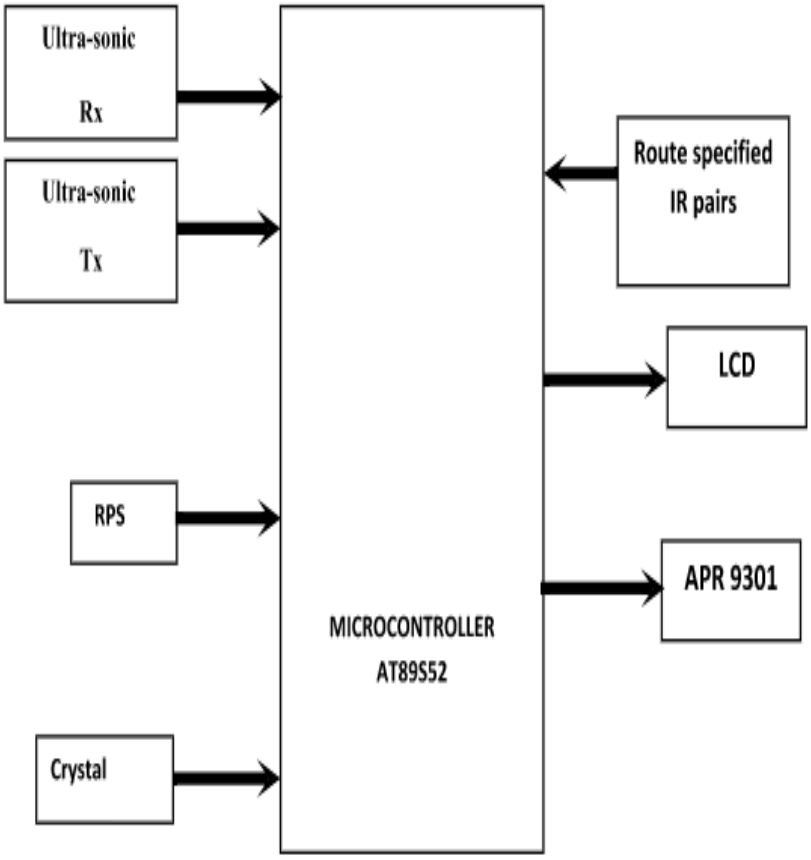
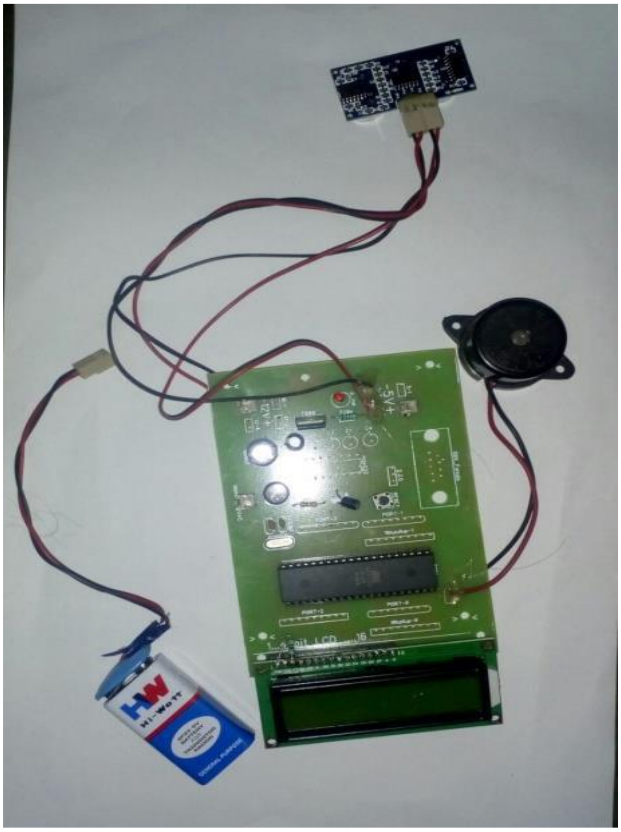


Fig.1.1. Block diagram

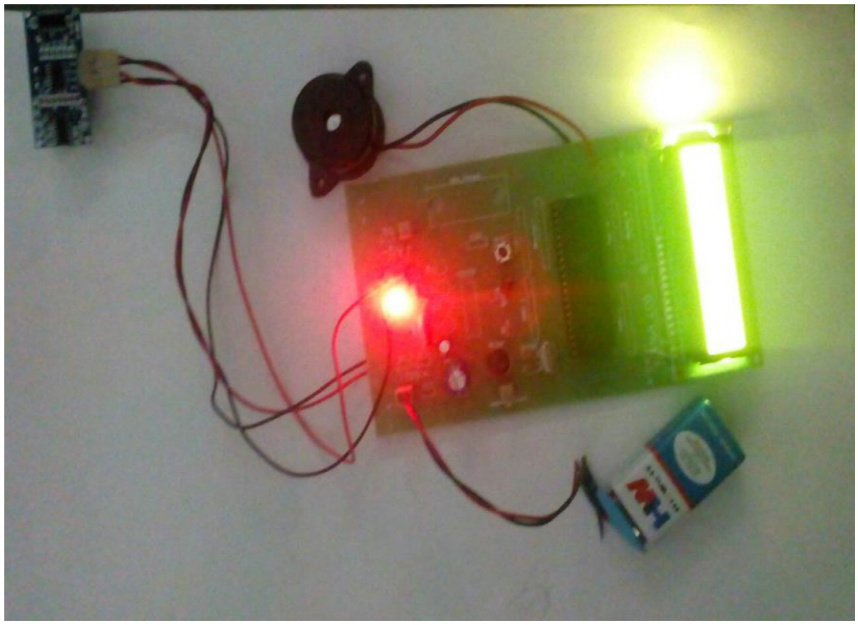
Fig.1.2. The following figure shows the equipment when there is no obstacle



Some more applications like vehicle detection[7], slippery floor, on-coming vehicle detection and fire or smoke alarm can also be included. One more application is for the family members to gain access to the blind person's location through the server whenever needed. Also, use of RFID tags[8] will transmit the location information automatically to the PCB unit when the intelligent stick is in its range

The system can be used both indoor and outdoor navigation[9]. Blind person's location can be tracked whenever needed which will ensure additional safety. Detects obstacles[10] and alerts the blind person through vibration alert and speech output

Fig.1.3. The following figure shows the equipment when the obstacle reached the vicinity of the equipment. We can observe a light which is an indication of the buzzer beeping.



II CONCLUSION

The paper proposed the design and architecture of a new concept of Navigation of blind person using ultrasonic sensors. The advantage of the system lies in the very fact that it is cost efficient and brings solution to millions of blind people worldwide. The proposed combination of various working units makes a real-time system.

It can be further improved to have more decision making capacity by employing varied type of sensors and thus could be used for different applications. It aims to solve the problems faced by blind people in their daily life. It also ensures to maintain safety.

It can be further enhanced my using VLSI technology to design the PCB unit. This makes it further more compact. Also the use of RFID tags will transmit the location information automatically to PCB unit , when the intelligent stick is in its range. The global position of the user is obtained using the Global Positioning System (GPS) and their current position and guidance to their destination will be given to the user by voice.

III REFERENCE

[1] G. Gayathri, M. Vishnupriya, R. Nandhini and M. Banupriya "Smart Walking Stick for Visually Impaired." International Journal of Engineering Science and Computing, August 2018 18790 http://ijesc.org/ International Journal of Engineering and Computer Science, vol. 3, number 3, pp. 4057-4061, 2014.

[2] R. Radhika, P.G. Pai, S. Rakshitha and R. Srinath "Implementation of Smart Stick for Obstacle Detection and Navigation." International Journal of Latest Research in Engineering and Technology, vol. 2, number 5, pp. 45-50, 2016.

[3] M.H. Mahmud, R. Saha and S. Islam "Smart Walking Stick – An Electronic Approach to Assist Visually Disabled Persons." International Journal of Scientific and Engineering Research, vol. 4, number 10, pp. 111-114, 2013.

[4] A. Jose, G. George, M.R. Nair, M. J. Shilpa and M. B. Mathai "Voice Enabled Smart Walking Stick for Visually Impaired." International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, vol. 5, pp. 80-85, 2016.

[5] R. Sheth, S. Rajandekar, S. Laddha and R. Chaudhari "Smart White Cane – An Elegant and Economic Walking Aid." American Journal of Engineering Research. Vol. 3, number 10, pp. 8489, 2014.

[6] M.H.V.Le, "Indoor Navigation System for Handheld Devices", Worcester, Massachusetts, USA, 2012.Roshni: Indoor Navigation System for Visually Impaired by D.Jain and M.Balakrishnan, P.V.M.Rao.

[7] C.S. Kher, Y.A. Dabhade, S.K Kadam., S.D. Dhamdhere and A.V. Deshpande "An Intelligent Walking Stick for the Blind." International Journal of Engineering Research and General Science, vol. 3, number 1, pp. 1057- 1062, 2015.

[8] B.G. Roopashree, B.S. Patil and B.R. Shruthi "Smart Electronic Stick for Visually www.ijcrt.org © 2021 IJCRT | Volume 9, Issue 7 July 2021 | ISSN: 2320-2882 IJCRT2107167 International Journal of Creative Research Thoughts (IJCRT) www.ijcrt.org b368 Impaired." International Journal of Innovative Research in Science, Engineering and Technology, vol. 4, number 7, pp. 6389-6395, 2015.

[9] World Health Organization, "Visual Impairment and Blindness," Fact sheet N "282", Oct 2014.

[10] National Disability Policy: A Progress Report - October 2014, National Council on Disability, Oct 2014.