

Sonic Eye with Walking Stick for Blind People

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Abstract— The aim of our project is to redefining vision to create and enhance opportunities for independence of blind people. The main objective of this project is to provide artificial guidance to the visually impaired people with the help of Arduino UNO board, 3 ultrasonic sensor placed on stick to detect obstacle on right, left and front side and earphone to inform blind person about obstacle in the form of voice message .GPS system is used for exact location tracking of blind person and GSM module to communicate with authorized person or care taker of that blind person to know about exact location of that person using google map.

Key words: Arduino Uno board, Ultrasonic sensor, Voice playback unit (APR9600), GPS receiver, GSM module, VB window

I. INTRODUCTION

Vision is the most important part of human physiology as 83% of information human being gets from the environment is via light. Blindness is a state of lacking the visual perception due to physiological or One has to ask for guidance in order to reach to the destination. But what if the person is visually impaired!! Person has to completely depend on other people to reach destination. Generally we observe that white cane is the best friend of visually impaired person. But many times this cane is not useful. In an unfamiliar surrounding visually impaired person might get confused. So this restricts their mobility. This makes them dependent on others. Regardless of the tool used, the factor that most determines a person's mobility is the use of essential personal skills. The traditional and oldest mobility aids for persons with visual impairments are the walking cane (also called white cane or stick) and guide dogs. The most important drawbacks of these aids are necessary skills and training phase, range of motion and very little information is conveyed. With the rapid advances of modern technology, both in hardware and software front has brought potential to provide intelligent navigation capabilities. Recently there has been a lot of Electronic Travel Aids (ETA) designed and devised to help the blind navigate independently and safely. Also high-end technological solutions have been introduced recently to help blind persons navigate independently. Many blind guidance systems uses ultrasound because of its immunity to the environmental noise. Another reason why ultrasonic is popular is that the technology is relatively inexpensive, and also ultrasound emitters and detectors are small enough to be carried without the need for complex circuit.

II. PROPOSED SYSTEM

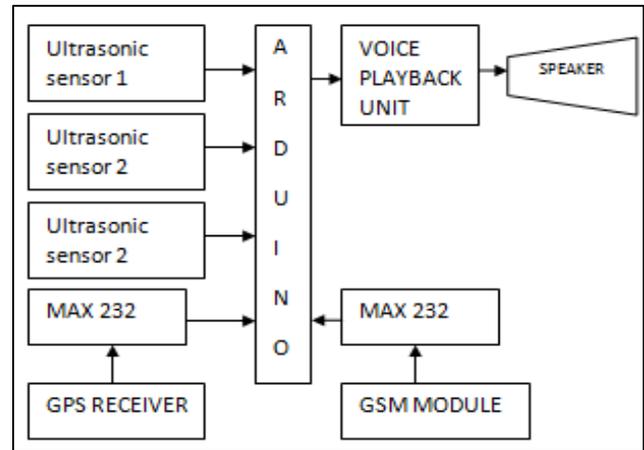


Fig. 1: Transmission Section

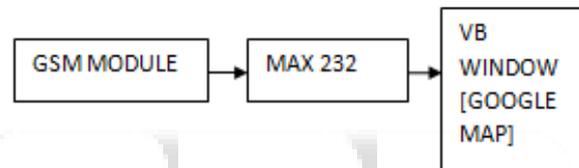


Fig. 2: Receiver Section

III. WORKING

In this proposed system, a blind person has to carry walking stick with him. The three ultrasonic sensors are placed on the stick such a way that right, left and front. When obstacle will come in front of the blind person then ultrasonic sensor sense the presence of object after that arduino will processed further and this system will give command to the blind in the form of voice message through earphone. Voice messages are already stored in voice playback unit (APR9600). Voice messages like front obstacle is detected, right obstacle is detected and left obstacle is detected.

Also this stick having a GPS receiver in the circuitry, which is used to track the exact location of the blind. Co-ordinates of location will send through GSM module from transmitter to the receiver, receiver is placed at the home of the blind and his care taker or guardians can know about exact location of him and location is viewed by google map in VB window.

IV. FLOW OF SYSTEM

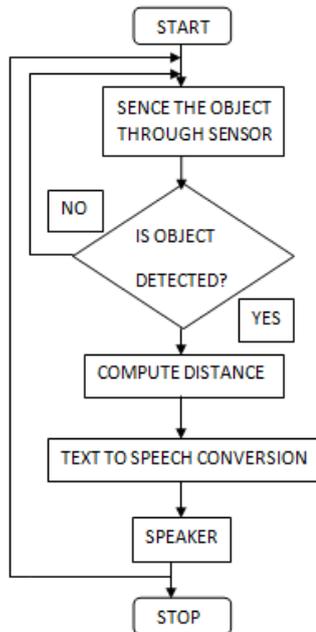


Fig. 3: Flow of System

V. HARDWARE DESCRIPTION

A. Power Supply

Overall system works on 9v external battery.

B. Arduino Uno Board

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

C. Ultrasonic Sensor

In this system, 3 ultrasonic sensors are used to detect the obstacle in the path of blind person. It works at 4 frequency 40khz and range of distance is from 4cm to 4m.

D. Voice Playback Unit (APR9600)

Voice playback unit is used to record and play the commands for blind people.

E. GPS Receiver

GPS receiver is used to track the exact location of blind person.

F. GSM Module

SIM 900 GSM module, one GSM module is used at the transmitter and one at the receiver. It is used to send message from transmitter to that of the receiver section of system.

G. MAX 232

In order to provide the communication between GPS receiver and microcontroller MAX 232 is used.

This is a standard serial binary data interconnection unit between data terminal and data communication unit.

VI. RESULT

For demo purpose we used here lcd display to display the result when obstacle is detected this lcd display will display the distance of obstacle and on which side obstacle is present. As well as it will display latitude and longitude values.

At the receiver section we have used VISUAL BASICS 6.0 as GUI, to display number of message sender, latitude and longitude values along with google map to display exact location of that person.

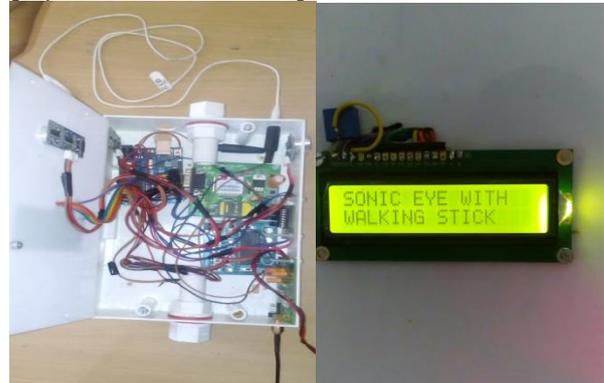


Fig. 4:



Fig. 5:



Fig. 6:



Fig. 7:

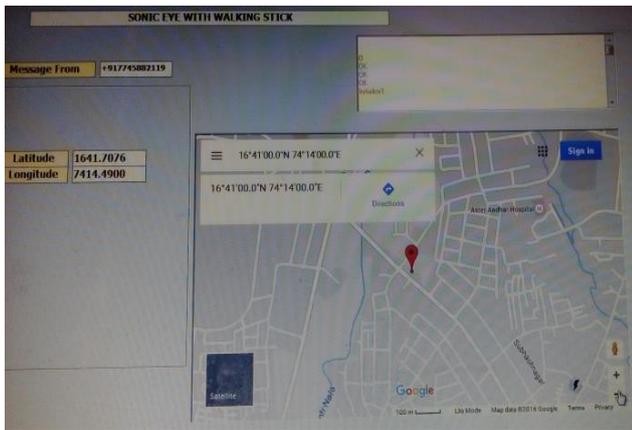


Fig. 8:

VII. CONCLUSION

A sonic eye with walking stick uses Arduino Uno board as main controller. A simple, cheap and easy to handle electronic system provide guidance to the blind. It is able to sense left, right and front obstacle present in the path of the blind person. It will track exact location of the blind and send the location information to the care taker of him.

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