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## Smart blind stick using Arduino

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### ABSTRACT

*A smart stick conception is constructed to give a smart electronic aid for sightless people. Sightless and visually disabled find difficulties in detecting obstacles during walking in the street. The system is intended to give artificial vision and object finding, real-time backing via making use of Arduino UNO. A brief study had been carried out to understand varied issues related to the design which involves furnishing a smart electronic aid for eyeless people to give artificial vision and object discovery, real backing via GPS module by using Arduino UNO. Our design substantially focuses on visually disabled people who can not walk singly.*

**Keywords:** Visually Disabled, Arduino UNO, Smart Electronic Aid, Ultrasonic Detector, Microcontroller

### 1. OBJECTIVE

The design describes an ultrasonic eyeless walking stick with the use of Arduino UNO. According to World Health Organization (WHO), 30 million people are permanently eyeless and 2.85 million people with vision impairment. However, you can veritably well know about, If you notice them, they can't walk without the help of others. At times people have to seek for guidance to reach their destination. They've to face further struggles in their diurnal life. Using this eyeless stick, a person can walk further confidently. This stick detects the object in front of the person and gives a response to the user either by wobbling or through command. In this way, someone can walk fearlessly knowing he will get notified of further obstacles in front of them. This device will be a stylish result to overcome their difficulties. We're going to upgrade the design by adding its operation. In this design, we're going to use two ultrasonic detectors. This smart stick will have Ultrasonic detector to sense an obstacle in front and inform the user using a buzzing sound made by buzzer.

### 2. INTRODUCTION

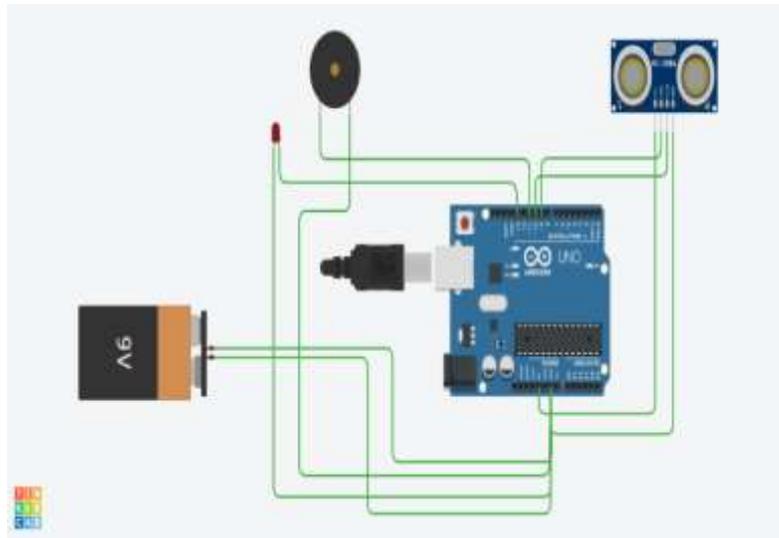
Visually disabled people are the people who find it delicate to capture the lowest detail with healthy eyes. Those who have the visual acuteness of 6/60 or the flat range of the visual field with both eyes open have lower than or equal to 20 degrees. These people are regarded as eyeless. A check by WHO (World Health Organization) carried out in 2011 estimates that in the world, about 1 of the human population is visually disabled ( about 70 million people) and amongst them, about 10 are completely eyeless ( about 7 million people) and 90 ( about 63 million people) with low vision. The main problem with eyeless people is how to navigate their way to wherever they want to go. Such people need backing from others with good sight. As described by WHO, 10 of the visually disabled have no functional sight at all to help them move around without backing and safely.

This study proposes a bettered approach to help blind people to navigate easily. In this system, the ultrasonic detectors are used to discover obstacles by using ultrasonic waves. By seeing the obstacles, the detector passes the entered data to the microcontroller. The microcontroller processes the data and calculates if the hindrance is close enough to the person. If the hindrance isn't close to the microcontroller, the circuit doesn't do anything. However, it sends a signal to the buzzer, If the hindrance is close enough to the microcontroller. The system consists of two ultrasonic detectors, one for detecting any obstacles in the path of navigation and the other one is used to determine pits (by chancing the depth). We can assign two different buzzers for two ultrasonic detectors respectively.

### 3. PROPOSED MODEL

A smart blind stick is a simple project based on Ultrasonic sensor and Arduino which detects an obstacle in front and notifies the user. We often notice that people with visual impairment seek for help while commuting their daily life. So, to make this commute easier we have tried to develop a model to detect an obstacle and make a buzzing sound to alert the person of an probable hindrance. This model is generally designed to create a hassle free lifestyle for the disabled people.

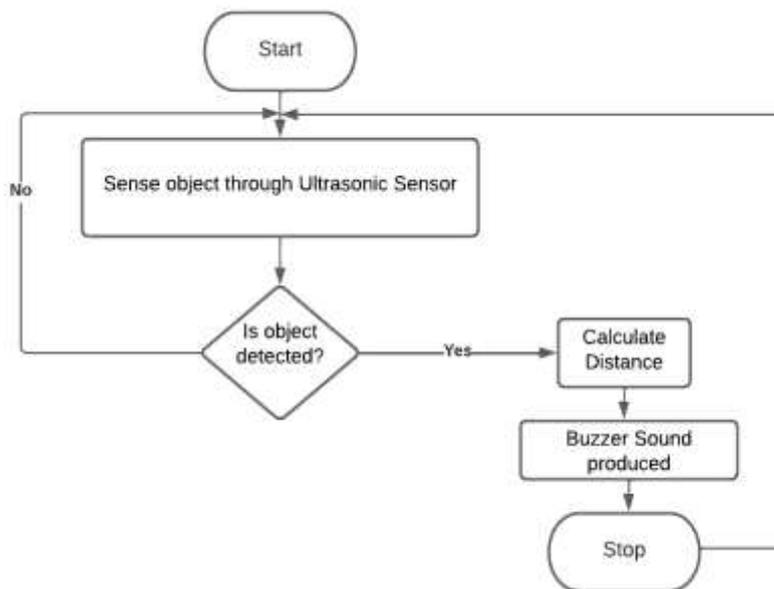
### 4. BLOCK DIAGRAM



### 5. MATERIALS REQUIRED

1. Arduino UNO
2. Ultrasonic Distance Sensor
3. Buzzer
4. Led Stripe
5. Battery
6. Jumper Cables
7. Wires
8. Handstick

### 6. FLOWCHART



### 7. WORKING PRINCIPLE

The system of The Smart Blind Stick mainly consists of an Arduino UNO, an Ultrasonic Sensor, an LDR, an LED, and a Buzzer.

- The working starts when the power supply is given.
- All the components of the system are connected to Arduino UNO.
- The Ultrasonic sensor is connected to the Arduino through:
  1. Ultrasonic sensor ground pin connected to the Arduino ground pin.

2. Trig pin of Ultrasonic sensor connected to pin 9 of Arduino.
3. Echo pin of Ultrasonic sensor connected to pin 10 of Arduino.
4. VCC pin of Ultrasonic sensor connected to +5 V pin of Arduino.
- The processing and ADC, DAC operations take place in the Arduino.
- The 9V battery is connected to the Arduino through the ground pin.
- An LED is also connected to the Arduino through:
  1.  $V_{input}$  pin connected to the Arduino pin 13 and
  2.  $V_{output}$  pin is connected to the ground of the Arduino
- For the efficiency of the navigation system, Buzzer is connected, where the:
  1.  $V_{input}$  pin is connected to pin 11 of Arduino and
  2.  $V_{output}$  pin is connected to the ground of the Arduino.

The distance of the obstacle in front is calculated by the formula:

$$\text{Distance} = (\text{time taken} * 0.034) / 2$$

Thus, according to the distance calculation of the obstacle in front, the input sensors detect the obstacle as an input function and warn the user of a probable obstacle in front by lighting up the LED and making a sound through the buzzer.

## 8. APPLICATIONS

- The primary use of this device is for the handicapped people with visual impairment alerting about the obstacles in front.
- This system calculates the distance of the obstacle in front, so it can be applied to the automobile industry as parking sensors and cruise control.
- It can be used in Robotics for barrier detection.
- It can be used as Auto detection.

With more software and sensor up-gradation it can be used as applications in many other different fields.

## 9. CONCLUSION

The design proposed the design and armature of a new conception of Smart Electronic Guiding Stick for eyeless people. The eyeless stick proposed in this paper can prop the visually impaired person by helping them pass through different terrains and obstacles. The advantage of the system lies in the fact that it can prove to be the veritably low-cost result to millions of eyeless people worldwide. The proposed combination of varied working units makes a real-time system that observers position of the user and give binary feedback making navigation safer and secure. It can be further bettered to have further decision-making capabilities by employing varied types of detectors and therefore could be used for different operations. It aims to break the problems faced by the eyeless people in their diurnal life. The system ensures total safety of the user.

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