Smart blind stick with voice module

[1]K.sateesh , [2]prem Kumar

Abstract--In this paper we propose a new device which assists the blind people for their daily activities without depending on other people. This device will improve the confident level of the blind people. This device is used to detect the objects like solids or liquids in front of them. This proposed system uses the arduino controller. This system is detect the objects with in 90 cm. Ultra sonic sensor is fixed in the stick end. This sensor senses the objects and inform to the blind people through voice message. When the voice message is received from this device, the blind people can detect the objects. This system consists of three ultrasonic sensors such as front, left and right. This system is mainly used to identify all type of objects on the path. This proposed device is also used to identify the blind people location and send the information to the concerned people with the help of GSM. This system is executed based upon ultrasonic sensor.

Keywords--GSM modem, Microcontroller, Ultrasonic Sensor, MEMS Sensor, Mike, Buzzer..

I   INTRODUCTION

T Eyes are the important part of our body. Without eyes the blind people are not able to go to anywhere without the help of others. Using the eyes we can see the entire world and objects. According to the survey report around 330 million people are having blindness or visual impairment. Human eye us an organ which reacts to light and also allows vision. It is the part of sensory nervous system. The common reason for blindness is because of diabetes macular degeneration, traumatic injuries, and infections of corona or retina. Blind sticks are very important for those people who are blind. But even using sticks blind peoples sometimes fall as a prey to someaccidents. Everyone has a mindset that blind people can't live with the help of others. But now technology has developed. In earlier days blind people use ordinary sticks. Blind peoples are dependent only the others help. They are using dogs for their guidance or other people to move from one place to another place. The blind people are upcoming a lot of issues in their daily activities. When the people move from one place to another place automatically the problem of blind people also increased. But now days by using the property of ultrasonic sticks are used by blind peoples. The unique characteristic of the ultrasonic sticks is that the sticks are inserted by ultrasonic sensors. Ultrasonic sensors are the instrument that measures the distance to an object using ultrasonic sound wave. These sensors detect the objects which come before them and the message is received to the blind people through the speaker connected to it. Smart phones are issue the voice message to the user. Other methods are ultra sonic sensor or laser technology for providing voice message.

The research article is ordered as follows: Section II presents the related works of blind sticks. Our proposed working model is offered in Section III. The sample prototype model is presented in section

IV. Finally, this article provides the conclusion part in Section V.

[1]*Professor, Department of CSE, RISE Krishna Sai Prakasham Group of Institutions, Ongole, AP, India, Email: ratnajoyal@gmail.com*

[2] *Professor, Department of CSE, RISE Krishna Sai Prakasham Group of Institutions, Ongole, AP, India*

II RELATED WORK

I Rupali A Tanpure et al., says the important of eyes in our life. God gave a gift to the people in the form of eyes. But some people are having problem in their eye sight and some people are entirely blind. The blind people are facing a lot of issues in their daily activities. The level of the problem was increased

when the blind people move to the new places. Because they are not familiar of the particular location. The existing devices are not working properly in outside environment. In this paper the authors proposed a new device for visually affected people which issue the voice output for object detection. The people are moved from one place to another place with the help of ultra sonic sensor and ADXL325 sensor. The locations of the peoples are identified with the help of GPS and GSM technologies [1].

Vijayalakashmi badre et al., described about stick for blind people using ultrasonic sensor and voice message. Using traditional system the blind peoples are not able of detect the objects on the path. The main objective of this proposed device is provides better object detector tool. In this tool ultrasonic sensor is used to detect the objects. It provides better result compared with an existing device. The voice system was used to assist the blind people after reach the specified location. In this stick also provides vibration when the blind people reach near slop or pit on the path [2].

Priyanka Patil et al., says the importance of device for blind people. Every blind people need some extra to assist when they are moving from one place to another place. Here a smart stick was proposed to provide a better solution of blind and visually impaired people. In this stick was constructed by using various hardware technologies such as ultrasonic sensor, infrared rays and laser rays. This device can be integrated with their smart phone. The various voices are already recorded on this device. This stick also used to find the objects on the path. This device was computing the distance of the objects from the blind people and turn into number of footsteps. This system generates a voice message when the users near the objects [3].

Akshay Salil Arora et al., explain the importance of technology in our daily life. Most of the peoples are using the benefits of the current technology except

some people in this society. The blind and visually affected peoples are depends only other peoples when they are moving from one location to another location. In this paper authors providing theoretical concept associated with current communication technology concepts to issue the well organized and smart device to the blind. The hurdle on the path was detected by using IR sensor combined with ultrasonic sensor. GPS concept combined with Bluetooth was provides the voice alert message in the necessary location and issue the SMS message to the concern people. The main objective of this model was providing proper information about the surrounding objects. The objects may be static or dynamic [4].

Hafiz M. U. Munir et al., explain about the blind people problems. They are facing large amount of problems when they or walk on the road or street. This type of human needs a special device to assist them. In this paper the authors constructed a new embedded system which was provides the help to the visually challenged people to walk in the middle of various hazards. This device looks like a long stick. At the end of the stick contains three various sensors are used to detect the objects on the way. The output of the ultrasonic sensors converted into voice message.

The voice message was displayed through the headphone and it issued various commands like move right, left etc. In this article the authors reviewed various related devices. Finally the proposed device was compared with existing related devices. The advantages of proposed device were highlighted in this article [5].

Bo Wang et al., says that large number of devices are available in the market for the blind people. But the existing devices are costly and they are doing a single function. In this article the authors designed a new system using gyroscope accelerometer part, ultrasonic part, SIM868 part, voice part etc. The entire system was controlled by using STM32F103controller. This device also identifiethe user's location. The location parameters are sent to the concern peoples contact already stored in this device [6].

Reshma Vijay Jawale et al., constructed a new device for blind people using ultrasonic navigation sensor. It is mainly used to guide the blind people in urban cities. This new device was worked by using two modes. The two important mode of this proposed system was object identifying mode and fixed mode. In the first mode nearest objects are detected using sensors like ultrasonic and water sensor with the help of arduino controller. Using this mode the blind people were easily identifying solid objects and water bodies. The fix mode was used to fix the route from source to destination. This proposed device gave the entire guidance to the blind people in any situation [7

Aritra Ray et al., designed a new portable device for blind people in the world. It consumes low power and small in size compared with existing devices. This device was constructed by using various hardware, software devices with sensing concepts. Pressure sensor device and distance sensor device also fix with this system. The speakers provide the responses through voice signals represent the distance in the form of meter. The current locality of the blind people is also detected by using this device [8

III PROPOSED APPROACH

The proposed system is used for blind people to detect the objects on their path. This system consists of various parts. The following fig1 shows the outline diagram of our proposed model
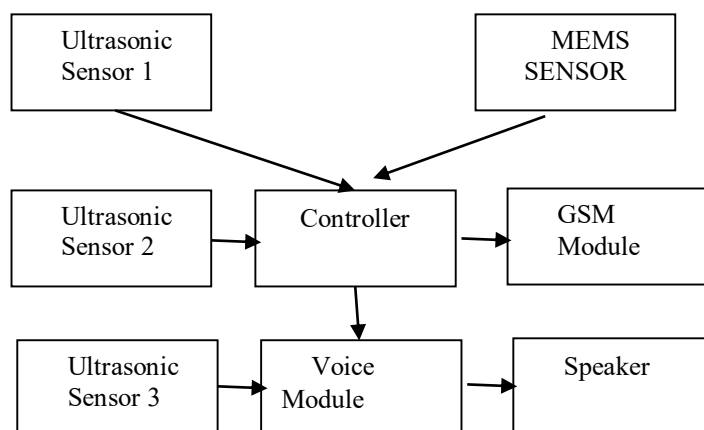

Figure 1: Outline Diagram of Proposed System

The following parts described about the various components used in this proposed system.

Arduino Microcontroller:

The entire device is controlled by Arduino microcontroller. It contains 4KB flash memory and it has reprogrammable property. The controller is capable of 1000 time's reprogrammable capacity. The sensors are connected with the controller using various ports. When the objects are identified by the sensors the buzzer and motor are vibrated. Embedded C language is used develop the program for microcontroller.

The Obstacle detection part

This object detection part contains three ultrasonic detector[9-10]. Ultrasonic sensor identifies the objects up to 180 cm. The object identification process is depends on speed of the sound signals[11-12]. The received sound signals transferred to the controller. Depends upon the distance parameter the buzzer will make the sound. The advantage of duration is to identify the objects are in left or right[13-14].

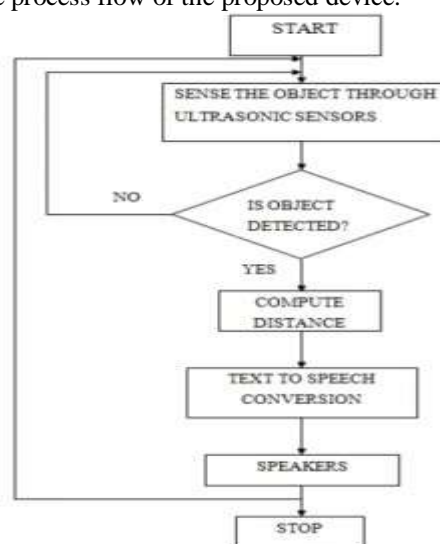The following diagram 2 shows the process flow of the proposed device.

Figure 2: Process Flow of the Developed Module\

The ultrasonic sensor is used to detect the object on the way of the blind people. After the hurdles are detected the distance is calculated by the controller. Depending upon the objects distance the voice message is displayed through the speakers.

IV. RESULTS AND DISCUSSION

This proposed device is used to detect the objects on the path of the blind people. This sensor emits the waves to one direction. Microcontroller is used to control the entire device. This controller contains flash memory, RAM and ROM for storing the data. Here we are using three ultrasonic sensors which is placed in the left, right and front position. If the left sensor is sensed turn right voice will be played and if the right sensor is sensed turn left voice will be played. If the front sensor is sensed go back voice will be played. We also have a MEMS sensor which will

detect the fall of the blind person. If the value of MEMS is increased an SMS will be sent to the concerned person. The following fig 3 shows the developed prototype of proposed system.
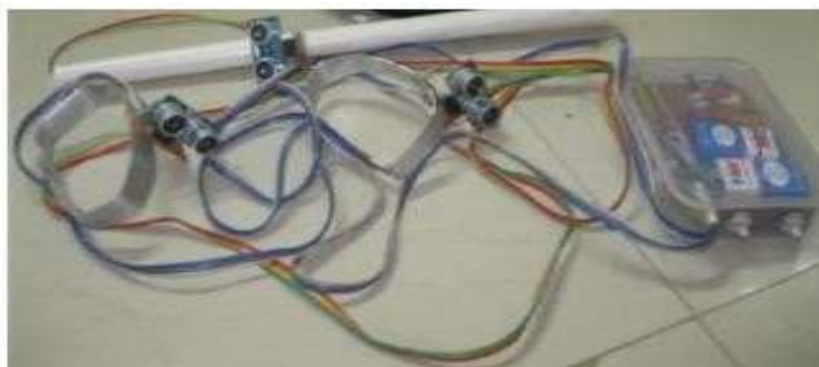
. **Figure 3**: Prototype of Proposed System

This system consists of front, left and right sensors. The following table 1 shows the distance covered by the various sensors and the vibration level of buzzer.

Table 1 Distance Covered By sensors and Buzzer Volume level

Direction	Hurdle Recognition		
	Sensor Used	Distance Range	Buzzer/Vibration
Front	Ultrasonic Range Detector	100-75 cm	200ms(B)
Front	Ultrasonic Range Detector	75-50 cm	500ms(B)
Front	Ultrasonic Range Detector	50-25cm	1s(B)
Front	Ultrasonic Range Detector	Less than 25cm	continuous(B)
Left	Left IR sensor	Up to 5cm	250ms(V)
Right	Right IR sensor	Up to 5cm	500ms(V)

V. CONCULSION

The blind people cannot be able to move from one location to another location without the help of others. In this paper describes a new device used to detect the hurdles or any objects on the path. By using this device the blind people are move easily both indoors and out door environments. This research paper also analyze the various existing devices are used by the blind people. This system consists of three various sensors are used to detect the objects on the path. Based upon the distance from the object to the user the voice message sends to the user. Using this message the blind people change their locations. In case of any emergency situations the blind people use the panic button to alert the concern people through GPS and GSM technology. This device is exclusively used for blind people**.**

REFERENCE

1. Rupali A , Tanpure Pragati D, Borkar Madhuri R , Falke Monali Dhale & Nanasaheb B Waditke, "Advanced Voice Based Blind Stick with Voice Announcement of Obstacle ", IJIRST – International Journal for Innovative Research in Science & Technology, Vol. 4 , No. 4, ISSN: 2349- 6010, 2018.

2. Vijayalakashmi badre, Roma Chhabria, Tanmay Kadam & Kritika Karamchandani, "Ultrasonic Blind Walking Stick With Voice Playback ", International Research Journal of Engineering and Technology (IRJET) , Vol. 03, No. 04, 2016.

3. Priyanka Patil, Apurva More, Madhura Rakshe ,Vaishnavi Badwe & Rachana Patil, "Voice Assisted Blind Stick using Ultrasonic Sensor ", International Research Journal of Engineering and Technology (IRJET), ISSN: 2395-0056, Vol. 05, No. 01, pp. 222-224, 2018.

4. Arora, Akshay Salil, and Vishakha Gaikwad. "Blind aid stick: Hurdle recognition, simulated perception, android integrated voice based cooperation via GPS along with panic alert system." International Conference on Nascent Technologies in Engineering (ICNTE), pp. 1-3, 2017.

5. Munir, Hafiz MU, Fahad Mahmood, Ayesha Zeb, Fahad Mehmood, Umar S. Khan, and Javaid Iqbal. "The voice enabled stick." 20th International Conference of Computer and Information Technology (ICCIT), pp. 1-5, 2017.

6. Wang, Bo, Wei Xiang, Kairen Ma, Yu Quan Mu, and Zheng Wu. "Design and implementation of intelligent walking stick based on OneNET Internet of things development platform." 28th Wireless and Optical Communications Conference (WOCC), pp. 1-5, 2019.

7. Jawale, Reshma Vijay, Madhavi Vijay Kadam, Ravina Shantaram Gaikawad, and Lakshmi Sudha Kondaka. "Ultrasonic navigation based blind aid for the visually impaired." IEEE International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI), pp. 923-928, 2017.

8. Ray, Aritra, and Hena Ray. "Smart Portable Assisted Device for Visually Impaired People." International Conference on Intelligent Sustainable Systems (ICISS), pp. 182-186, 2019.

9. Snehalatha, N., TS, S.A. and Amudha, S.,. REMOTE DISPLAY ACCESS USING REMOTE FRAME BUFFER AND IO STREAMING. International Journal of MC Square Scientific Research, 8(1), pp.23-40, 2016.

10. Rajesh, D. Ch Panel Based Routing Scheme for Mobile Wireless Sensor Network. International Journal of MC Square Scientific Research, 8(1), pp.183-198, 2016.

11. Vijayabaskar V. and Rajendran V. "Analysis and modeling of wind dependence of ambient noise in shallow water of Arabian sea", European Journal of Scientific Research, Vol.50, pp.28-34,2011.

12. Vijayabaskar V., Rajendran V. and Mathews M Philip."Frequency Domain based approach for Denoising of Underwater Acoustic Signal using EMD", Journal of Intelligent Systems, Vol. 22, 67–80 2013.

13. Vijayabaskar V., Rajendran V. and E.Logashanmugam , "Study of Different Denoising Methods for Underwater Acoustic Signal",Journal of Marine Science and Technology,Vol. 23, No. 4, pp.414-419 ,2015.

14. Vijayabaskar V. and Rajendran V, "Wind Dependence of Ambient Noise in Shallow Water of Arabian Sea During Pre-Monsoon", Proceeding of IEEE International Conference on Recent Advances In Space Technology Services & Climate Change",Sathyabama University, pp. 413-416, 2010.