

Ultrasonic based Navigation and Location Tracking System for Blind and Deaf People

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Abstract— Blindness and deafness is the condition of lacking the power of visual perception and hearing. Due to these two conditions there are number of blind and deaf people around the world. They are suffering a lot while doing their daily activities and travelling outside. So to provide the navigation system for them we propose the idea to indicate the detection of obstacle through speaker and vibrating motor. And also we provide the tracking system to know the location of the blind and deaf people using GPS and the location will be sent through the GSM module to his/her relatives who gives request to the mobile application.

Key words: Ultrasonic Sensor, Vibrator, GPS, GSM

I. INTRODUCTION

Ultrasonic based navigation system uses the ultrasonic sensor for continuously transmitting the ultrasonic waves to the environment. When the obstacle is detected the transmitted waves are reflected back to the sensor. The ultrasonic receives the signal and give it to the Microcontroller which processes the signal. The processed signal is given to the relay as well as the voice IC to produce the vibrations and voice alerts. Using GPS and GSM technology the location of the blind and deaf people will be tracked.

In existing system, a detachable device is attached to the wheelchair. If any user using a wheelchair along with the device approaches the obstacle, the sensor detects the same and provide voice feedback to the user to alert about the obstacle so that the user can correct his/her path suitably [1]. The cost of the wheelchair is high so very few people only use the wheelchair. The user will have to confine to the wheelchair which is inconvenient to the user and also the speed of the wheelchair may vary. IR sensor is attached to the walking stick to improve the mobility of the blind and visually impaired people. Within a range of two meters, the stair-cases and other obstacles presence in the user path are detected by a pair of infrared sensors [2]. IR sensors are only for detecting the proximity of an obstacles and it cannot measure the exact distance between the user and the obstacle. Infrared sensors are not be used in the outside.

Ultrasonic based spectacles for blind people is the electronic navigation system for the detection of obstacles using ultrasonic sensors. Ultrasonic transmitter continuously passes the ultrasonic waves to the environment. When the obstacle is sensed the transmitted waves are reflected back to the receiver. The ultrasonic receiver senses these ultrasonic waves and this sensed data are passed onto the microcontroller which gives alert through buzzer unit [3]. The exact direction of the obstacle does not indicate by the buzzer module it just give the buzzer sound.

II. PROPOSED SYSTEM ARCHITECTURE

The system in this paper is designed to two parts of operations. First part is for detecting the obstacle and alerting the blind and deaf person through speaker and vibrator respectively. And the second part is for tracking the location of the person using GPS and also sending an SMS to the relative of the blind and deaf person via GSM module about his/her location.

The first part consists of Ultrasonic sensors, Microcontroller, Voice IC, Speaker and Vibrational motor. Ultrasonic sensor is the device that can measure the distance to an object by transmitting ultrasonic waves in the atmosphere. It calculates the distance by transmitting an acoustic wave at a specific frequency and listening for that sound wave to get back. The transducer of the ultrasonic sensor transmits the sonic waves that are reflected by an object and received back in the transducer. The received signal is passed to the microcontroller through the interfacing circuit. The further process of the signal is processed by the microcontroller which also calculates the distance from the obstacle. It also gives the signal to the voice IC as well as relay to control the vibrational motor. Voice is pre-recorded in voice IC. The voice feedback alert is given through speaker and for deaf people vibrator gives the vibrational alert. The location of the blind person can be located through GPS and GSM is used to send the location of the blind person through a mobile application.

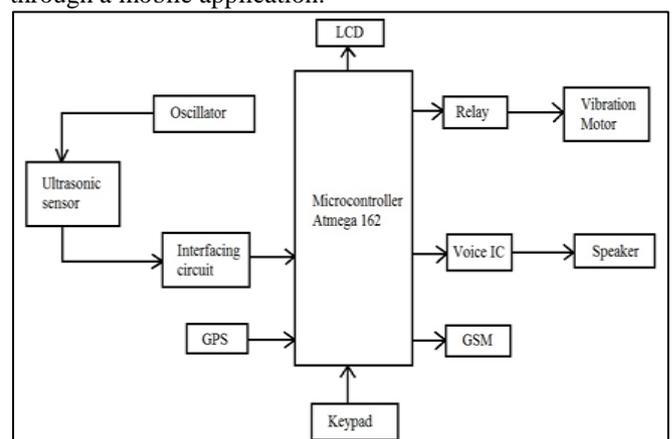


Fig. 1: Block diagram of proposed system

And the second part will be working for tracking the location of the blind and deaf people using GPS. When the request is given through the mobile application by the person's relative, the location of the blind and deaf person will be sent via the GSM module. Initially the mobile number and the value of the ultrasonic sensors are stored in Microcontroller using keypad.

III. RESULT

The value of ultrasonic sensor will be entered into the microcontroller using keypad. When the obstacle was detected, the microcontroller activates the relay for switching the vibrating motor to give the vibrational alert. And also microcontroller gives the signal to the voice IC where the voice has been stored. Voice IC delivers the voice signal through the speaker. Using GPS technology the location of the blind and deaf person will be tracked and it is sent through an SMS to his/her relative.

IV. CONCLUSION

The system is proposed with the prominent advantage to the people who are blind and deaf. The navigation system for blind and deaf people indicates the direction by voice and vibrations. The tracking system provides the location of the person through GSM. In future the system can be enhanced by providing variety of vibrations depends on the distance between the sensor and the obstacle for the deaf people.

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