

# Blind Man Stick

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**Abstract**—It's the 21st century and everyone is independent, disability wants nothing but equality. So to make it easier for them, we have come up with a Smart Blind Stick that will help them in their daily activities and eliminate their fear of hitting a wall or object. The blind rod is made up of three ultrasonic sensors and an Arduino UNO. To detect movement on almost all sides, we used automatic car alarms and a buzzer to notify anyone if a specific obstacle was found. The motivation for building this stick is to make them independent and help them solve all their problems. Two sensors are placed on other sides and third one is placed in front. Vibrating motors are used to know the movement along directions, for obstacle detection. One major component included in this embedded system is the ATmega328 single-chip microcontroller which is programmed in the C language. The rod aims to provide low cost, efficient and easy-to-use visually impaired people.

**Keywords-** Smart Blind Stick, Ultrasonic Sensors, Arduino UNO

## I. INTRODUCTION

Every day we meet people who are visually impaired and who rely on a variety of sources for effective day-to-day operations. In our country around 16 million people are blind and rely on a variety of sources for their daily activities. Some people rely on dogs, others rely on sticks.

Visual impairment thus creates the worst possible effects on the visually impaired. This problem creates the inability to move independently and a blind person can face major obstacles such as stairs, potholes, mountains, pits etc. blocked by other things, people or related issues.

In the circuit, the buzzer is attached as a warning signal, its beep frequency varies depending on the target distance. Ultrasonic sensors are a key feature of this device. The blind rod is equipped with three ultrasonic sensors, a panic switch, a light switch, and a Bluetooth and moisture bar and an Arduino

UNO. Three ultrasonic sensors are used to detect precursors using ultrasonic waves.

When detected, a sensor transmits this information through the microphone to the alarm unit. The buzzer or vibrator is used in the alarm unit for knowing obstacle or water in the path. Therefore, we can say that the length of the beep is proportional to the size.

In addition to the ultrasonic sensor, to detect the presence of water, water sensor is used. The additional feature is used here in case the stick is lost where radio waves are used. Here the user can press the button to create alarm.

We have created a uniquely designed charging stand which makes it easier for people to charge the sticks and there is no necessity of changing batteries. A GSM tracker is also used so that the location of the person can be identified easily.

Compared with the existing system, it has a more stable detection function and the ability to deal with emergencies. It is a cost effective stick that would satisfy the needs of visually impaired people and help them in functioning with 90% accuracy. Therefore it is more reliable.

## II. LITERATURE REVIEW

Much work has been done to make it easier for the blind to travel on the street or elsewhere independently. These Regulatory Measures (ETAs) are able to detect obstacles in the surrounding areas. These guiding aids can also determine the shortest route between the starting point and the destination.

A. PIC Based Blind Man Stick This rod is based entirely on the Programmable Interrupt Controller (PIC) and the main component of this rod is the Ultrasonic Sensor which detects nearby obstacles. But the lack of indicating the formation of an obstacle. This means that the situation can get to the point where the rod can detect any obstacle in the way but if we do not know the size of the obstacle then it can be difficult to determine if we are moving forward (taking the obstacle into a piece of stone) or stopping (considering the obstacle as a wall). Here PIC16F877A is used to operate a complete microcontroller unit.

B. The Wise Guide

This device is equipped with an ultrasound transfer sensor, two DC engines and a microcontroller. This smart rod weighs 4.0 kg and can detect obstacles on both sides, in front and behind the rod. This stick uses Artificial Intelligence Technology to determine the best way and the most important tools used to use AI technology are Smart Intelligence Cameras.

C. IR Based on Smart Stick

Here the proposed concept consists of two IR sensors and the construction of a folding rod. The device is connected to earphones which are used to direct the correct direction with voice commands. Here the horizontal sensor is able to detect high-level obstacles and the sensor tends to detect low-level obstacles. This program is able to detect the type of obstacle and send the voice message correctly.

D. Electric Walking Stick

It is a system that can be used in a straight line, right-hand corner or curved path with a width of at least 1 m. The key functions of this device are an indication of a clear path and environmental awareness. This program uses Microcontroller (AT mega 328).

E. Arduino Based Automated Stick Guide

This design is powered by a low-power rechargeable battery. This model contains a GSM module that assists sending SOS signals and suggests that it be enhanced by installing a solar cell. This feature fails

when indoors or out of satellite cover

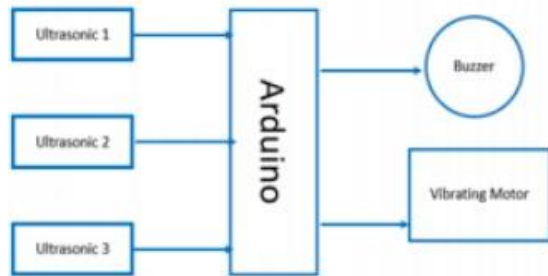
Features	2020	2019	2018	2015 Dec	2015 Aug
Bluetooth	Y	N	N	N	N
GPS	Y	Y	Y	N	Y
Charging stand	N	N	N	N	N
Ultrasonic sensors	Y	Y	Y	Y	Y
Soil Moisture Detectors	Y	N	N	N	N
Pothole Detection	N	N	N	N	Y
Vibrating motor	N	Y	Y	N	Y
Buzzer	N	Y	Y	N	Y
RF Transmitter & Receiver	N	N	Y	N	Y
Panic Switch	Y	N	N	N	N
Accelerometer Sensor	N	N	N	Y	N
Android Device	Y	N	N	N	N
Water Sensor	Y	Y	Y	Y	Y

III. METHODOLOGY

The system is divided in 2 parts. The first part was about designing a smart stick using the SOLID WORK software.. The first plan was to design the whole section individually. Then the second plan is to put the parts together. The rod consists of three ultrasonic sensors mounted on the 3 positions (left, right and front). Actuators are Used to scare the user

into any obstacle that the sensor will detect.

The electronic system is the second part which is controlled using Arduino UNO. When the button is on the rod; A signal is automatically transmitted by the ultrasonic sensor. It points back to sensor receiver when the signal touches a higher level. Hence, Actuators will receive the pulse from Arduino to operate as a loaded code.



#### IV. HARDWARE COMPONENTS

- Arduino UNO

The main Hardware tool we use is ATmega328 based microcontroller board i.e Arduino Uno. The Arduino UNO has fourteen I/O digital pins and 6 Analogue inputs. We like these boards because they are relatively cheap and contain everything needed to support a microcontroller.

- Atmega 328

The Atmega328 is a powerful microcontroller for CMOS 8-bit which is used on Arduino UNO boards.

- Ultrasonic Sensors

Three Ultrasonic sensors located on the right, on the left side and in front of the rod. Ultrasonic sensors and water sensors collect data and send it in real time to small control. The microcontroller activates the buzzer after processing certain details.

- Charging Stand

This will make it easier for the visually impaired user to place the stick on the stand and charge, without the need to download a charging cable or port. Charging mode comes with an audio note (sound tag) making it easy for the user to identify it within a nearby location.

- GSM module

With the help of the GSM module, the user's location can be sent to the user's relative, in case the user is lost. GSM (Global System for Mobile Communications) is a global standard for mobile communications and GPRS (General Packet Radio Service) mobile service for 2G and 3G mobile communications. The navigation system is powered by a smart stick with a Global Positioning System (GPS) blind, who will find an obstacle in the way and determine the position again via GPS coordinates. The technology used for this device includes embedded C programming language and coding.

- Buzzer

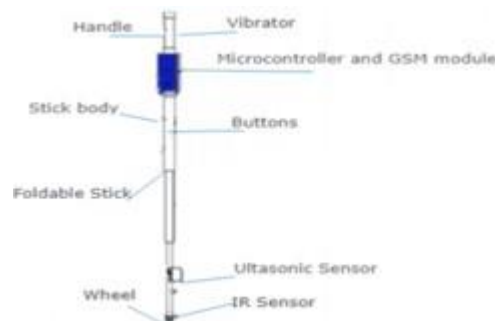
The buzzer is basically a small speaker that will be directly connected to the Arduino. By using an electric signal at the right frequency, the crystal will create noise. a buzzer that helps a blind person find his stick by tracing where it came from.

- Vibrator

When the buzzer goes off, the vibrating motor creates an uneven movement. With the help of the buzzer and the vibrating motor, it is easier for the blind man to sense an obstacle on their route.

- Transmitter and Receivers

The blind rod is fitted with an RF transmitter and receiver. Transmitter sends a signal to the receiver and, using this, we will place a button that helps the blind person to easily find his stick by following the trail and echoing where it comes from.



#### VI. ADVANTAGES & DISADVANTAGES

##### Advantages

1. It will provide an emergency backup of the power supply to the sensors used on the device.
2. The device is able to detect almost all types of obstacles.

3. Reducing the extra use of sensors, speaker systems and easily accessible configurations make this device cheaper and less economical for people in need.
4. Parts of this device are easily accessible.
5. It has a charging stand which makes it easier for the visually impaired to use and charge the stick
6. It has a GSM module attached to it, which is easy to locate the person.
2. GSM attached can help in the future for any emergency help.
3. GPS may need to find the shortest and longest route according to Google or Apple Map based on real-time communication.
4. Video recording when the alarm is triggered.
5. Connect to multiple devices.
6. Provide direct assistance to the police in the event of a crisis.

### Disadvantages

1. The Buzzer system may be confusing at first but with second or third use, it will work easier.
2. Piezoelectric Plate nerves contain lead that can be harmful to children if injured.
3. The current design is less cluttered like other white sticks.

### VII CONCLUSION

The design and construction of the intelligent ultrasonic travel rod made for this task was successful because the various components were carefully selected. Imitation has also been shown that a different part of the ultrasonic migration rod is designed for anticipation. Ultrasonic sensor when properly tested sends a signal to a vibrating vehicle as soon as an obstacle is detected, and this causes the sound phase to respond appropriately. The sound response then alerts the user to the presence of an obstacle, the vibrating vehicle also vibrates with varying intensity depending on the distance of the obstacle. 93.8% accuracy was obtained from unsupervised reading in a set of data indicating that the output result is satisfactory. The C Matlab code used to translate the source code into C language for effective embedding in the ATmega328 microcontroller also worked well and the Arduino board used to edit the available source C code also helps in achieving our goal of building and building a smart stick. ultrasonic mobility. Plus the charging stand makes it more convenient and easy to use. The GSM module helps to track the location of the user in the times of need.

### VIII. FUTURE SCOPE

A variety of future scope is available that can be used with Smart Blind Stick -

1. Link to Aadhar Card so that the government can better help people with physical disabilities.

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