JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY, SECTOR-62, NOIDA

MINOR PROJECT-2

Project Report

"SMART SHOES FOR VISUALLY IMPAIRED/BLIND PEOPLE"

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CERTIFICATE

This is to certify that the work titled "Smart Shoes for visually impaired/blind people" submitted by Kavya Tiwari and Kartikey Nawab in partial fulfilment for the award of the degree of B-Tech of Jaypee Institute of Information Technology, Noida has been carried out under supervision of Dr. Akansha Bansal. This work has not been submitted partially or wholly to any other University or Institute for the award of this or any other degree or diploma**.**

Signature of Supervisor …….

Name of Supervisor …….

Designation …….

Date ……

DECLARATION

I, hereby declare that the work presented in this report entitled "Smart Shoes for visually impaired/blind people", in fulfilment of the requirement for the award of the degree of Bachelor of Technology in Electronics and Communication, submitted to the Electronics and Communication Department, affiliated to Jaypee Institute of Information Technology, Sector 62 Noida is an authentic record of my own work carried out during my degree. The work reported in this has not been submitted for the award of any other degree or any other degree or diploma.

ABSTRACT

Eyes-all of us recognise that that is the fine present god offers us. All the matters take place round us, this complete international is seen to us, due to our eyes. We also can say that we're very blessed for this valuable present. But there are a few individuals who can not see the matters that take place round them, they can notsee what is taking place of their surrounding areas, due to the fact they're blind or they misplaced their imaginative and prescient permanently. Those humans face many demanding situations of their each day life. They used strolling cane, or stickto transport and locate any object. But the stick isn't always provide right outcomes and it's miles used for a constrained range. There are many varieties of sticks and different gadgets are to be had in marketplace however they're very expensive, so terrible humans can not purchase it. This paper offers clever footwear for blind person. This clever shoe is straightforward to apply and it creates user-pleasant surroundings for blind person. It is wearable system. And it isn't always expensive.In this ultrasonic sensor, buzzer, battery, Arduino NANO and jumper wires are used.

1)Smart Shoes for Blinds is an innovative Arduino project designed to help visually impaired individuals navigate their surroundings with ease. The project involves integrating sensors and microcontrollers into shoes, which provide audio feedback to the user, allowing them to detect and avoid obstacles.

2)Sight is considered the most important sense and the blind people are observed upon with pity by others. Technology helps the blind people to communicate with the environment, the communication process and the dissemination of information has become very fast and on a wider scale to include all parts of the world which greatly affected to the human life, thus increasing the ways of entertainment and comfort and reduced suffering and hardship in many things. Blind people are part of this world, so the technology must leave a significant impact on their lives to make what was impossible for them as possible and available to them today.

3)The assistance provided earlier for blind people were as a particular hardware devices such as talking OCR Products, identifying color, barcode readers; that hardware were expensive and limited capabilities due to rapid change in hardware.

4)The challenges faced by impaired/blind people in their daily lives are not well understood. In this paper, we try to present an application called SMART SHOES where is it’s a way to give hand to blind people with the aid of technology in order to solve some of their faced problems.

5)The Application results enhance the understanding of the problems facing blind people daily, and may help encourage more projects targeted to help blind people to live independent in their daily lives

ACKNOWLEDGEMENTS

I would like to extend my sincere gratitude to my supervisor, Dr. Akansha Bansal for providing his invaluable guidance, teaching and suggestions throughout the course of the project.

Her persistent efforts to help me throughout the project played a crucial role in encouraging me. I am highly indebted to sir for his constant supervision and for providing the necessary information regarding the project.

Moreover, it would not have been possible without the kind support and encouragement of my parents and colleagues who helped me with their abilities and moral guidance in developing the project.

Signature:

Kavya Tiwari:

Kartikey Nawab:

Date:

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INTRODUCTION

Blindness, visual impairment, visual impairment, and vision loss have a dramatic impact on people with such disabilities. They have physiological, psychological, social, and economic consequences, impacting quality of life and preventing these individuals from performing many activities of daily living (ADLs).

Blindness is a qualitative term that describes the clinical condition in which an individual loses the perception of light as a result of complete loss of vision. Blindness also refers to people who can see so little that they have to rely mostly on senses other than visual substitution. Visual impairment, on the other hand, is a qualitative term used when the condition of visual loss is characterized by loss of organ-level visual function, such as: B. Loss of vision or loss of vision.

This project presents a prototype model and system concept for providing intelligent electronic aids to the visually impaired. The system is intended to provide a comprehensive means of object detection and transmit relevant information to visually impaired people. The system consists of a microcontroller, an ultrasonic sensor, and an oscillator circuit. This project aims to develop an Electronic Travel Assistance (ETA) to help blind people find obstacle-free routes. This ETA is attached to the shoe. When an object is detected near the shoe, it will alert you with the help of vibrating circles, with the help of speakers or headphones, and with the help of Android applications, it will alert you in advance with voice commands. Power is the main criterion here, and the shoes are integrated with a self-powered unit, so power is not a problem.

1.1Problem statement

Artificial vision is the most important part of human physiology, as 83% of the information humans receive from the environment comes through vision. According to 2014 World Health Organization (WHO) statistics, it is estimated thatthere are 285 billion blind people, 39 billion blind people, and 246 visually impaired people. . The oldest and traditional mobility aids for the blind are walkingsticks (also called white canes or canes) and guide dogs. The drawback of these aids is the very low freedom of movement and transmission of information. Rapid advances in modern technology, both hardware and software, have raised the possibility of providing intelligent navigation capabilities. Recently, many electronic travel aids (ETAs) have been developed and developed to help visually impaired people move safely and independently. Recently, high-end technological solutions have also been introduced to help blind people find their way.

Ultrasound and buzzers do not give accurate results to blind people. This is the main drawback of the previous project. In my previous project, the IR sensor was the object detection sensor. Problems and inefficiencies and losses associated with these reasons. Another problem is not providing clear information to the visually impaired.

1.2 Solution to the problem

Rapid advances in modern technology, both hardware and software, have raised the possibility of providing intelligent navigation capabilities. Recently, many electronic travel aids (ETAs) have been developed and developed to help visually impaired people move safely and independently. Recently, advanced technological solutions have also been introduced to help blind people find their way. This project tried to improve the quality of the system to make it more useful for blind people. For this project, the system was manufactured as part of a blind shoe. This project uses ultrasonic sensors and speakers to provide more accurate object detection and provide clean information for the visually impaired.

1.3 Proposed system

This project presents a prototype model and system concept for providing intelligent electronic assistance to the visually impaired. The system aims to provide a holistic countermeasure for object detection, human detection and real-time assistance system, consisting of microcontroller, ultrasonic sensor and buzzer. This project aims to develop an Electronic Travel Assistance (ETA) to helpblind people find obstacle-free routes. This ETA is attached to the shoe. When an object is detected near the shoe and a person comes in front of it, it will warn with the help of a buzzer circuit and advance warning with the help of a loudspeaker. Power is the main criterion here, and shoes are integrated with power generation.

1.4 Methodology

This project presents a prototype model and a system concept to provide a smart electronic aid for blind people. This system is intended to provide overall measures object detection, and real-time Assistance via Global Positioning System. The system consist of microcontroller, ultrasonic sensor and a smart phone (GSM Module) and vibratory circuit and Bluetooth unit. This project aims at the development of an Electronic Travelling Aid (ETA) kit to help the blind people to find obstacle free path. This ETA is fixed to the shoe. When the object is detected near to the shoe and if any person coming in front it alerts them with the help of buzzer circuit.

Many blind people require travel aids to navigate in unknown environments. We present Smart Shoes project that enable the visually impaired users with mobility impairment to avoid obstacles. By leveraging existing robotics technologies, our system detects obstacles such as curbs, and staircases in the ground or even moving objects, and transmits obstacle information through haptic feedback (vibrations and beeps). Initial experiments show that our device enables human users to navigate safely in indoor and outdoor environments.Being blind generally refers to a complete lack of functional vision. However, blindness involves varying levels of vision ability, sometimes under varying conditions. Vision is the result of light rays hitting the back of the eye, or retina, and then the optic nerve transmitting electrical signals to the brain. Blindness occurs when an inadequate amount of light hits the retina, or the information has not been delivered to the brain correctly.

1.5Working Concept

This project is intended to be developed as a tool or aid to aid mobility and travel for the visually impaired. Dependence on others is reduced and these people are able to become more independent.

The project is built around the ARDUINO NANO controller. This project has features related to obstacle detection using ultrasonic modules and ultrasonic sensors. Thesesensors are attached to the shoes of the visually impaired. People are alerted and receive information about their environment.

CHAPTER 2
LITERATURE SURVEY

Reference [1]: S.Gangwar (2013) designed a smart stick for blind people that can give early warning of obstacles using infrared (IR) sensors. When an obstacle is detected, the stick alerts the visually impaired with a vibration signal. However, Smart His Stick focuses only on obstacle detection and does not address the emergency needs of blind people. Also, IR sensors are not efficient enough, as theycan only detect the following obstacles at close range:

Reference paper [2]: S.Chew (2012) describes a smart device called Blind Spot that combines GPS technology, social he networking, and ultrasonic sensors to enable blind people to navigate public spaces. I suggested a white cane. GPS detects the location of obstacles and uses ultrasonic sensors to warn blind people toavoid hitting obstacles. However, GPS did not show efficiency in tracking the position of obstacles, as ultrasound indicates the distance of obstacles.

Reference paper [3]: Benjamin et al.(2014) developed an intelligent his stick that uses laser sensors to detect obstacles and curbs. Obstacle detection was signaled by a high "beep" sound from the microphone. The laser stick design is very simple and intuitive. Sticks can only detect obstacles, but they cannot provide cognitive and psychological support. There is only a beep to trigger obstacles, no help maneuvering them.

Reference [4]: Central Michigan University (2009) developed an electronic cane for the visually impaired that provides contextual information about the user's environment. They use RFID chips embedded in street signs, storefronts, etc. The wand reads these and returns information to the user. The device also has an ultrasonic sensor that helps detect objects in front of the stick tip. A smart cane equipped with an ultrasonic sensor is combined with a messenger bag that can be worn over the shoulder. A speaker attached to the bag strap alerts the user when an obstacle is detected and instructs the user to move in another direction.

Reference [5]: Mohd Helmyabd Wahab and Amirul A. Talibetal (2013) developed a stick that can communicate with the user through audio alarms and vibration signals). Ultrasonic sensors are excellent at detecting obstacles several meters away, and this information is transmitted in the form of audio signals, so ultrasonic sensors are used to detect obstacles in front of them. will be This audio signal is

sent to the user through the speaker. This is where blind people can have trouble navigating without an emergency alert as well as having ultrasonic sensors.

Reference [6]: Alejandro R. Garcia Ramirez and Renato Fonseca Livramento da Silvaetal (2012) designed a technological device called an electronic cane that serves as a mobility aid for the visually impaired and partially sighted. The author implements a stick with an ergonomic design and an embedded electronic system that fits in the grip of a traditional long stick. The system was developed to detect obstacles above the waistline using tactile sensors. It works like this when an obstacle is detected. The stick vibrates or makes noise. However, this system only detects obstacles above the waistline.

Ref [7]: Joao José, Miguel Farrajota and Joao M.F. Rodrigues (2013) designed a smart stick prototype. It was a small, inexpensive, and easy-to-carry navigational aid. The blind stick works by supporting global navigation, directing users to a specific destination, and local navigation, navigating paths, sidewalks, and corridors while avoiding static and moving obstacles. Instead, they invented only a chest-high stereo camera, a portable his computer in his bag or bag on his shoulder, headphones or small speakers. The system is discreet and does not interfere with walking with a cane. Additionally, normal noise in the environment will not be blocked.

Referenced paper [8]: Shruti Dambare and A. Sakhare (2011) used artificial vision with real-time assistance via GPS to provide cost-effective and efficient navigation assistance to the visually impaired. Developed object recognition. vision by providing information about environmental scenarios provided by surrounding static and dynamic objects

2.1 Summary

Blind people are at a disadvantage when traveling because they do not have enough information about their position and orientation in relation to traffic and obstacles in transit, and what is easily seen by a non-visually impaired person. increase. The traditional method of guide dogs and for a long time only helps you get around obstacles without knowing what they are. Normally, a navigation system consists of his three parts, detecting surrounding obstacles and hazards while driving, and providing location and direction information to help people achieve psychological comfort and independence. Raise it so it can move. Various technologies are used in today's market to navigate the visually impaired.

1) Guide Dog:
A specially trained dog that helps the visually impaired to avoid obstacles. Dogsare trained to stop in front of obstacles and respond to walking commands. Guide dogs are very useful, but they are rarely used, only about 1% of blind people use them. Benefit:
Good at following familiar paths, good at general obstacle avoidance, and trainedto selectively disobey their owners when they perceive danger. Disadvantages: Very expensive, guide dog care lasts an average of 6 years, normal dog ownershipcosts and lifestyle changes.

2) Human Guide:
A blind man walks hand in hand with a sighted guide. Pros/Cons:
Most obvious, but not really a permanent solution to facilitate movement and navigation for the visually impaired. Blind people lack privacy and can feel like a burden to the guide.

The development of humanity and behavioral patterns over the years shows that he sees, perceives and understands. Visually impaired people find it difficult to be blind, but they try to hear and recognize places, notice sounds, situations, and places that they can understand, and try to remember them while moving. If you accidentally delete a saved tag from your memory, you'll lose track of your

location, become confused, and have to ask your companions or other moving people for help.

A similar case concerns direction finding to move towards a desired target. It clearly shows that all people, whether disabled or not, remember and retrieve location information and sensory markers when they want to move. Literature analysis shows that four main techniques and combinations are used to work in the context of similar goals in visually impaired people. They are mainly:

(1) RFID information grid

(2) Mobile platform devices /sensors and Client server architectural systems anddevices. Let us discuss about above one by one

Since the signal from the geosatellite is used to calculate the position difference with the satellite, the accuracy is quite high at 100m to 300m, and it can be received by people walking in the city, but it is very difficult to receive indoors. . I can't even achieve the accuracy I need. Therefore, it is an empty solution that the visually impaired use as a navigation device. RFID information grid:
RFID is a radio frequency identification device. It contains specific information such as numbers, symbols, and text. This is a passive device powered by the Inquisitor's EMF field. To form an information grid, the RFID tags are arranged so that they can describe their longitude and latitude locations. The locator queries thelocation information and sends it to the server via SMS. The server contains a database containing relationship descriptions of local locations referenced via SMS. Search it in a database and broadcast it on FM where it can be heard on the requestor's device. A major problem in designing indoor RFID-based recognition devices to assist visually impaired and partially sighted people in the system is the time to send and deliver SMS. Air congestion calls again. Personal devices may work fine, but the server error detection case cannot be resolved. So the solutions we cover are more about the problem than the solution. Two three devices in different locations should work together with one fetched query for reliability, which is not practical. The same applies to the rest of the technical solutions. More or less, they are a combination of two or more types of technology-mixed hybrid devices. An RfID-Grid system with an RFID reader integrated in the user's shoe.

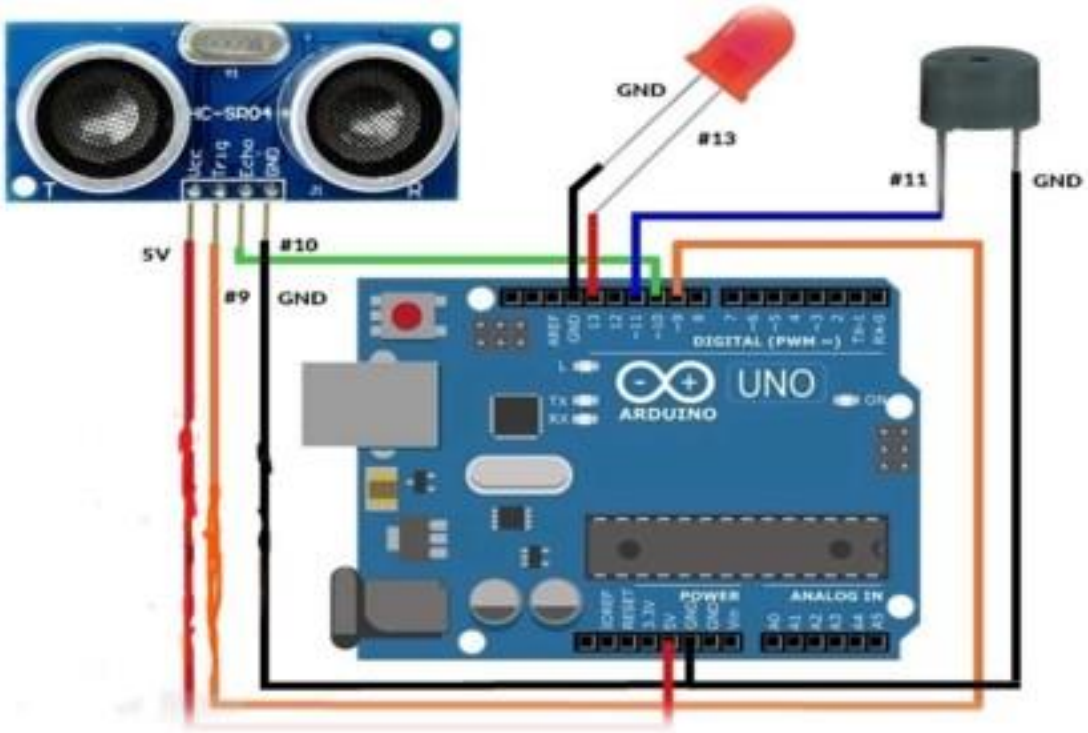
and a walking stick with Bluetooth connectivity to the user's mobile phone. Mobile Platform Device:
Mobility is she one of the main problems blind people face in life. Overtime, blind and visually impaired have used methods and devices such as long white canes andguide dogs to aid mobility and enhance safe and independent travel.

With the development of modern technology, various types of devices are now known as electronic travel aids. These aids include sonic pathfinders, mowat sensors, and guide sticks. They are called path indicators or obstacle detectors because they can only determine if there are obstacles in the path ahead for the visually impaired. These devices are used to look for obstacles in front of the blind and work like flashlights with very narrow directivity.

A sound wave sensor with wide directivity that can detect multiple obstacles at the same time. Portability, low cost, and most importantly ease of control are the main factors determining the practicality and user acceptance of such devices. An Electronic Travel Aid (ETA) is a type of portable device. Therefore, it should be a small and lightweight device for easy portability. Blind people cannot see the display panel, control buttons, or labels. Therefore, the device should be easy to control. There should be no complicated control buttons, switches or display panels. Also, the ETA device should be inexpensive so that more blind people can use it.

CHAPTER 3
DIAGRAM

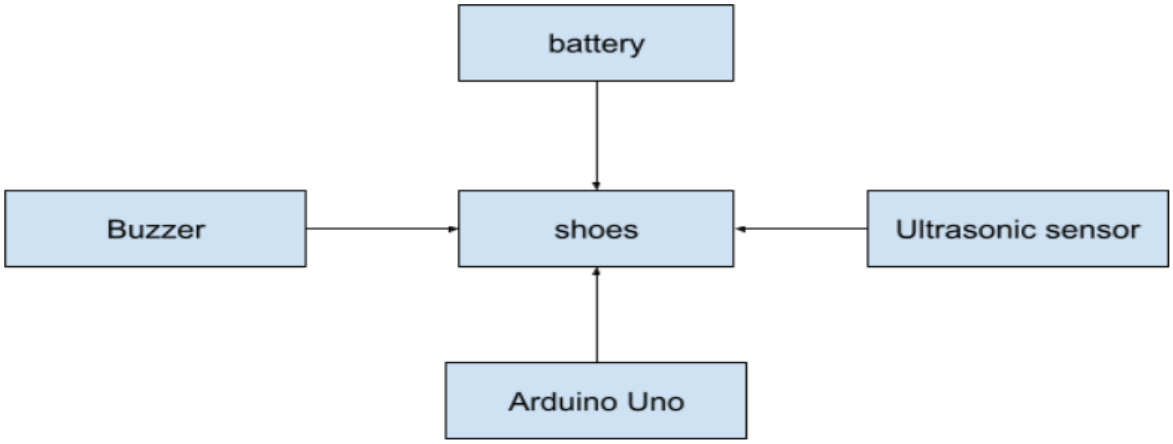
3.1 CIRCUIT DIAGRAM



3.1 CIRCUIT DIAGRAM

‘

3.2 BLOCK DIAGRAM



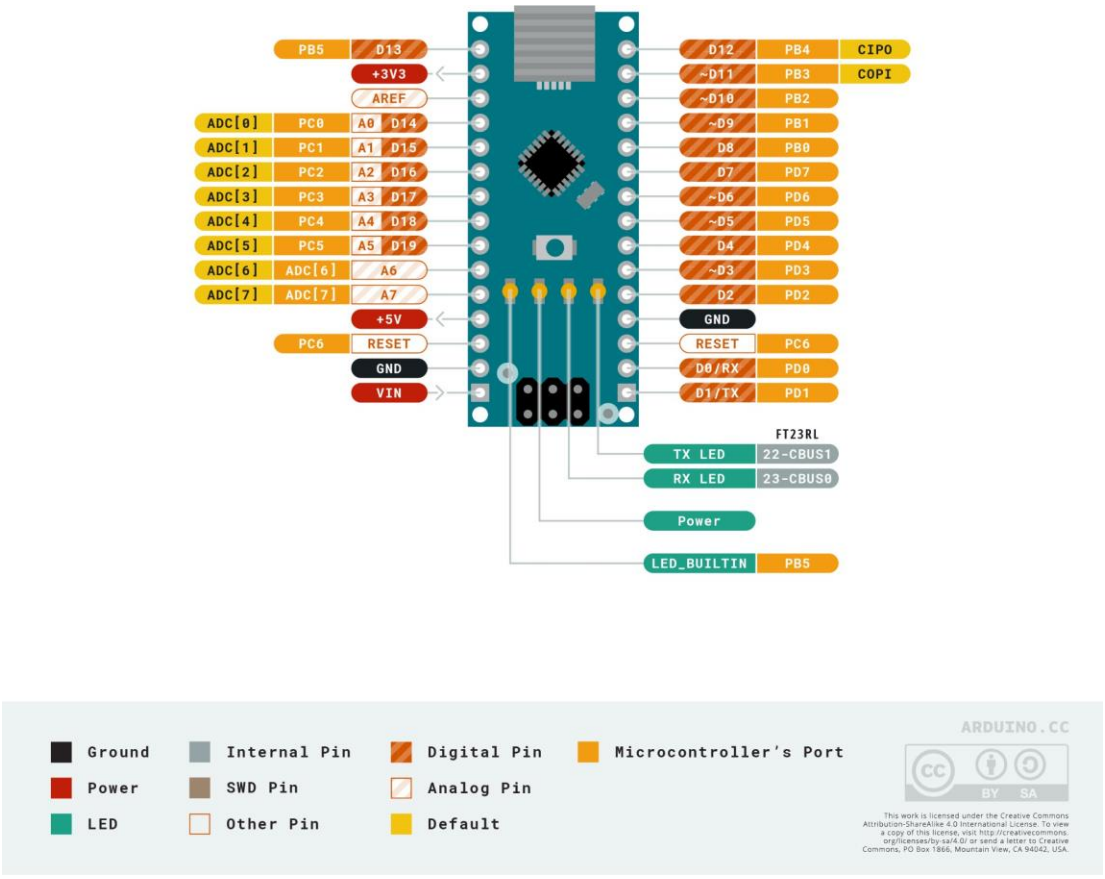
CHAPTER 4
COMPONENT LIST AND SPECIFICATIONS

NO	Name
1	Arduino Nano
2	Ultrasonic sensor
3	Buzzer
4	Capacitor
5	Diode
6	Resistor

4.1Component List

COMPONENT SPECIFICATIONS

1.ARDUINO NANO



Power

The Arduino Nano can be powered via the Mini-B USB connection, 6-20V unregulated external power supply (pin 30), or 5V regulated external power supply (pin 27). The power source is automatically selected to the highest voltage source.

Memory

The ATmega328 has 32 KB, (also with 2 KB used for the bootloader. TheATmega328 has 2 KB of SRAM and 1 KB of EEPROM.

Input and Output

Each of the 14 digital pins on the Nano can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. In addition, some pins have specialized functions:

Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serialdata. These pins are connected to the corresponding pins of the FTDI USB-to-TTL Serial chip.

External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt ona low value, a rising or falling edge, or a change in value. See the attachInterrupt() function for details.

PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analogWrite() function.

SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication, which, although provided by the underlying hardware, is notcurrently included in the Arduino language.

LED: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

The Nano has 8 analog inputs, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the analogReference() function. Analog pins 6 and 7 cannot be used as digital pins. Additionally, some pins have specialized functionality:

I2C: A4 (SDA) and A5 (SCL). Support I2C (TWI) communication using the Wire library (documentation on the Wiring website).

There are a couple of other pins on the board:

AREF. Reference voltage for the analog inputs. Used with analogReference().

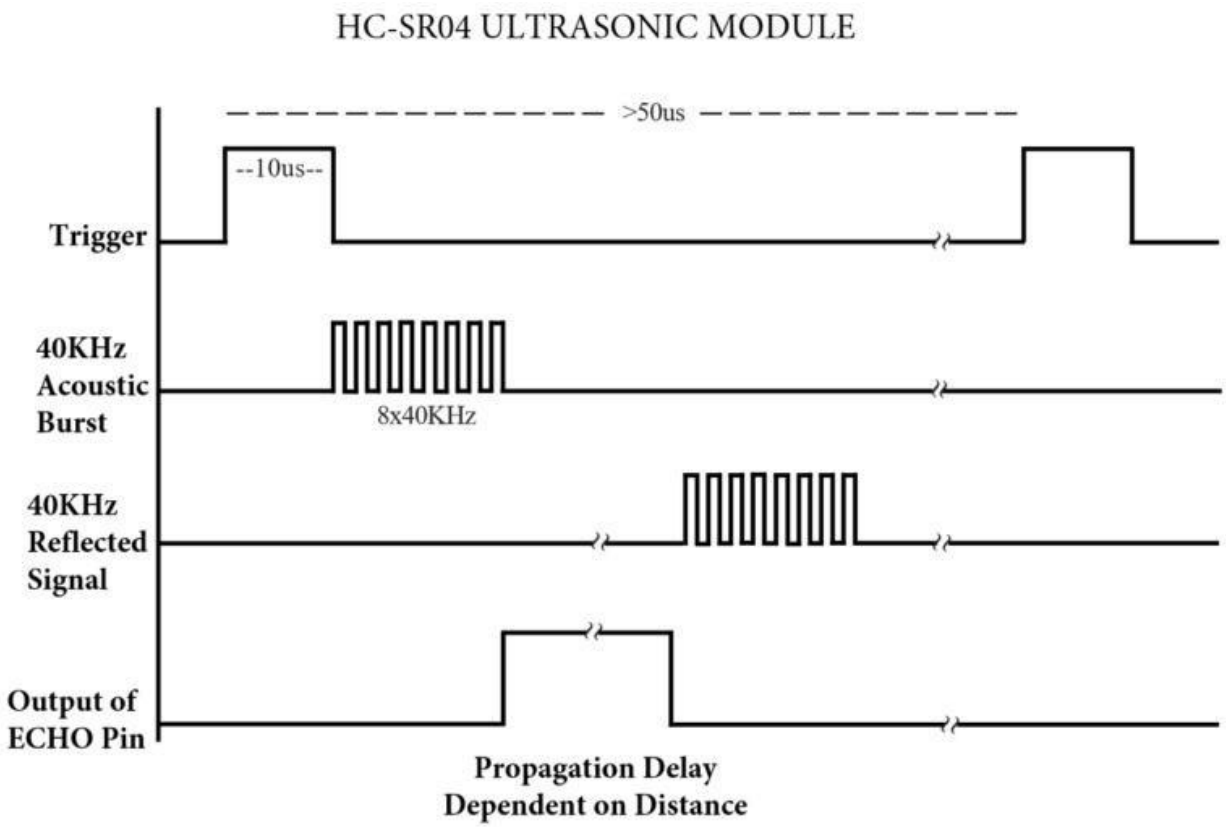
Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

2.ULTRASONIC SENSOR

Ultrasonic sensors (or transducers) work on the same principle as radar systems. Ultrasonic sensors can convert electrical energy into sound waves and vice versa. Acoustic signals are ultrasonic waves propagating at frequencies above 18 kHz. The well-known ultrasonic sensor HC SR04 produces ultrasonic waves with a frequency of 40 kHz.

A microcontroller is typically used to communicate with the ultrasonic sensor. To start measuring distance, the microcontroller sends a trigger signal to the ultrasonic sensor. For the ultrasonic sensor HC-SR04, the duty cycle of this trigger signal is 10 µS. When triggered, the ultrasonic sensor produces eight acoustic (ultrasound) bursts and starts a timer. The timer stops as soon as the reflected (echo) signal is received. The output of an ultrasonic sensor is a high pulse of duration equal to the

time difference between the transmitted ultrasonic burst and the received echosignal.



The microcontroller uses the following functions to interpret the time signals asdistances.

$$Distance\ (cm) = \frac{echo\ pulse\ width\ (uS)}{58}$$

$$Distance\ (inch) = \frac{echo\ pulse\ width\ (uS)}{148}$$

In theory, distance can be calculated using the TRD (Time/Speed/Distance) measurement formula. The calculated distance is the distance from the ultrasonic transducer to the object and back to the transducer, so it is a bi-directional movement. By dividing this distance by two, we can determine the actual distance from the transducer to the object. Ultrasound propagates at the speed of sound (343 m/s at 20 °C). The distance between the object and the sensor is half the distance that sound waves travel. [iv] The following formula calculates the distance to an object placed in front of the ultrasonic sensor.

3.BUZZER

An arduino buzzer is also called a piezo buzzer. It is basically a tiny speaker that you can connect directly to an Arduino. You can make it sound a tone at a frequency you set. The buzzer produces sound based on reverse of the piezoelectric effect.

What is the piezoelectric effect?

Arduino buzzers are also called piezo buzzers. It's basically a small speaker that you can plug directly into your Arduino. You can play a tone sound at the set frequency. Buzzers produce sound based on the inverse of the piezoelectric effect.

How does an Arduino buzzer work?

The buzzer makes the same loud sound regardless of changes in applied voltage. It consists of a piezoelectric crystal between two conductors. When an electric potential is applied to these crystals, they push one conductor and pull the other. This push or pull creates sound waves. Most buzzers produce tones in the 2-4 kHz range.

How to use an Arudino buzzer?

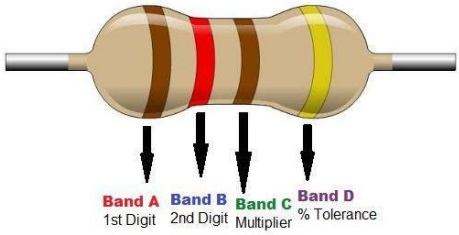
If there is a sticker on the buzzer, remove the sticker. Connect one pin (it doesn't matter) to Arduino ground (Gnd) and the other end to digital pin 10. You can create a tone using a buzzer using tone from Arduino. You need to specify the pin of the buzzer, the desired frequency (hertz, Hz), and the duration (in milliseconds) you want the sound to sound. Use command to generate Arduino buzzer sound.

tone (8, 1200, 500); // 1200 Hz tone on pin 8 for 1/2 second

How do you know which frequency to use? Adolescents can generally hear frequencies between about 20 Hz and 20,000 Hz. Older people can lose their high frequencies and be unable to hear sounds up to 20,000. Of course it varies from person to person. Also, the buzzer may not be able to reproduce the full range, especially very high and low sounds.

You can omit the period if you want. In this case, on another frequency it will continue to beep until he calls noTone(pin) or Tone() to tell it to stop.

4.RESISTOR



Based on Ohm's law named after German Physicist Georg Simon Ohm, theresistance is defined as follows:

As per the Ohm's Law, the voltage V across a resistor is directly proportional to the current I flowing through it. Here, the resistance R is constantly proportional.

Therefore, $V = I \times R$

Working Principle of Resistor

A resistor absorbs electrical energy, reduces the voltage, impedes the flow of current, and releases it as heat. In today's electronics world, heat dissipation is typically a fraction of a watt.

Ohm's law states that if I is the current through a resistor (in amperes) and R is the resistance (in ohms), then V is the voltage drop (potential difference between two connected contacts) caused by the resistor. I'm here.

V= I/R

Another way of saying this is that the 1Ω resistor will allow a current of 1 amp when there is a capacity difference between the ends of the resistor of 1 volt.

CHAPTER 5
WORKING

5.1 WORKING

The Smart Shoes for Blinds is a groundbreaking project that uses ultrasonic sensors and Arduino Nano to help visually impaired individuals navigate their surroundings with greater ease. Here's how it works:

1. The ultrasonic sensor is placed on the front of the shoe and sends out sound waves that bounce back when they hit an obstacle.

2. The sensor then calculates the time it takes for the sound waves to return to the shoe and determines the distance to the obstacle.

3. This information is then transmitted to the Arduino Nano, which processes it and sends signals to the motor to vibrate, providing haptic feedback to the wearer.

The wearer can then use the different buzzer sound vibrations to determine the location and proximity of the obstacle, allowing them to navigate their surroundings with greater confidence and independence.

Overall, the Smart Shoes for Blinds is a powerful tool that leverages the latest technology to help visually impaired individuals navigate their environment with greater ease and independence. By using ultrasonic sensors and the power of Arduino, this project has the potential to make a real difference in the lives of people with visual impairments.

5.2 CODE

```
#define echoPin 2 // attach pin D2 Arduino to pin Echo of HC-SR04
#define trigPin 3 //attach pin D3 Arduino to pin Trig of HC-SR04

// defines variables
long duration; // variable for the duration of sound wave travel
int distance; // variable for the distance measurement

const int buzzer =  4;      // the number of the LED pin

void setup() {
  Serial.begin(9600);

  pinMode(output, OUTPUT);
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an OUTPUT
  pinMode(echoPin, INPUT); // Sets the echoPin as an INPUT
  pinMode(buzzer, OUTPUT);

  Serial.begin(9600); // // Serial Communication is starting with 9600 of baudrate speed
}
void loop() {
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin HIGH (ACTIVE) for 10 microseconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  // Reads the echoPin, returns the sound wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);
  // Calculating the distance
  distance = duration * 0.034 / 2; // Speed of sound wave divided by 2 (go and back)
  // Displays the distance on the Serial Monitor
  Serial.print("Distance: ");
  Serial.print(distance);
  Serial.println(" cm");


  if (distance < 100) {
   // digitalWrite(vib, HIGH);
    for (int x = 0; x < 15; x++) {
      if (x % 2 == 0) {
```

```
      x + 2;
    //  Serial.println(x);
      digitalWrite(buzzer, x);
      delay(10 + distance);
    }
    if (x > 15) {
      x = 0;
    }

  }
 } else if(distance > 30){
  digitalWrite(buzzer, LOW);
 }
// Serial.println(distance);

}
```

5.3 MAIN FUNCTIONS

1. The system detects nearby obstacles and measures their distance using an ultrasonic sensor.

2. The Arduino Nano microcontroller processes the distance data and activates the buzzer to emit a beeping sound.

3. The beeping sound becomes more frequent as the object gets closer, giving the user a sense of how far away the obstacle is.

4. The system is designed to be attached to a pair of shoes, providing the user with real-time feedback on the location and proximity of obstacles in their path.

5. The project helps visually impaired individuals navigate their surroundings more safely and independently by providing audio cues to avoid collisions and obstacles.

These functionalities can be adjusted or expanded depending on the specific implementation of the project.

CHAPTER 6
ADVANTAGES,LIMITATIONS,APPLICATIONS

6.1 ADVANTAGES

1.Provides increased mobility and independence for visually impaired individuals.

2.Real-time feedback helps individuals navigate their surroundings with greater ease and safety.

3.Relatively affordable and accessible technology that can be easily customized and maintained.

6.2 LIMITATIONS

1) Low design time.
2) Low production cost.
3) This system is applicable for both the indoor and outdoor environment.
4) It is dynamic system.
5) Less space.
6) Low power consumption.

6.3 APPLICATIONS

1. Can be used by individuals with visual impairments in both indoor and outdoor environments.

2. Can be implemented in public spaces to improve accessibility for individuals with disabilities.

3. Can be used as a teaching tool for individuals with visual impairments to learn about the technology and programming.

CONCLUSION AND FUTURE SCOPE

FIGURE 1:THE SHOE

FIGURE 2:CIRCUIT DIAGRAM

1)CONCLUSION

We would like to conclude that the proposed system completed successfully. as westated earlier in a problem statement, the previous problem like a less information conveyed, poor efficiency of IR sensor and dependency on stick are overcome and successfully implemented with efficiency of object detection and with a clear information to a blind people for their guidelines

Hence, it can be concluded that this project is able to play a great contribution tothe state of the art and will play a great role to assist the blinds to walk easily.

1)There is no doubt that every project has its own weaknesses. In this section, we are going to

mention the weaknesses of the Walk Me Home project.

2)One of the weaknesses in our project, is that it is only compatible only on Android platforms. Another weakness is that the hardware is not waterproof yet.

3)A third weakness in the mobile application is when the user asks the application to walk him home, they need to tap the navigate button on the right bottom corner, since they are visually impaired users, it is going to be a problem, and since we aim to provide the best product.

One of the strengths in our product that it's depending on voice commands. Since we are dealing with visually impaired users, this gives our product a strong advantage. The hardware we worked on helps not only the user, it also helps the other people nearby. For example, if someone is moving towards the user, and the user couldn't notice them, a connected beeper is going to make beeping noises to warn them. The room for improvement still wide and open in this area. In particular this project can be improved by adding some other pieces of hardware into a device such as a Controller that fully controls the functionality of the hardware, by turning it on and off, connecting the device to the mobile application by Bluetooth technology, and also saving the current location and translating the voice commands. Another improvement is enhancing the mobile application by growing the database which allows the user to save more than one location to visit in the near future, also creating a community for visually impaired users, which allows them to interact with volunteers, and arranging possible meetings.

2) FUTURE ENHANCEMENT

Going forward, we will focus on improving the performance of the system and reducing the burden on users by adding cameras to guide the blinds accurately. Images captured by a webcam and his NI smart camera help identify objects and scan the entire instance to see if there are different objects in the path of the blind person. . It can also recognize the material and shape of objects. Match percentages should be exact most of the time. For blind people to be reliable, because there isno way to fix it. Long-range targets can be identified using the monopulse radar principle. Other application areas may include new concepts of optimal safe path detection based on neural networks for the visually impaired.

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APPENDICES

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