



## Facilitate Traffic Signal Identification For Impaired Vision

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# Facilitate Traffic Signal Identification for Impaired Vision

## PROJECT GUIDE

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## **Abstract-**

*The spread of visually challenged is a very sensitive issue worldwide. Impaired vision plays in the everyday actions of different difficulties. These include the difficulties of moving in complete dependence and the ability to seek and recognise objects. Until a decade ago, the only aid that unseeing person has used are sticks, guide dogs accompanying persons or to move. In the last decade, computerized devices have been introduced into the world of the blind in order to ease the lives of these people.*

*This paper presents a system for visually impaired, that make use of ultrasonic sensor and RF transceiver as assistive devices. Unsighted individuals find navigation difficult as they struggle everyday in performing actions for bypassing obstacles and hurdles in their path. In order to help visually challenged people handle safely and quickly this system is proposed. Ultrasonic sensor is placed which is used for obstacle detection with distance indication. RF transceiver simulator is used to provide the traffic signal information for pelican crossing in real time scenario and*

## **I. INTRODUCTION**

As always, people with disabilities, classified as the traffic weak, are exposed to various traffic accident risks, but there are very few disability protection areas designated around disabled facilities. One of

*also the bus route information to help the user know about the desired bus. The main aim of this work is to design a voice based alerting system for the blind people.*

*People who are visually impaired struggle every day in performing their actions. One of most difficult problem faced by visually impaired people is detecting signal lights at crossroads. This paper presents new detection system for signal light detection. This system helps in guiding the visually impaired people to cross the road safely. The colour of traffic light is detected and informed via the voice output. Ultrasonic sensors detect obstacles in their path .With the help of this information the visually impaired people cross the road safely.*

**KEYWORD:** Rf transceiver, Arduino UNO, LEDs, Ultrasonic sensors.

the consequences of being visually impaired is being uncomfortable about safety while travelling independently as they are in unfamiliar environments. Various techniques are there which a visionless person commonly uses such as guide dogs, white cane or walking cane for navigation.

But there are many limitations with this such as the length of the cane as well. The blind still have to face a lot of difficulties with navigation even in the present time. So, on taking this into account we decided to design a product which would help the blind people specifically to cross the road.

The aim is to develop a portable, low cost and user friendly navigation system for the blind. This project involves helping the blind to recognize traffic signal pattern as well as obstacles around and to cross the road without depending on others. Usually, blind people use a first aid, such as the white cane. It allows them to detect obstacles in a close range, but cannot help them with detecting the condition of a traffic light. The visually impaired have difficulty seeing the traffic signs, however they can hear. Although there are some audio beepers employed to inform a visually impaired person about what color the traffic light is by means of different frequency, it is more convenient to have a portable device which can inform the visually impaired about the traffic signal through voice or buzzer. In this paper, we implemented a system that enables the blind to cross the pedestrian crossings independently. First, the current signal state is accurately recognized so that the visually impaired can know the state of the crosswalk. Ultrasonic sensors are used to detect the obstacles on the path as well. The visually impaired person can navigate faster and more safely among the obstacles by the use of these sensors. The system recognizes crosswalk lights in real time and detects obstacles and guides the current signal and objects detected to the visually impaired by voice and buzzer. This will provide a safe walking environment for the visually impaired.

## II. LITERATURE SURVEY

A lot of research has been completed for visually impaired people. Some of the recent research methods are discussed here. Ultrasonic sensors are used for obstacle detection and calculation of its adaptive distance from the person. The system is not suitable for outdoor environments. Ultrasonic Navigation System for the visually impaired & blind

pedestrians, the system is designed in such a way that it

gathers data about the environment via ultrasonic sensors and extracts the visual information from that data. The visual information is processed and intimated through buzzer. Intelligent Guidance System for Visually Impaired, it is a guidance system for the blind people based on joystick, ultrasonic sensor, IR sensor and image processing. A Blind Guidance System for Street Crossings Based on Ultrasonic Sensors, this system helps in detecting the obstacles with the help of ultrasonic transmitter with the combination of three receivers to keep track of direction. Radio transmission system is used to provide guidance information to the user by using of two vibrators. Vibration and Voice Operated Navigation system for Visually Impaired Person, this system guides visually impaired people to navigate easily with the help of vibrators and voice controlled system.

## III. DESIGN AND IMPLEMENTATION

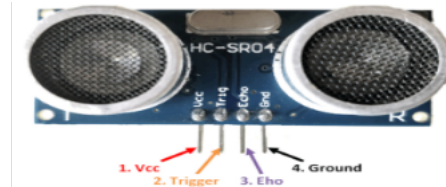
### A. Hardware and software description

- o Hardware components
- Arduino Uno:



Arduino Uno is a microcontroller board found on the ATmega328P (datasheet). It holds 14 digital input/output pins (of which 6 can be used as Pulse Width Modulation outputs), 6 pins are analog inputs. It is a 16 MHz quartz crystal, a USB connection, a power jack, an In Circuit Serial Programming header and a reset button.

- Transmitter and Receiver



The 433MHz transceiver/receiver components are used on a wide variety of applications that demand wireless control. And you can use them with any microcontroller (MCU), whether it's an Arduino or ESP8266, or ESP32.

Receiver:

Product Model is MX-05V

Frequency Range is 433.92MHz

Voltage is DC5V

Receiver sensitivity is 105DB

External antenna is 32cm single core wire, wound into a spiral.

**Transmitter:**

Product Model is MX-FS-03V

Launch Distance is 20 – 200 meters

Operating Voltage is 3.5-12V

Rate is 4 kb/s

Transmitting Power is 10mW

Transmitting Frequency is 433.92MHz

External Antenna is 25cm ordinary multi-core or single-core line

- **Ultrasonic sensor**

Ultrasonic sensor

Power Supply is +5V DC

Quiescent Current is <2mA

Working Current is 15mA

Effectual Angle is <15°

Ranging Distance is 2cm – 400 cm/1" – 13ft

Resolution is 0.3 cm

Measuring Angle is 30 degree

Trigger Input Pulse width is 10µs

Dimension is 45mm x 20mm x 15mm

- o Software tools

RadioHead library: Provides an easy way to work with the 433 MHz receiver/transmitter.

Arduino IDE: By installing RadioHead library in the Arduino IDE.

## B. Methodology

This prototype was done to recognize traffic light signals and obstacle detection for visually impaired people. The paper describes a smart system for visually impaired people. Since this project is an add-on of current traffic light system and this project consists of two parts that will be installed in various locations in an intersection, we are accruing a wireless communication part between two parts. We only want one-way data transmission, which is from the crosswalk to the traffic light area. In this project, we are using RF 433MHz Transmitter/Receiver Module to transfer the data. Using the transmitter we are able to send signal information to receiver and with the help of voice output we can generate the required

information. And with the help of Ultrasonic sensor blind person can detect the object.



Fig1.working model of signal recognition.

Once the program is compiled and dumped into the aurdino board, we will be able to establish the connections between LEDs(traffic lights), transmitter, receiver,voice output. Then the data will be transferred to the aurdino.After setup of the traffic module , through the transmitter will be able to send the signal light to the receiver ,hence receiver will detect the light and through the voice output blind person can notify the traffic signal i.e., if red light blinks voice output will be Red light ON or if green light blinks then the voice output Green light ON you can move.

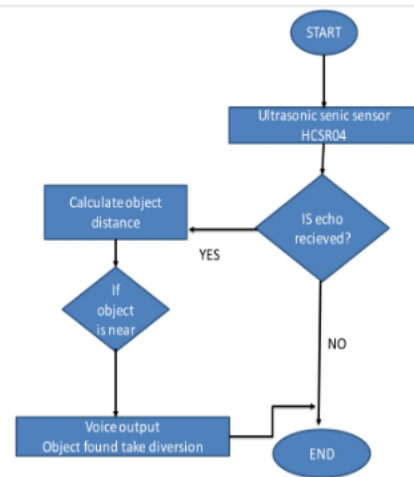


Fig 2.working model of obstacle detection

One more application of this project is to develop an application for blind people to detect the objects in all directions, detecting pits and man holes on the ground using Ultrasonic Sensor (HCRS04) which is connected with aurdino board. If echo is received by Ultrasonic sensor. It will calculate object distance and if the object is near to the blind person then the voice output is interfaced with the aurdino will transmit the information by telling object found take diversion.

#### IV. CONCLUSION

The main aim of this work is to design a voice based alerting system for the blind people. The proposed system consists of helping the blind people to cross the road by detecting the traffic lights and obstacles. With the proposed system, if developed with more accuracy, the blind people will be able to move from one place to another place without others help. With such a system, it will act as a platform for the generation of much more features later. The developed prototype gives good result in detecting moving vehicles on the road and traffic signal and intimating the user in the form of beep commands. The solution developed is a low cost and user friendly navigational aid for the visually impaired.

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