OBSTACLE DETECTION BAND

A report submitted in partial fulfilment of the Academic requirements for the award of the degree of

Bachelor of Technology

Submitted by

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UNDER THE COURSE

ENGINEERING EXPLORATION & PRACTICE

CENTRE FOR ENGINEERING EDUCATION RESEARCH

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

(NAAC Accredited with 'A+' Grade & NBA Accredited)

(Approved by AICTE, Permanently Affiliated to JNTU Hyderabad)

KANDLAKOYA, MEDCHAL ROAD, HYDERABAD-501401

2021-2022.

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CERTIFICATE

This is to certify that the report entitled **"OBSTACLE DETECTION BAND "** is a bonafide work done by R.Srinu(21H51A0499), S.Venkatesh(21H51A04A0),T.Kumar sai sriram(21H51A04A3),T.Thanuja(21H51A04A2), D.Madhumitha(21H51A04B0) of I year B.Tech, II semester in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology, submitted to Centre for Engineering Education Research, CMR College of Engineering & Technology, Hyderabad during the Academic year 2021-2022.

(Names of the project coordinators)   **Mr. B.Sureshram**

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2.K.Raju-Asst.Proffesor of CEER/ECE

3.Amritha Kumari-Asst.Professor of CSE

DECLARATION

We, the students of I year B.Tech II semester of Centre of Engineering Education Research, **CMR COLLEGE OF ENIGNEERING & TECHNOLOGY**, Kandlakoya, Hyderabad, hereby declare, that under the supervision of our course coordinators, we have independently carried out the project titled "**OBSTACLE DETECTION BAND**" and submitted the report in partial fulfilment of the requirement for the award of Bachelor of Technology in by Jawaharlal Nehru Technological University, Hyderabad (JNTUH) during the academic year 2021-2022.

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We own all our success to our beloved parents, whose vision, love and inspiration has made us reach out for these glories.

ABSTRACT

From the survey of WHO, 39 million people are blind all over the world. It is a quite miserable statement. The peoples who are all suffered from these visual difficulties can use this project to overcome their situations. The ultrasonic sensor used in this project plays a vital role. It detects the object in front of this with a certain range. When object is detected a sound is given to the user as an indication. While they hear this sound they can know an obstacle in front of them. : The paper main objective is to provide the information to the blind people. Information which contains the exact location of the blind person, where he is standing or any obstacle is nearby of him.We are going to develop an intelligent system that works efficiently in both indoor and outdoor environment. When a person walks, he must be able to know that, is there any obstacle is present in front of him or not. The current device works for the visually impaired person, which can be able to move freely without any restrictions. It can provide an alarm to the person if the visually impaired person gets an obstacle in front of him.

 Keywords : Arduino UNO, speaker, ultrasonic sensor.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER-1

1.INTRODUCTION

As the world is growing faster people will always try to improve the technology that can be used for the needful. In today's era each and every person has the ability to walk anywhere he wants to go, but the persons with lack of visual ability faces different problems to move from one location to another. As the problem is in their blindness, we must use some technique so that he can be able to walk anywhere without any restrictions. Our technique is used for that person, in which a blind person can be able to know whether he is facing any obstacle in front of him or not. If any obstacle will be present in front of him an alarm rings, with that he will able to know that something is coming in front of him and he can stop their or change its direction. If in case a blind person lost himself in any market or in any place, that blind person can be able to send his location to their family members. So that they can come and take him home.

CHAPTER-2

2. LITERATURE REVIEW

Problems identified:

A. Ultrasonic Spectacles and Waist-belt:

As the need increases there is an enormous work going in this field. Since a blind person face various problems like daily activity, walking on road. There must be technique which will be helpful to them, so that they can work properly in the world. Now a day there are some of the techniques available for the blind persons which can help them for mobile activities. Some of the techniques which include: A. Ultrasonic Spectacles and Waist-belt: The ultrasonic spectacles and waist-belt technique is used for Ultrasonic sensors for obstacle detection and calculation of its adaptive distance from the visually impaired person. Ultrasonic sensors are used in pair as transceivers . One device which emits sound waves is called as transmitter and Other who receives echo is known as receiver. These sensors Work on a principle similar to radar or sonar which detects the Object with the help of echoes from sound waves.
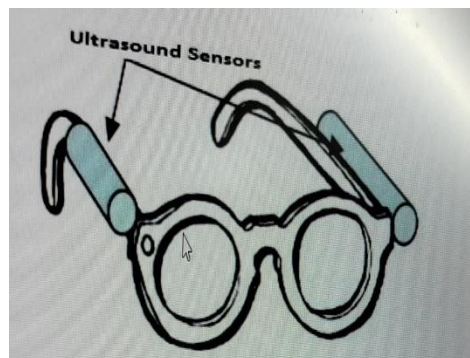

Fig 2.1-ultrasonic spectacles and waist-belt

Ultrasonic sensors are used for obstacle detection and calculation of its adaptive distance from the visually impaired person. An algorithm is implemented in C-language on AT89S52 microcontroller.

B. Ultrasonic Smart Stick:

This technique provides a natural way of carrying that facilitate its use. The components integrate are: two sonar sensors, a microcontroller, and two vibrators . The sensors are fixed on the shoulders to increase the field of sensing and side determination.
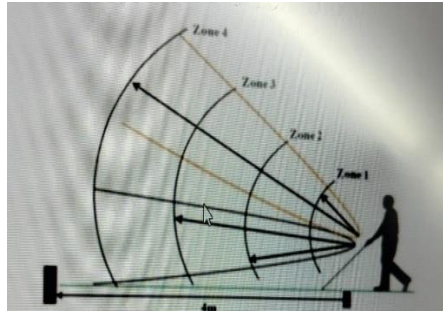

Fig 2.2 ultrasonic smart stick

On sensing obstacles the sensor passes this data to the microcontroller. The microcontroller then processes this data and calculates if the obstacle is close enough . If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to sound a buzzer. In addition to that, when the GSM modem receive a message it will be sent to the microcontroller which will get the location of the stick from the GPS modem and transmit the location to the GSM modem in response to the sender . In the areas with low signals cameras can be use, this system works by fitting a camera on the persons head, it will use certain algorithm to identify the highs and obstacles in front the blind person. In case of an emergency, the user of the stick will press the emergency button and the signal from the button will go to the microcontroller which will get the location from the GPS modem and transmit the location to the GSM modem which will send a SMS messages to the all saved numbers in the system .

C. DSP-based Ultrasonic Navigation:

This system contains a DSP based system is able to determine the distance and the horizontal position of the obstacles in front of the user and to indicate the location of the nearest (most dangerous) one by stereo sound through earphones . The DSP is equipped with suitable interface circuits connected to one ultrasound transmitter and two receivers, which can be mounted on the hat of the blind person. To simplify the discussion some assumptions have

been made: 1). There is only one obstacle. 2). The size of the obstacle is relatively small. 3). The surface of the object to be detected is ideally reflecting.
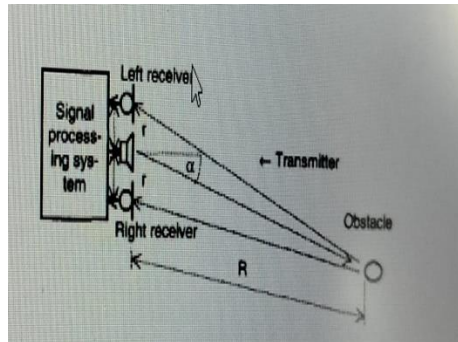
Fig 2.3 DSP-based ultrasonic navigation

Though this simple method is sensitive to noise, it should be mentioned that it could work without envelope demodulation of the received signal, so it can provide the basis of more sophisticated methods like distance varying or adaptive threshold methods.

CHAPTER-3

EXISTING SOLUTIONS:

A.WHITE CANE:

A white cane is a device used by many people who are blind or visually impaired. A white cane primarily allows its user to scan their surroundings for obstacles or orientation marks, but is also helpful for onlookers in identifying the user as blind or visually impaired and taking appropriate care. The latter is the reason for the cane's white colour , which in many jurisdictions is mandatory.

-It cost 300.

DIS ADVANTAGES

1. It may get stuck in the Pavement cracks

2.It is easy to crack or break

Fig 3.1 white cane

B.PET DOG

Guide dogs (colloquially known in the US as seeing-eye dogs) are assistance dogs trained to lead blind or visually impaired people around obstacles. Although dogs can be trained to navigate various obstacles, they are red-green colour blind and incapable of interpreting street signs.

It cost 30,000

DIS ADVANTAGES:

1.Heavy cost

Fig3.2 pet dog

C.SMART STICK

The smart stick for the blind as the name suggests is a device for the visually   Impaired to guide the user to respective destination and avoiding to collide with the obstacles. It uses two ultrasonic sensors HC SR 04 to detect the depth below or the obstacles in between

-Itcost1500
DISADAVANTAGES:
1.Heavycost
2. They Can't detect the objects which are hidden

Fig 3.3 smart stick

D.SMART BLIND ASSISTANCE

This device helps blind people to detect obstacles and to do their work easily and comfortably. In normal stick, the detection of the obstacle is not done and it is not efficient for visually impaired persons. The device measures the measures the distance between objects and Smart Walking stick by ultrasonic sensor

-It cost 2500

 DISADVANTAGE

They can't detect the obstructions which are Hidden but Dangerous to blind people

Fig 3.4 Smart blind assistance

E.SMART BLIND GLASSES FOR BLIND

The project uses a few ultrasonic distance sensors, an Arduino Pro Mini, an MP3 player module, and some vibration motors.The circuit board used this project is designed in the form of a spectacle, which can be worn by visually impaired person. An Arduino mounted on the spectacle will detect the obstacle with the help of the sensors and notify the user through headphones and vibration motors.

-it cost 7000

Fig 3.5 smart blind glasses for blind

CHAPTER-4

4.PROBLEM DEFINITION

4.1Community interaction with the concerned project team

With the aim of social innovation, we initially set our sights to a solution to a pesky problem that can turn out to be fruitful to many of the people living out there in the dark reality of sorrow. But, after visiting the village, one can easily acclaim it as a developing village i.e, on a verge of becoming a town. In the initial stages, we didn't come across any sort of serious problems that are being faced by the people in that village. We enquired some handful of houses only through which we came to know that their problems have been addressed earlier and even been cleared.

Into the last hour of the visit, we identified a problem, which turned out to be the chosen as our course project.

4.2 Problem statement

According to the recent survey reports there are around 1.1 billion people who are blind in our world. They face many difficulties while walking because of many obstacles in between the way. There are heavy chances to hurt themselves by hitting to the obstacles. One of the biggest tragedy is no one is concern about blind people , just they show their sympathy towards them .

4.3 Objective

1. The main aim of obstacle detection is to determine the presence of interested obstacles in the scene in front of the users, while the obstacle warning represents and sends this information to the users. The obstacle detection module takes scene information from a mobile Kinect.
2. An obstacle detection system uses ultrasonic sensors mounted on the front and/or rear bumpers. These sensors can measure the distance between your car and nearby obstacles directly around the front or rear bumper. The driver is alerted by beeps or the dashboard display.

4.4 REQUIREMENT ANALYSIS

The required materials for this project are :-

A.Arduino NANO:

The Arduino Nano is equipped with 30 male I/O headers, in a DIP-30-like configuration, which can be programmed using the Arduino Software integrated development environment (IDE), which is common to all Arduino boards and running both online and offline. The board can be powered through a type-B mini-USB cable or from a 9 V battery.
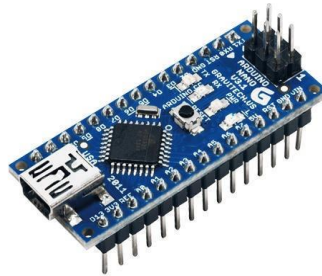
Fig 4.4.1 Ardino nano

B.Pref board:

A breadboard or perf board is a convenient platform for prototyping electronic circuits. It is a quick and easy way to mount and connect leaded electronic components and is easily changeable when testing new configurations.
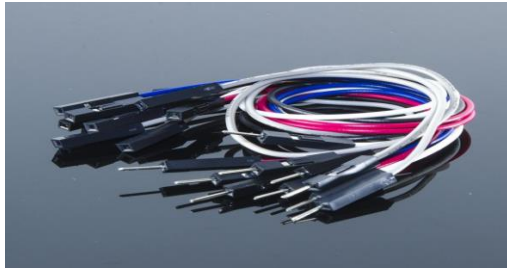

Fig 4.4.2 pref board

13
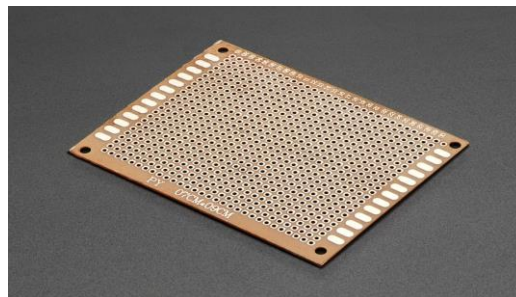
C. Jumper Wires:

With these wires, the connections are given. This make the connection of modules to the Arduino, so that correct functioning of the project or modules takes place.

The whole project is connected using jumper wires.

Male-to-Female jumper wires:

Fig 4.4.3

D.Ultrasonic sensor:

The ultrasonic sensor consists of transmitter, receiver and transceiver. The transmitter convert electrical signal into soundwaves. The receiver converts the soundwaves into electrical signal again. The transceiver performs both the receiver and transmitter operations. It also has crystal oscillators in it. It will perform the stabilization operation in the ultrasonic sensor

Fig 4.4.4 ultrasonic sensor

E.Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.

Fig 4.4.5 Buzzer

F.Battery

A nine-volt battery, either disposable or rechargeable, is usually used in smoke alarms, smoke detectors, walkie-talkies, transistor radios, test and instrumentation devices, medical batteries, LCD displays, and other small portable appliances.

Fig 4.4.7 Battery

4.5 METHODOLOGY

This project is completely depends upon the code we write and the sensors we use. In the code, we write that when the sensor senses the property and the type of input it want, it gives information of the object.

When a person wears our proposed device while walking, the sensors in the device senses the object around him/her , and alert the person about the obstacle near them.

CHAPTER-5

5.1 CONCEPTUAL DESIGN

This prototype helps a blind person to know the obstacles in between the way. And, it doesn't require more equipment.

When a blind person wear the band the ultrasonic sensor in the band activates and continuously sense sonic waves to calculate distance and to locate objects nearby the person.when the object is detects by the ultrasonic sensor it sends information to the aurdino and activates its buzzer .

Arduino NANO is used as a micro controller since it can process the input and gives the respective output on the console and it as the base of the project.
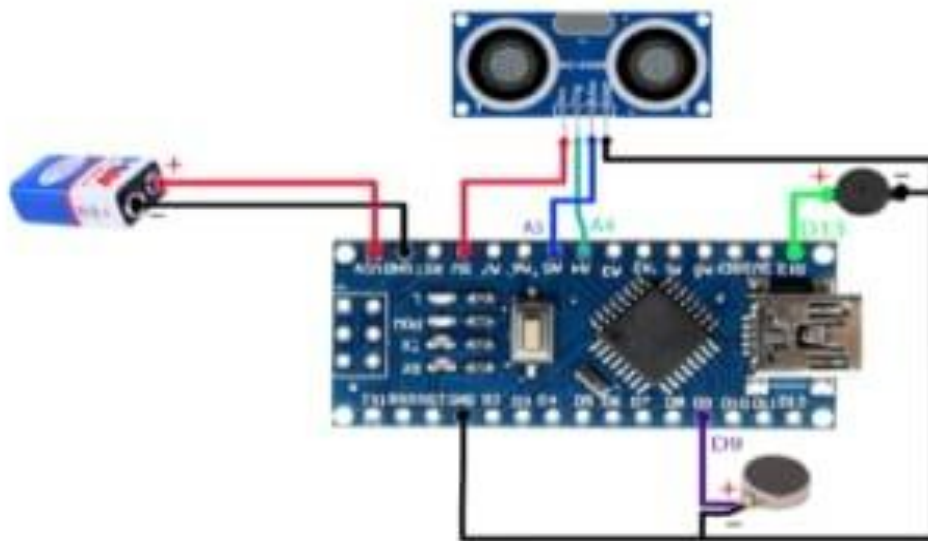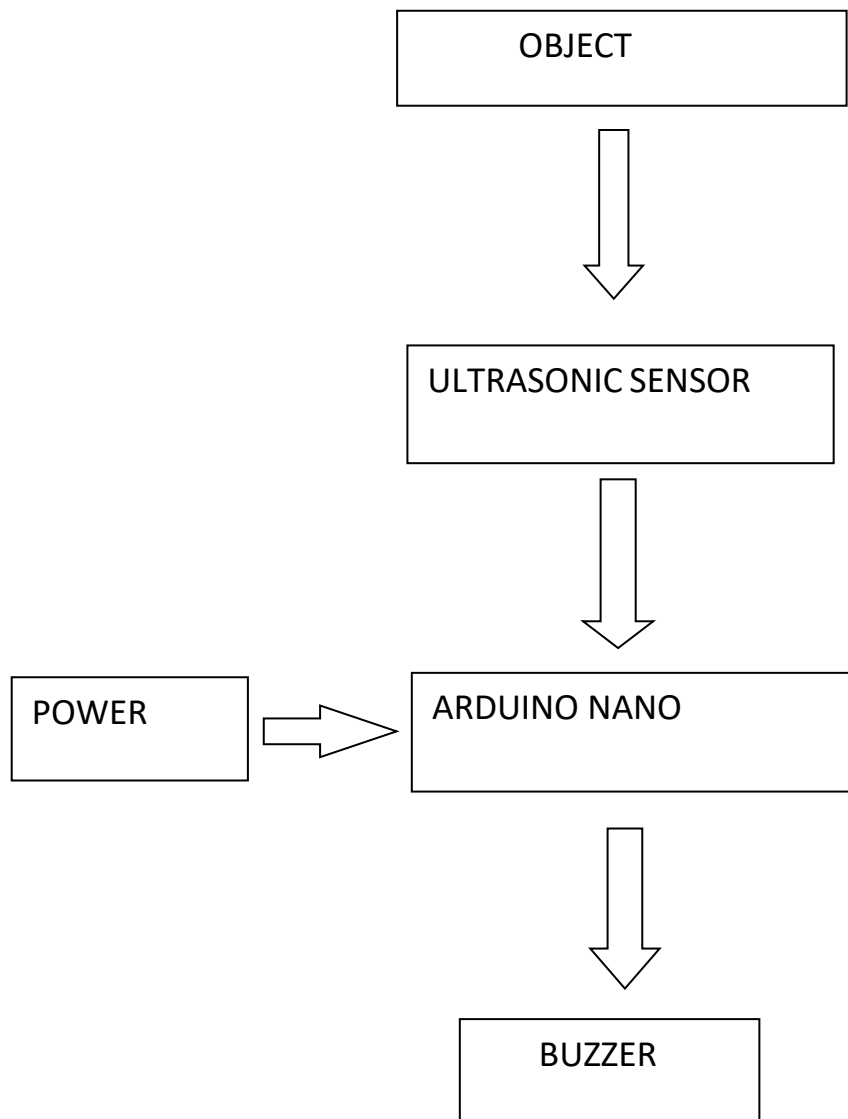

Fig :5.1.1

5.2 BLOCK DIAGRAM

```
        ┌─────────────────────────┐
        │         OBJECT          │
        └─────────────────────────┘
                    │
                    ▼
        ┌─────────────────────────┐
        │    ULTRASONIC SENSOR    │
        └─────────────────────────┘
                    │
                    ▼
┌──────────┐   ┌─────────────────────────┐
│  POWER   │──▶│      ARDUINO NANO       │
└──────────┘   └─────────────────────────┘
                    │
                    ▼
        ┌─────────────────────────┐
        │         BUZZER          │
        └─────────────────────────┘
```

Fig:5.2.1 Block diagram

17

5.3 DESIGN DESCRIPTION

This design consist of ULTRASONIC SENSOR which detects the objects from sorrundings and analise the distance between the objects and the person and it will give information to the ARDUINO NANO where the total information is analisied and processed and it will run by the power supply given to it . after processing total details the Arduino nano will give the information through the buzzer connected to it .
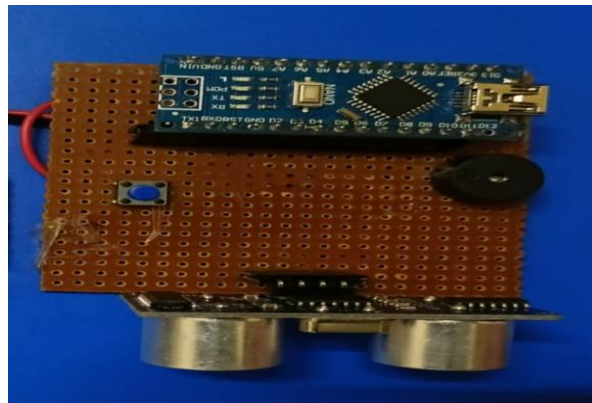
Fig :5.3.1

ADVANTAGES

1. Easy to carry
2. Fast response
3. Affordable price

CHAPTER-6

6 IMPLEMENTATION

6.1 SOURCE CORD:

```
const int pingTrigPin = 12; //Trigger connected to PIN 7

const int pingEchoPin = 10; //Echo connected yo PIN 8

int buz=5; //Buzzer to PIN 4

void setup() {

Serial.begin(9600);

pinMode(buz, OUTPUT);

}

void loop()

{

long duration, cm;

pinMode(pingTrigPin, OUTPUT);

digitalWrite(pingTrigPin, LOW);

delayMicroseconds(2);

digitalWrite(pingTrigPin, HIGH);

delayMicroseconds(5);

digitalWrite(pingTrigPin, LOW);

pinMode(pingEchoPin, INPUT);

duration = pulseIn(pingEchoPin, HIGH);

cm = microsecondsToCentimeters(duration);
```

```
if(cm<=50 && cm>0)

{

int d= map(cm, 1, 100, 20, 2000);

digitalWrite(buz, HIGH);

delay(100);


digitalWrite(buz, LOW);

delay(d);

}

Serial.print(cm);

Serial.print("cm");

Serial.println();

delay(100);

}

long microsecondsToCentimeters(long microseconds)

{

return microseconds / 29 / 2;

}
```

6.2 RESULT AND DISCUSSION

When the problem was identified, the immediate solution was a obstacle detector band with buzzer device which can be programmable and easily help to detect the obstacles. This help the blind people to know the obstacle in between the way .

6.3 CONCLUSION.

By completing this project, we conclude by saying that the blind people are still in oblivion of many problems . Whether it is because of ignorance or lack of affordability, people now a days are not using the technology to the fullest. Apparently our product is most feasible, affordable, plausible solution to the existing problem. Hopefully, our project might stand as a diligent drop of advancement in this ocean of digitalization and social innovation and help the blind people to know the obstacles in between the way and get rid of it .

CHAPTER-7

7. APPENDIX

7.1 References

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Team picture with prototype

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