

# SMART BLIND STICK USING ARDUINO

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*Abstract--God precocious sense of vision to the individual is a crucial side of our life however there area unit unfortunate those that lack their ability of visualizing the items. The visually impaired have to be compelled to face several challenges in their standard of living. the matter gets worse once there's Associate in Nursing obstacles before of them. sensible blind stick is Associate in Nursing innovative stick style for visually disabled folks for improved navigation. The unhearable detector gift during this stick is employed to sight the obstacles and path hole before of them. The advance feature of this stick is that the obstacles area unit detected to the blind folks through Bluetooth. a new advance feature is that this stick has temperature detector that conjointly sight the hearth accident through buzzer and Bluetooth. The aim of the general system is to produce an occasional value and economical navigation aid for blind folks*

**Keywords: arduino, ultrasonic sensor, fire sensor, piezo, Bluetooth**

## 1.INTRODUCTION:

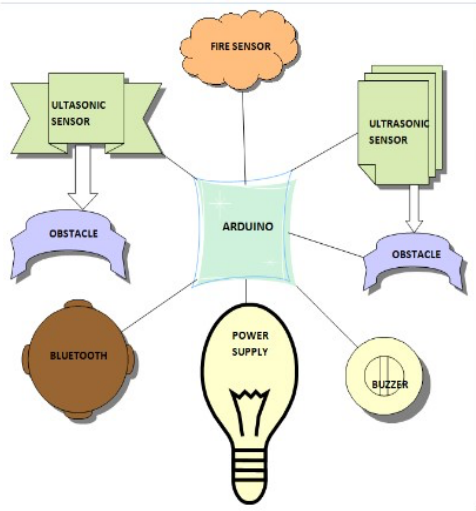
This project works supported the arduino board. The inaudible distance device is employed to search out the obstacles close to blind individuals. The detected obstacles can send the waves to the arduino and also the arduino and alert through Bluetooth to the victim. once the obstacle is with reference to the person then the piezo sound are going to be high, if the obstacle is in an exceedingly sure distance then the sound within the piezo are going to be low. The temperature device is employed to search out the temperature round the blind man. when there's a fireplace accident, the temperature are going to be high which is able to be detected by the temperature device conjointly the sound through buzzer and also Bluetooth and alerts the person. This is however our arduino board on the blind stick works. This method presents an idea to produce a wise electronic aid for blind individuals, each publicly and personal area. The projected system contains the inaudible device, hearth device, voice playback board, arduino and buzzer the most aim of the system is to produce a economical navigation aid for the blind man which supplies a way of vision by providing the knowledge regarding the environment and object around them. The objectives of this analysis work include: to style associate helpful technology for visually impaired people who will sight obstacles and provides various routes for the blind; to alarm the user through vibration to work out the obstacles direction sources. The development of technology needs the innovation of a tool which will be used to facilitate the blind as a road guide. This device is quite the white cane to assist blind individuals to scan their surroundings for obstacles or orientation marks.

## 2. LITERATURE SURVEY:

[1]Jismi Johnson et al., (2013), presents the sensible walking Stick helps blind folks in moving and permitting them to perform their work simply and well. The visually handicapped person cannot acknowledge what's the dimensions of that object and the way way is he from the thing. So, it's tough for visually handicapped person to maneuver here and there. The sensible walking stick supports visual perception and output comes principally within the type of Voice output. In sensible Walking Stick, we have a tendency to sight the thing with the assistance of a camera.

The stick measures the gap between objects and sensible Walking be unhearable detector. once the objects or obstacles are available in vary of the unhearable detector, the speaker tells Name of obstacle ahead of the stick. pictures are captured employing a camera and also the camera is connected to the Raspberry Pi. If any obstacle comes ahead of visually handicapped person, he will comprehend the obstacle by hearing the sound generated by the pinnacle phone. The sensible walking stick is extremely helpful for the visually impaired persons for his or her safety and freedom from the opposite persons in the least the time. The developed system offers sensible ends up in police investigation obstacles ahead of the user . [2]. KherChaitrali S et al., (2013), presents the visually impaired got to face several challenges in their everyday life. the matter gets worse after they travel AN strange location. solely few of the navigation systems offered for visually impaired folks will offer dynamic navigation through speech output. during this paper, we have a tendency to propose a navigation device for the visually impaired that is targeted on providing voice output for obstacle bar and navigation victimization infrared sensors, RFID technology, and mechanical man devices. The device has proximity infrared sensors. RFID tags are put in into public building and additionally integrated into blind person's walking stick. The system additionally takes measures to make sure their safety [3]. Jini.S et al., paper presents the design and implementation of a system that may facilitate the visually impaired folks to navigate victimization GPS technology. The commands and messages are compete back to the blind via APR9600 voice playback IC. The computer keyboard utilized in system permits the user to pick the required locations to that he/she needs to travel. computer keyboard consists of twelve keys wherever every key represents a location. Blind selects the key victimization Braille language. The paper focuses on the event and analysis of a Navigation system that creates use of worldwide Positioning System, voice and unhearable detector for obstacle detection. [4] ISSN (Print) : 2320 – 3765 ISSN (Online): 2278 – 8875 International Journal of Advanced analysis in Electrical, physics and Instrumentation Engineering (A High Impact issue, Monthly, Peer Reviewed Journal) The input voltage ought to be between 9V and 12V DC and therefore the current should be rated for a minimum of 250mA current output, though you may probably need one thing a lot of like 500mA or 1A output, because it offers you the present necessary to power a servo or twenty LEDs if you wish to. There should have a two.1mm power plug on the Arduino finish, and therefore the plug should be "centre positive", that is, the center pin of the plug should be the + affiliation. [5] AN Intelligent Walking Stick for the Blind was planned. The planned navigation device for the visually impaired is targeted on providing voice output for obstacle navigation victimization infrared sensors, RFID technology, and mechanical man devices. The RFID detector doesn't got to scan it expressly. the full device is meant to be tiny and utilized in conjunction with the white cane.

**3. ARCHITECTURE DIAGRAM:**



**Fig 3.1 ARCHITECTURE DIAGRAM**

In the above fig(3.1) All the sensors (ultrasonic sensor, fire sensor), bluetooth, buzzer, power supply are connected to Arduino. When any obstacles/ path hole/ fire is sensed the signals from ultrasonic sensor/ fire sensor resp. are sent to buzzer and Bluetooth via Arduino to alert the person

**4. EXISTING SYSTEM:**

There is a dramatic increase of blindness in the world. Due to WHO, there are 285 million people in world with visual impairment, 39 million with blind and low vision people with 246. According to WHO, 30 million people are permanently blind and 285 million people with vision impairment. In earlier days, people who are blind have to walk only with the help of other person. he/ she can't walk individually. If they try to walk by themselves then they don't know what is in front of them and can hurt themselves. So, by using a blind stick they can move around by themselves without getting hurt. Blind stick is a stick that helps a visually impaired person to walk in a safe way by themselves. Few years back, there was a new innovation in blind stick making them alert with buzzer when there is an obstacle. This stick is known as smart blind stick. It can be used by all blind people so that they can walk freely and individually without others help. But, the drawback of this system is when there is a heavy traffic then the buzzer sound and the horn sound might coincide and they would not be able to hear the buzzer sound. To make the blind stick more effective and easier to use we need to change the design of the blind stick. Our project is an advanced level of making this smart blind stick. It helps visually impaired people to walk in a safer way even in heavy traffic.

**5. PROPOSED SYSTEM:**

This project works based on the Arduino board. In this project we are using ultrasonic sensor, fire sensor, bluetooth device, connecting wires, power supply. The ultrasonic sensor is used to find the obstacles near the blind people and calculates the distance. The sensed obstacles will send the waves to the Arduino and the Arduino sends it to the bluetooth. When the obstacle is

near to the person (less than 30cm) then the sound will be detected as audio through bluetooth device. When there is a hole, then it will be alerted by the bluetooth device to alert the blind people. The obstacles and the path hole are sensed by the ultrasonic sensor. The fire sensor is used to find the fire accidents near the blind people. When there is a fire accident, the fire will be sensed by the fire sensor, the audio will be high and piezo makes the sound alerts the person. The bluetooth has connected through mobile. When the obstacle or hole or fire accident occurs then the bluetooth sounds as obstacle detected. Likewise the arduino board works on the blind stick.

## **6. HARDWARE SPECIFICATION:**

The major components used are:

- Arduino.
- Ultrasonic sensor.
- Buzzer.
- Fire sensor.
- Bluetooth device.
- Connecting wires.

### **6.1. ARDUINO:**

It is an open source platform for the purpose of electronic projects. It contains both physical (microcontroller) and software or integrated development environment (IDE) which is used to run, write and upload the code on the computer.

### **6.2. ULTRASONIC SENSOR:**

An ultrasonic sensor is an instrument used to measure the distance to an obstacle using ultrasonic sound waves. It uses a transducer to send and receive the ultrasonic pulses that gives back information about the objects proximity. It works by sending out the sound wave at a specific frequency above the range of the human hearing.

### **6.3. BUZZER:**

The arduino buzzer is also known as piezo buzzer. It is like a tiny speaker that can be connected directly to the arduino. Based on the reverse of piezoelectric effect, the buzzer produces sound. It is a simple device that can produce basic beeps and tones. It also works by the piezo crystal, i.e. a special material that changes the shape when voltage is applied to it.

### **6.4. FIRE SENSOR:**

The fire sensor is also known as the flame sensor. It is used for detecting as well as the occurrence of a fire or a flame. The flame detection response can depend by its fitting the main function of this is to give the authentication whether the device is properly working or not.

### **6.5. BLUETOOTH DEVICE:**

It is a short range wireless technology used for exchanging the data between fixed and mobile devices. For short distances, UHF radio waves are used. It builds personal area network (PANs).

### **6.6. CONNECTING WIRES:**

It is made up of copper and aluminium. jump wires are used for solderless breadboarding. It allows an electrical current to travel from one point to another point because electricity needs the medium to travel through which it can move easily.

### 7. WORKING:

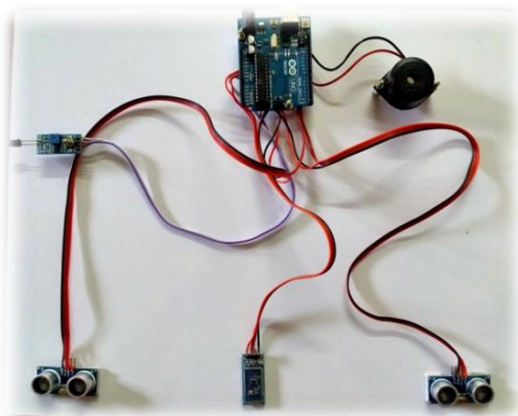


FIG 7.1 CONNECTION OF ARDUINO

The above fig(7.1) represents the connections of Arduino in the stick. Working of smart blind stick is easy to use. It uses 12V 1Amp power supply to run the system. When the power supply is on all its input sensors starts working, the ultrasonic sensor always calculates the distance as to detect the object or a pathhole in front of the person, and the fire sensor starts sensing whether there is fire accident or fire present near them. For this the Bluetooth in phone must be ON. When the person is holding the stick and starts walking, when an obstacle comes in his way the ultrasonic sensor senses and calculates the distance. If the distance is lesser than 30cm it sends the signal to the Arduino and Arduino sends the signals to Bluetooth device connected with the phone. Then the signals are given, the output is in the form of audio output saying "OBSTACLE DETECTED".

When a path hole detected in the ultrasonic sensor then the signal is sent to Bluetooth via Arduino and an audio output is given saying "PATH HOLE DETECTED". Then the person moves away from the path hole. When there is fire accident in the place where the person is living or walking, the fire sensor senses the smoke or fire and alerts the person by giving the buzzer sound and audio output saying "STAY AWAY... FIRE DETECTED", so the person can move quickly from that place and save his life. Thus, this project helps a visually impaired person to walk in a safer way. In some cases these sensors saves the life of the person also.

### 8. RESULT:



S.NO	DISTANCE(m)	ALERT
1	0.5055	OFF
2	0.6036	OFF
3	0.2312	ON
4	0.0015	OFF
5	1.8288	OFF
6	2.0076	OFF
7	3.7400	OFF
8	0.1254	ON
9	3.0550	OFF
10	0.0660	ON

RESULT OF OBSTACLE DETECTION

S.NO	DISTANCE(m)	ALERT
1	0.21	ON
2	0.68	OFF
3	12.8850	OFF
4	20.7400	OFF
5	6.0076	OFF
6	2.8288	OFF
7	0.0855	ON
8	0.2056	ON
9	15.0550	OFF
10	0.2090	ON

RESULT OF PATH HOLE DETECTION

S.NO	FIRE DETECTION	BUZZER	BLUETOOTH
1	Yes	Buzzer sound rises	Bluetooth audio will sounds as "STAY AWAY ... FIRE DETECTED"
2	No	Buzzer OFF	BLUETOOTH_AUDIO OFF.

RESULT OF FIRE SENSOR

**9. ADVANTAGES :**

- It can detect automatically.
- It detects the danger accurately.
- This device is low cost and user-friendly.
- It gives confidence to blind people.
- Find information about path and indicates with audio when it is obstacles/ path hole, buzzer and audio when fire accident. Visually impaired can walk without anyone’s help.

**10. APPLICATION:**

- It is one of the simple device that is used to help the visually impaired people.
- It is used by people who are in need of help to walk.
- It helps the visually impaired people to protect them from fire and escape from falling in obstacles/ path hole.
- As there is an increase in traffic, this helps visually impaired to walk freely and independently.

**11. FUTURE SCOPE:**

The aim of the blind stick is to help blind people to come out of dependency. This stick will help the blind people to navigate independently and also ensures the person's safety. Braille: This device gives the uncomplicated process to provide the destination for the visually impaired people. The programmable wheels: If any object identified this wheel would steer the stick away from the object and helps the blind people to continue their path. Internet of Things: This is an important and very useful method which allows one stick to communicate with other stick nearby to utilize the functionality of the other stick if one stick is damaged. Solar panels: We can run the blind stick with the help of solar panels as an alternative to the battery. As solar

energy is an easily renewable resource the recharge process are also made easier. This is the greatest advantage of blind stick. The microcontroller and Bluetooth: The building entrance will be affixed with microcontroller and a Bluetooth, so that the people can navigate through indoor easily. This involves the path information to every destination in that building. When the user entered into the entrance the information from controller is transmitted to the user via Bluetooth.

## 12. CONCLUSION:

This project introduces the new concept of blind stick for visually impaired people. The most important and advantage of this project lies in the fact that it can given to be very low cost solution to the millions of blind people throughout worldwide. This project ensures that this people can feel safe and secure when they uses blind stick. When they meet with the dangerous situation laid in their path, the buzzer sound and vibration will help the people to travel in a correct direction. This smart stick builds the strong and confident platform for the visually impaired people to be more safe. This is the effective measures and affordable to everyone. Though the stick is made up of hard- wires with sensors it is still weightless. In future, this stick can be developed with various sensors and multiple device, in order to help the visually changed people.

## 13. REFERENCE:

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