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ULTRASONIC BLIND WALKING STICK

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Abstract: : Blind stick is an innovative stick designed for visually disabled people for improved navigation. We here propose an advanced blind stick that allows visually challenged people to navigate with ease using advanced technology. The blind stick is integrated with ultrasonic sensor along with light and panic button. 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 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 or vibrate the stick. One more feature is that it allows the blind to detect if there is light or darkness in the room.IR sensors are also embed to this system to detect stairs of lower ground area. Thus this system allows obstacle detection as well as has panic button in case of any emergency which will send the current location to the server

Keyword: Blind Stick, NodeMCU Microcontroller, IOT interface, GPS Technology, Ultrasonic Sensor, Server.

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I INTRODUCTION

Artificial Vision is the most important part of human physiology as 83% of information human being gets from the environment is via sight. The statistics by the World Health Organization (WHO) in 2014 estimates that there are 285 billion people in world with visual impairment, 39 billion of people which are blind and 246 with low vision. The oldest and traditional mobility aids for persons with visual impairments are the walking cane (also called white cane or stick) and guide dogs. The drawbacks of these aids are range of motion and very little Information conveyed. With the rapid advances of modern technology, both in hardware and software front have brought potential to provide intelligent navigation capabilities. The main aim of this project is to implement a real time system for driver to navigate them route to destination. In this project obstacle is detected by IR sensor. Also if the water is present on road it will be detected by float type sensor.

II GOALS AND OBJECTIVES

- To help blind people to navigate with its own.
- To provide security to blind people through panic button.
- To make fully intelligence based blind stick with stairs detection.

III PROBLEM DEFINITION

Outwardly blind people wind up testing to go out autonomously. There are a great many outwardly disabled or visually impaired individuals in this world who dependably need assistance. For a long time the white stick turned into an outstanding ascribe to daze individual's route and later endeavors have been made to enhance the stick by including remote sensor. Blind persons have enormous issue when they stroll in the city or stairs utilizing white stick, yet they have sharp haptic affectability. The electronic blind stick will help the visually impaired individual by giving more advantageous methods forever.

IV LITERATURE SURVEY

Sung Jae Kang, et al. [1] describes an intelligent guide stick for the blind was developed. It consists of an ultrasound displacement sensor, two DC motors, and a micro-controller. The total weight is 4.0kg, and the width and the height of the guide stick are 24 cm and 85 cm, respectively. Computer simulations were performed in order to find the traces of the guide stick at three different paths using an in-house Visual C/sup ++/ software.

Actual experiments were also performed to compare with the computer simulation results. The difference between the actual experiment and the simulation was 1.19 cm in the straight path. However, the differences alter the first 90/spl deg/ turn was 9.3 cm and became 11.9 cm after the second 90/spl deg/ turn. Nevertheless, the intelligent guide stick followed the path of the road successfully avoiding the obstacle. The intelligent guide stick will help the blind travel with providing more convenient means of life.

Alessio Carullo et al. [2] describe this paper describes an ultrasonic sensor that is able to measure the distance from the ground of selected points of a motor vehicle. The sensor is based on the measurement of the time of flight of an ultrasonic pulse, which is reflected by the ground. A constrained optimization technique is employed to obtain reflected pulses that are easily detectable by means of a threshold comparator. Such a technique, which takes the frequency response of the ultrasonic transducers into account, allows a sub-wavelength detection to be obtained. Experimental tests, performed with a 40 kHz piezoelectric-transducer based sensor, showed a standard uncertainty of 1 mm at rest or at low speeds; the sensor still works at speeds of up to 30 m/s, although at higher uncertainty. The sensor is composed of only low cost components, thus being apt for first car equipment in many cases, and is able to self-adapt to different conditions in order to give the best results.

Zul Azizi Hailani, et al. [3] describes mobility for the blind is always a great problem. Just like a sighted, blind also needs to travel around inside closed premises like house, factory, office, school etc. They may also like to go for shopping, visiting friends and other places of their interest. Presently available electronic travelling aids like sonic path finder, sonic torch etc. are not suitable for using inside closed premises such as school, factory, office etc. In this paper an electronically guided walking stick that can be used conveniently inside closed premises has been discussed.

R. Dhanuja, et al. [4] describe ultrasonic blind walking stick with the use of Arduino. According to WHO, 30 million peoples are permanently blind and 285 billion peoples with vision impairment.

If you notice them, you can very well know about it they can't walk without the help of other. One has to ask guidance to reach their destination. They have to face more struggles in their life daily life. Using this blind stick, a person can walk more confidently. This stick detects the object in front of the person and gives response to the user either by vibrating or through command. So, the person can walk without any fear. This device will be best solution to overcome their difficulties.

Dada Emmanuel Gbenga et al. [5] describe the smart walking stick based on ultrasonic sensors and Arduino for visually impaired people. There are approximately 37 million people across the globes that are blind according to the World Health Organization. People with visual disabilities are often dependent on external assistance which can be provided by humans, trained dogs, or special electronic devices as support systems for decision making. Thus, we were motivated to develop a smart white cane to overcome these limitations. We accomplished this goal by adding ultrasonic sensors at specific positions to the cane that provided information about the environment to the user by activating the buzzer sound. We proposed low cost and light weight system designed with microcontroller that processes signal and alerts the visually impaired person over any obstacle, water or dark areas through beeping sounds. The system consists of obstacle and moisture detection sensors for receiving, processing and sending signals to the alarm system which finally alerts the user for prompt action. The system was designed, programmed using C language and tested for accuracy and checked by the visually impaired person. Our device can detect obstacles within the distance of about 2m from the user.

V PROPOSE SYSTEM

One ultrasonic sensor is mounted on the stick having range from 20-350cms (set to different ranges). One Infrared sensor is also implemented on the lower side of stick for avoiding small obstacles ranging from 2-10cms like stairs. A switch that can be operated with the thumb (in worst condition) that allows the blind user to send current location (like I am in trouble, help me) on an IOT server. Vibrating circuitry or a buzzer used for beep and vibration if stick is about to hit with any obstacle.

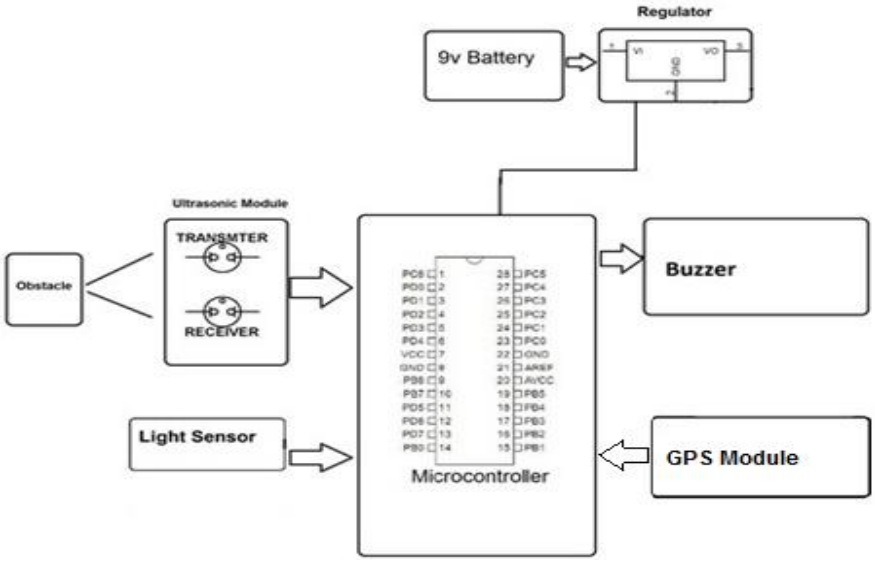

Figure 1: Block diagram of Propose System

VI RESULT

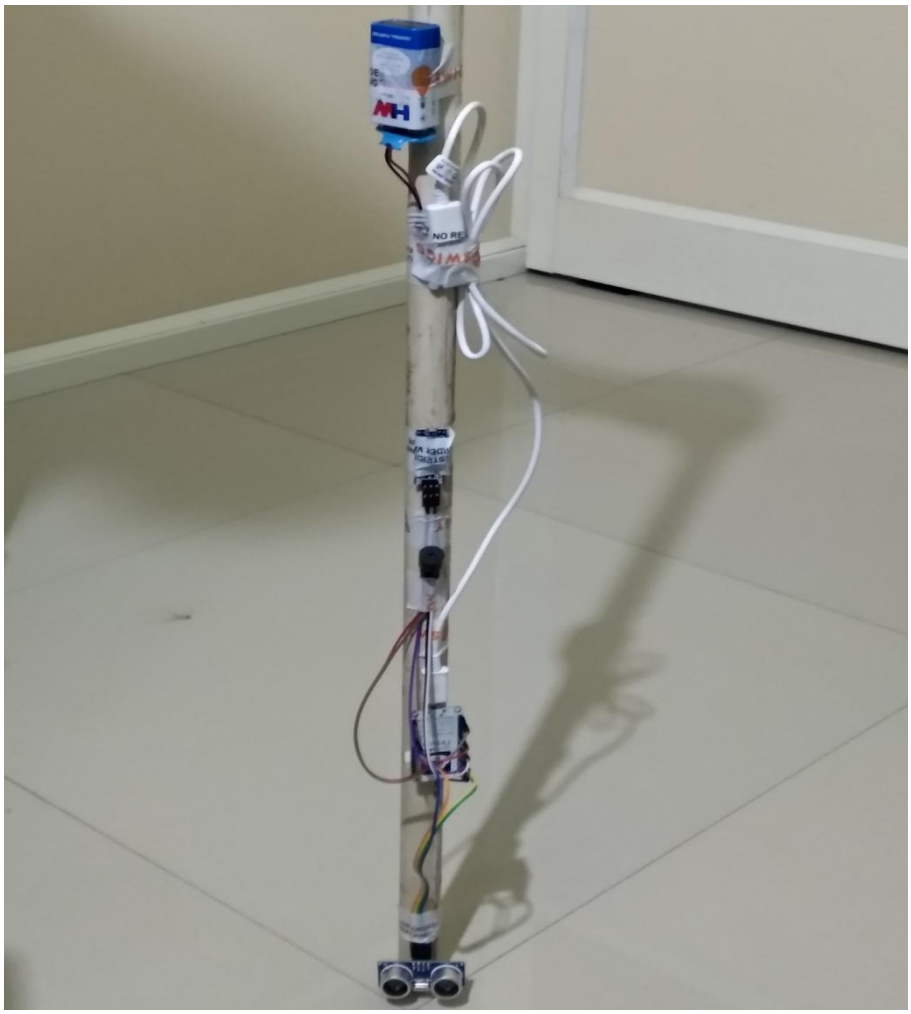

Figure 2: Ultrasonic Blind Walking Stick

VIIMODULES

1) IOT:
    a) NodeMCU microcontroller that collect information and then send it to Android application i.e. User (Blind Person)
    b) Android application i.e. User (Blind Person) that receive information and then act on it
2) Stick
3) User (Blind Person)
4) Android Application

VIII CONCLUSION

In this project model conclude that this experiment would be successful if we apply this in real lives of blind people. This project can help those who need it. Use of stick is ordinary so there would be no embarrassment in using this in public. Secondly, the components being used are easily available. Blinds will not need an external assistance so they will feel more independent. The estimated cost of the project is also reasonable. Also obstacle, potholes and water can be easily detected with the help of sensor. It is necessary that visually impaired people get access to an efficient and comfortable object in order to live their daily life comfortably. In a developing country like India, there is a need for a cost effective solution so that most of the people can have an effective product as proposed in this project.

IX FUTURE WORK

Future work includes installation of GPS system along with additional sensors like accelerometers, PIR motion detector and digital compass which tell the exact location of the user.

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