Shrewd Walking Crutch for Visually Impaired Person

R. Gurulakshmi[1] R. Akshaya[2] S. Rabia Jebin[3]
[1,2]UG Student [3]Assistant Professor
[1,2,3]Department of Electronics and Communication Engineering
[1,2,3]IFET College of Engineering, Villupuram, India

Abstract— Nowadays everyone in this world is in a race of achieving success, so for the betterment and welfare of the blind person, many gadgets are invented. In such a way this paper describes a new gadget which will improve the navigation of blind person from one place to another and it will also helps the blind person to walk on the roads very safely by making awareness with an alarm for the obstacle or hurdles ahead in the path. This project helps to detect the obstacles with distances up to 10 cm by using HC-SR04 ultrasonic sensor. The distances are displayed in the 16× 2 LCD display. The blind people are alerted by the buzzer sound when obstacles are detected. Then the SOS button is pressed by the bind people when they feel that they are in danger situation. GSM SIM900A will transfer messages and emergency calls to their family members with help of a UART. The location will be shared to their family members with help of Wi-Fi via GPRS. The GPRS is also used to store the information in CLOUD and retrieve it later. This project will help the blind people to locate the places, to detect the obstacles and in some emergency situations. Our main aim of this project is to provide safe and secure for the blind people in the society.

Keywords: Ultrasonic Sensor, GSMSIM900, GPRS, LCD Display, Buzzer, Battery

I. INTRODUCTION

"Action with a vision is a daydream. Vision without Action is a nightmare "is a proverb said by the Japanese. According to the Vision 2020, India has reduced the blindness to 0.3% of the total population. India has a higher number of blind people from international forums definition. India presently has around 12 million of blind people against 39 million worldwide which makes India accommodation to one-third of the world's blind population. Dig Vijay Singh Hada, Himanshu Gautam has proposed Smart walking Stick for visually impaired person [1]. This paper presents outline and usage of a helpful gadget to help the blind people. This existing system using ultrasonic sensor will senses the obstacles and passes the information to the microcontroller then processes this information to the microcontroller. If the obstacles are close enough it is indicated using headphones giving the knowledge of distances. The water sensor is used to senses the water a head path in the roads and alert by different buzzer by the user. The live wire in the path is detected by the water sensor. The blind people forget the stick where they kept it is found by the system integrated with the stick. A wireless based remote is used for this purpose. The blind person will press the remote button and heard buzzer sound and they find the stick. G.Gayathri, M.Vishnupriya, R.Nandhini has proposed a paper Smart walking stick for visually impaired [2]. They use ultrasonic sensor and it can detect any object that lie on the ground within a distances should not less than 3cm width. These electrodes are fitted at the bottom of the stick for water detection and sending the information to the blind people. And for pit indication we infrared sensor and it inform the pit in the path. Another advantage is distances are traced out by the alarm sound. Akila Jose, Greeshma George, Meenu R Nair has presented a paper on Voice enabled smart walking stick for visually impaired [3]. The sensor give information about the object detection, pit sensing and water detection. The pre-programmed locations to determine the optimal route to be taken from the GPS technology. Memory stores any location which can be chosen by the user. The information in which regarding obstacles is given voice alert either than vibration pattern used in earlier system. It system which uses for easy mobility. Kher Chaitrali S, Dabhade Yogita A, Kadam Snehal K, has projected a paper An Intelligent Walking Stick for the Blind [4]. The obstacle prevention is indicated by voice indication and infrared sensor, RFID technology and android devices for navigation purpose. The RFID technology are used to install in public buildings and also integrated with stick. These devices are connected to android devices through Bluetooth. The person's location information is updated to the server based by the RFID voice navigation is designed by the android application.

II. RELATED WORK

G.Prasanthi, P.Tejaaswitha has proposed Sensor Assisted Stick for the Blind People [5].The sensor are used to detect the obstacle for collision avoidance, it detect the object in the direction up, down and front. These sensors are integrated with voice record and play record. The information are given to the blind people to alert them with different speakers. In this project, the main objective is to detect the object in all direction to help the blind people to walk in the roads. Abhishek Bhokare, Amruta Amberkar, Avnesh Gawde, has proposed Ultrasonic sensor walking stick [6] in which use artificial vision object which provide information about the environment and static object around them. The ultrasonic sensors are used to detect any obstacles with indication alert sound to the user. They also find the forget stick by using wireless remote. Mohammad Hazzaz Mahmud, Rana Saha, Sayemul Islam Smart walking stick- an electronic approach to assist visually disabled person [7]. The constructed microcontroller based automated hardware that can collaborate with blind to detect obstacles in front in his /her path. The components associated with microcontroller are ping sonar sensor, wet detector, proximity sensor, a micro pager motor. The ping sonar sensor is used to detect ranges of the obstacles, GH311 Ultrasonic obstacle sensor is applied what to notice at the bottom of the stick i.e. terrain a pair of electrodes are used to observe the wetness underneath. The strength of the vibration of the motor, beeping of the sound or blinking of the LED embedded with stick. Rohit Sheth, Surabhi Rajandekar, Shalaka Laddha, Rahul Chaudari has proposed the ultrasonic sensor is used to detect pits, holes, downfalls, a staircase, low lying and knee lying obstacles and

above the waist. The user is indicated by the pre-recorded sound messages and haptic vibration sounds.

III. PROPOSED SYSTEM

In this project Atmega 328 microcontroller is the main component of the system. The ultrasonic sensor will senses the obstacles with distances by emitting ultrasonic waves to detect the objects. When the obstacle is detected the data is passed to the Atmega 328 microcontroller. Then it is indicated by the buzzer sound to the blind people. Then the distances are displayed in mm and inches. The distances are shown in 16×2 LCD display. The ultrasonic sensor can measure up to 10cmm and in inches. When the blind people press the SOS button when they feel that they are in danger situation. Then the GSMSIM900A are used to transfer messages and emergency calls to their family members. It is connected to the laptops, mobile phones with help of UART. The GPRS is connected to the mobile phones using Wi-Fi connector such as hotspot. The GPRS connect the satellites with Wi-Fi connection and the signal s are send to the base station and then to the server and distributed to all mobile phones. The information is stored in the CLOUD and can be retrieving later by the user. The mobile application app is created to connect the mobile phones. The mobile app is called as Blind app. Blind app is used to locate the blind person. It is login in by user ID and password. The blind app is used by their family members. Then it shares the direct location of the blind people to their family members. The battery is used to operate the blind stick with all its necessary components. The proposed system which help the blind people to cross the roads safely. It is secure and safety for the blind people. The proposed system block diagram of the actual project is explained in figure 1.

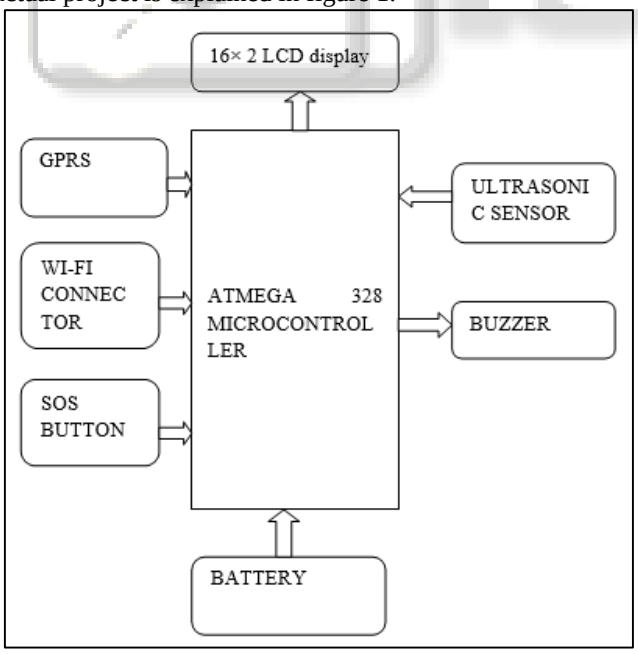

Fig. 1: Block Diagram of Proposed system

IV. HARDWARE OF THE SYSTEM

To measure the obstacle's distance to avoid collision the HCSR-04 ultrasonic sensor can be used. For wireless connectivity Wi-Fi connector such as hotspot can be used. The sensors are interfaced with the Atmega 328 microcontroller. The output of the device is displayed in the LCD display and buzzer. And separate android application is created for locating the places. The fig 2 shown below is the project overview.

Fig. 2: Project Overview

A. Methodology

The ultrasonic sensor will measure the obstacles distances and output is displayed in the 16×2 LCD display. It can be displayed in cm and inches. The detectable distance measurements are shown in table1.

Distances in cm	Distances in inches
28 cm	11inches
30 cm	12 inches

Table 1: LCD Display Status

V. RESULTS AND DISCUSSION

The model of the proposed system is compete functionality. The ultrasonic sensor will senses the obstacles with distances and it is displayed in the LCD display. The fig 3 shows the LCD display output is given below

Fig. 3: LCD Display Measurement

The GSM SIM 9000A are connected to the mobile phone by using UART they can transfer messages to their family members. When GSMSIM900A is switched on then the GSM will send the messages as software activated and when SOS button is pressed the message will be send as Alert… I am at emergency I need your help. The figure 4 shown below is the message displayed in the mobile phones.

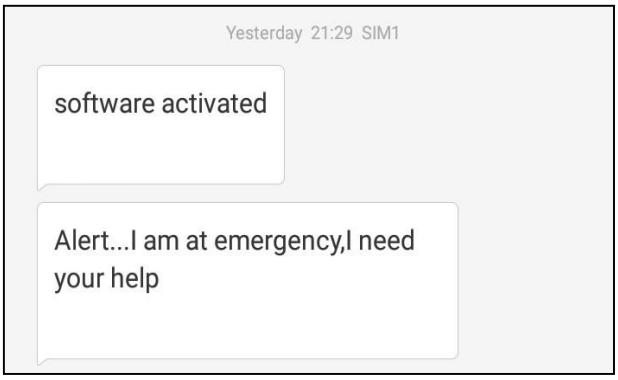

Fig. 4: Message Displayed in the Mobile Phones

The GSM SIM900A will also send emergency calls to their family members to their mobile phone which is indicated in the software program. The figure 5 shows that emergency calls displayed in the mobile phones

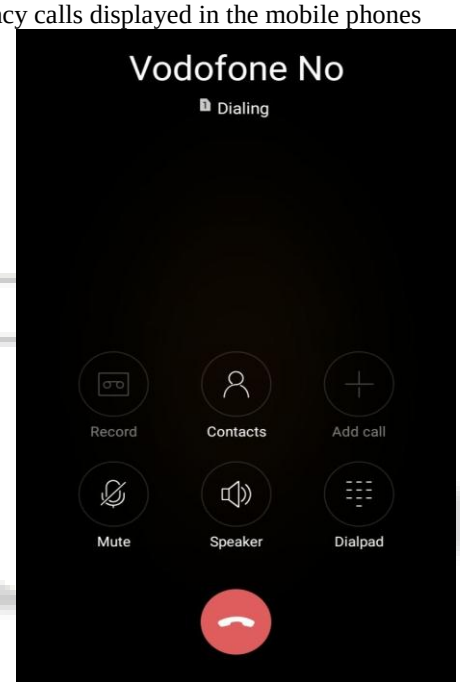

Fig. 5: Emergency calls

The GPRS system will connect to mobile phones by Wi-Fi connection such as hotspots. The mobile application created for blind people will share the place to their family members. The figure 6 shows that the locating the blind people place

Fig. 6: Locating the blind people place

VI. Conclusion

After conducting the experimental works we are successful in designing the walking crutch for the welfare of the blind people with low cost. It would help the blind people to go from place to place, walk and cross roads safely. The blind people can be benefited from our project and they can feel safe and secure in their navigation.

VII. Future Enhancement

In the future, the proposed paper can be implemented with help of GSMSIM900A developed with 4G internet facilities and will be faster and accurate information about the blind person location.

References

[1] Dig Vijay Singh Hada, Himanshu Gautam, Jitendra Rathore, Kamal Bhopani, Lakshita Vishnoi, Sarfaraz Nawaz" Smart Walking Stick for Visually Impaired person," IJSRST Vol.4, Issue5, March-April2018.

[2] G.Gayathri, M.Vishnupriya, R.Nandhini, Ms.M.Banupriya" Smart Walking Stick for Visually Impaired" International journal of Engineering and Computer science, Vol 3, Issue 3, March 2014.

[3] Akila Jose, Greeshma George, Meenu R Nair, Shilpa M J, Mr. Munna Basil Mathai" Voice enabled smart walking stick for visually impaired" International Journal Research in Electrical & Electronics Engineering Vol 5, Issue 3, March 2016.

[4] Kher Chaitrali S, Dabhade Yogita A, Kadam Snehal K,Dhamdhere Swati D,Deshpande Aarti V," An Intelligent Walking Stick For The Blind "International Journal of Engineering, Research and General Science Vol 3, Issue 1,January-Feburary2015.

[5] M.Prasanthi, P.Tejaaswitha "Sensor assisted Stick for the blind people" Transaction on Engineering. And science, Vol 3, Issue 1, January, 2015.

[6] Abhishek Bhokare, Amruta Amberkar, Anvesh Gawde, Pratham Kale, Abhijeet Pasi "Ultrasonic Blind Walking Stick" International Journal on Recent and Innovation trends in Computing and Communication, Vol 4,Issue 1,January 2016.

[7] Mohammad Hazzaz Mahmud, Rana Saha, Sayemul Islam," Smart Walking Stick an Electronic approach to assist visually disabled persons" International Journal of Scientific & Engineering Research, Vol 4, Issue 10,October 2013.

[8] Rohit Sheth, Surabhi Rajandekar,Shalaka Laddha, Rahul Chaudari" Smart White Cane –An Elegant and Economic walking Aid "American Journal of Engineering Research, Vol 4, Issue 10,March 2014.

[9] Shruti Dambhare, A.Sakhare "Smart stick for Blind Obstacle Detection – Artificial Vision and Real Time assistance via GPS" National conference on Information and Communication technology and International journal of Computer Application,2011.

[10] Olakanmi, O.Oladayo "A Multidimensional Walking Aid for Visually Impaired Using Ultrasonic Sensor Network with Voice Guidance" I.J. Intelligent System and Application, July 2014.

