



Smart Cane for Visually Impaired

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Abstract:

Millions of visually impaired or blind people in this world are always in need of helping hands visually impaired persons find themselves challenging to go out independently. Today technology is growing to a greater extent, however there is no cost effective device for visually impaired people. For a visually impaired person it becomes impossible to do his/her day to day activities, therefore Smart cane can help visually impaired people in moving and allowing them to perform their work easily. The smart cane will have sensors embedded with it, thereby it senses the objects/intruder, when any objects or obstacles come in range of an ultrasonic sensor then the person is alerted with a quick response time. This System also has a water sensor at the bottom of the stick and Infrared sensor for effective obstacle detection. Designing a cost effective and efficient blind stick is the main aim of the project.

Keywords: Microcontroller, Ultrasonic Sensor, Smart Stick.

INTRODUCTION

There are about 253 million people live with vision impairment, 36 million are blind and 217 million have moderate to severe vision impairment. 81% of people who are blind are aged 50 years and above (WHO estimation). There is expected increase in numbers of visually impaired people in near future due to various reasons. As a result there is a need for cost effective device that blind person can use to make their life easy and comfortable. It is now necessary to propose smart solution to blind person for making their daily lives convenient. In this paper smart cane device design and development proposes to help visually impaired people.

LITERATURE SURVEY

Done research on various literature survey paper which was already done – review of existing devices many ETAs and robot technologies have been applied, to guide the blinds that aimed at improving their mobility in terms of safety, to detect obstacles on the ground, uneven surfaces, holes, steps, and puddles.

Paper [1] Title: Smart Stick for the Blind a complete solution to reach the destination. This system uses IR sensor, Ultrasound sensor and water sensor to detect the obstacle. However, this system just gives an alert if any one of the sensor is triggered, it uses a buzzer to alert the blind person. This system does not use any location identifier or location indicator.

Paper [2] Title: Pothole detection for visually impaired which uses a camera that captures image 15 frame per second and based on the concept of image processing the pothole is detected. Problem with this system is use of camera makes it expensive, and also a lot of images captured per second increases overhead and storage requirement.

Paper [3] Title: Smart Walking Stick for Blind describes about a Stick which use Raspberry Pi [10] and an ultrasonic sensor to detect objects and intruder, the system also has a camera embedded with it, and based on the images captured the objects are detected. The objects are analysed based on the set of image datasets that are already stored. This system

however, becomes costly due to the use of high-end camera and also because of storage constraints as large volume of datasets are needed to be stored. This system, sometimes might also be inaccurate because the obstacles are detected based on dataset (large set of images) as different objects vary in their shape and size.

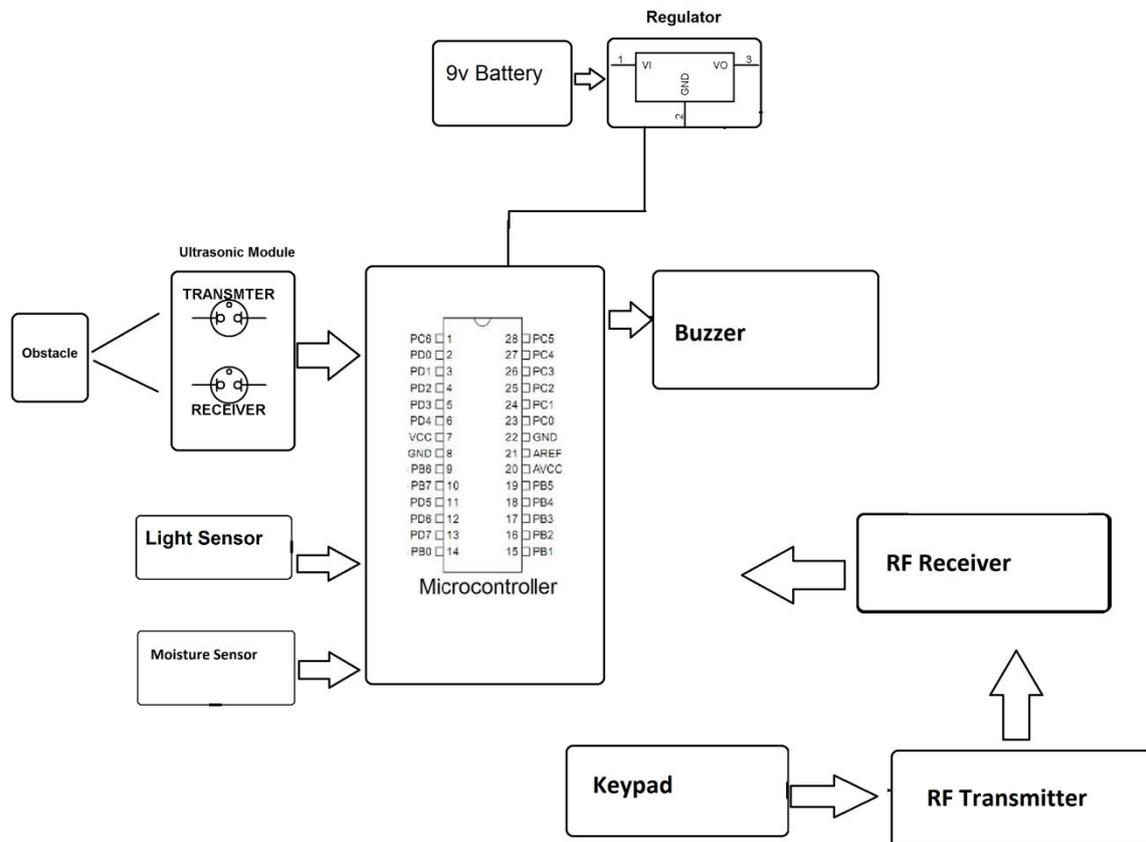
Paper [4] Title: Smart Belt for Blind uses a belt embedded with ultrasound sensor which detects the obstacle. The belt also has a buzzer which vibrates when obstacle is detected. The entire system is developed in such a way that the distance calculated is sent as an audio message for the blind person, where in which he hears the distance calculated using a speaker.

Paper [5] Title: A wearable ultrasonic obstacle sensor for visually impaired. This system uses a couple of ultrasound sensor on either side over the strap of the goggles. This project can detect the intruder in front of the blind person who is wearing the goggles. This system is not robust as the sensor embedded with the goggles makes it heavier and also it cannot detect complex objects such as water, vehicle etc.

PROPOSED WORK

- Smart cane is an innovative blind stick which is designed for visually impaired people for improved navigation. We here propose an advanced smart cane that allows visually challenged people to navigate with ease using advanced technology. The smart cane is embedded with light and water sensors along with ultrasonic sensor. These Ultrasonic sensors use to detect obstacles ahead by using ultrasonic waves. Sensor passes this data to the microcontroller which processes this data and calculates if the obstacle is close enough. If the obstacle is close microcontroller sends a signal to sound a buzzer and if obstacle is not that close then circuit does nothing. It also detects water, a sensor at bottom of stick integrates which sounds a different buzzer and alerts the blind. Also to detect there is light or dark in the room one more feature added. And a wireless RF based remote also embedded in system to help blind to find there stick if they forget where they kept, by pressing the remote button its sound a buzzer on stick. Thus this system helps blind for obstacle detection as well as finding stick if misplaced.

Block Diagram:



Hardware Specifications

- ATmega328P AVR MC- Buy ATmega328P
- HC-SR04 Ultrasonic
- LDR Sensor 5MM Photoresistor
- Buzzer
- RF Tx Rx
- Encoder IC
- Decoder IC
- Crystal Oscillator
- Resistors
- Capacitors
- Transistors
- Cables & Connectors
- Diodes
- PCB
- LED's
- Transformer/Adapter
- Push Button

Software Specifications

- Aurdino compiler
- MC Programming Language: Embedded C

ADVANTAGES

- The system detects obstacles and alerts the blind person through buzzers and be easily used for navigation.

DISADVANTAGES

-Device developed here is of low budget .which leads to compensation of more advance features .

FUTURE SCOPE

- Some more features like slippery floor, vehicle detection, fire/smoke alarm can also be included.

- Accessibility of the blind person's location by family members.

CONCLUSION

All the studies which had been reviewed show that, there are a number of techniques for making a ultrasonic blind walking stick for blind people. The advantage of the system lies in the fact that it can prove to be a very low cost solution to millions of blind person worldwide. The smart cane is convenient to carry around like any other stick and a practically feasible product .This could also be considered a sense of vision to the blind person. With the help of electronic walking stick blind, people can improve more than 15-20% travel speed, reduce minor collision, do not lose their way, and increase safety as

7. REFERENCES

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