

An Embedded Project

On

SMART BLIND STICK

By

KHARE POOJA

Abstract:

This project describes ultrasonic blind walking stick with the use of arduino. according to who, 30 million peoples are permanently blind and 285 billion peoples with vision impairment . if you notice them , you can very well know about it they can't walk without the help of other. one has to ask guidance to reach their destination. they have to face more struggles in their life daily life. using this blind stick , a person can walk more confidently.this stick detects the object in front of the person and give response to the user either by vibrating or through command. so, the person can walk without any fear. this device will be best solution to overcome their difficulties.

Introduction:

Blind peoples have to face many challenges in their life, one of them is to find their way on the streets. As on the streets, there are so many vehicles and obstacles that may block their way and also may injure them.

So keeping this problem in the mind we developed a Smart blind stick that scans for the obstacles in front of it with the help of an ultrasonic sensor.

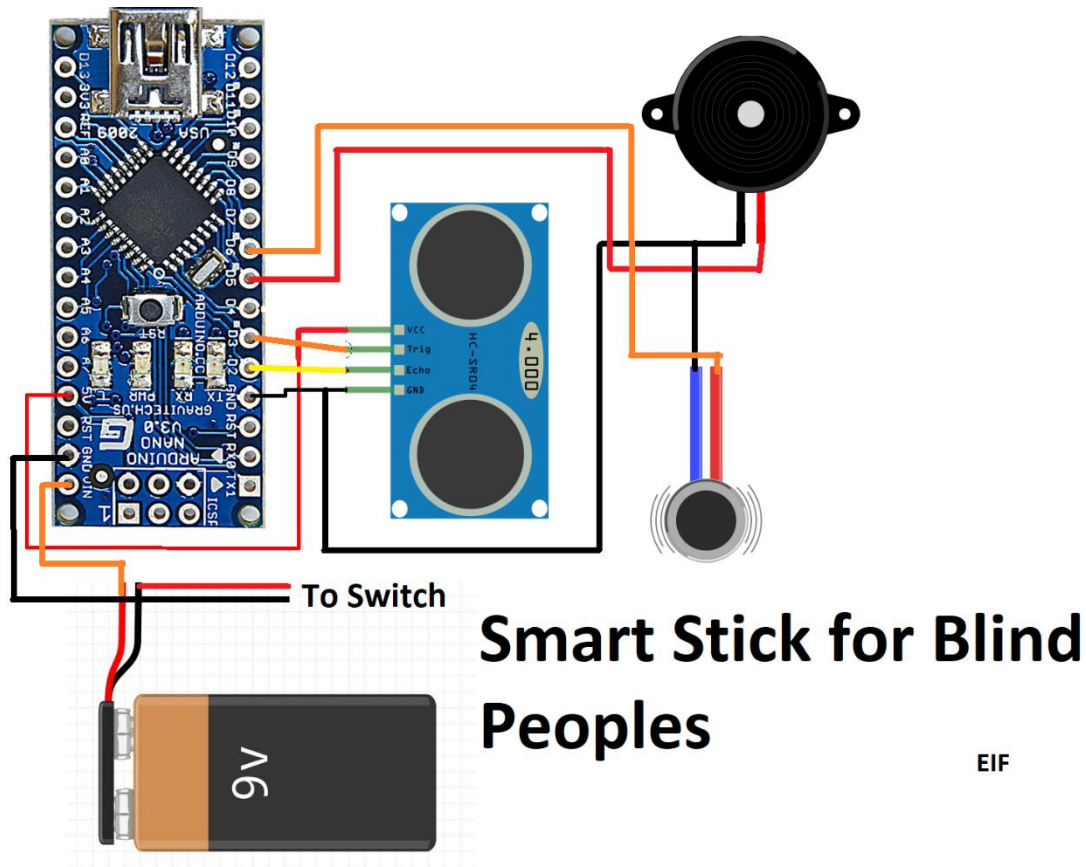
Apparatus:

- i)Arduino UNO.
- ii)Jumper wires.
- iii)Breadboard.
- iv)HC-SR04 ultrasonic sensor.

v)LED with a 220-ohm resistor.

vi)DC batteries.

Block Diagram:



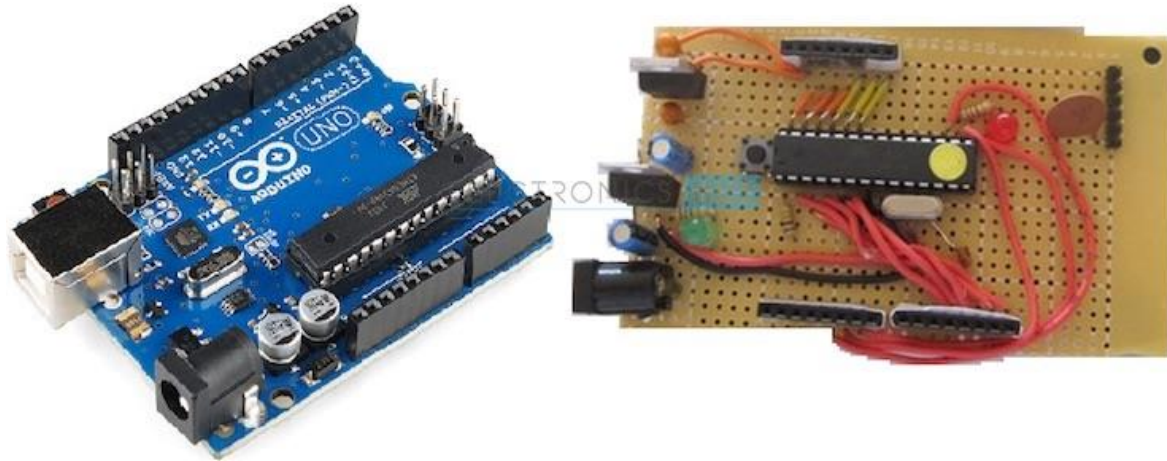
Smart Stick for Blind Peoples

EIF

Introduction to Arduino board:

A decade ago, working around electronics involved knowledge in physics and math, expensive lab equipment, a laboratory type setup and important of all, love for electronics. But the picture has changed over the decade or so where the above-mentioned factors became irrelevant to work around electronics except for the last part: love for electronics.

There are many reasons which made this possible like rapid growth in the field of information technology, lower cost of electronic components and equipment and widespread availability of the internet.



Arduino boards are generally based on microcontrollers from Atmel Corporation like 8, 16 or 32 bit AVR architecture based microcontrollers.

The important feature of the Arduino boards is the standard connectors. Using these connectors, we can connect the Arduino board to other devices like LEDs or add-on modules called Shields.

The Arduino boards also consists of on board voltage regulator and crystal oscillator. They also consist of USB to serial adapter using which the Arduino board can be programmed using USB connection.

In order to program the Arduino board, we need to use IDE provided by Arduino. The Arduino IDE is based on Processing programming language and supports C and C++. There are many types of Arduino boards available in the market but all the boards have one thing in common: they can be programmed using the Arduino IDE. The reasons for different types of boards are different power supply requirements, connectivity options, their applications etc.

Arduino boards are available in different sizes, form factors, different no. of I/O pins etc. Some of the commonly known and frequently used Arduino boards

are Arduino UNO, Arduino Mega, Arduino Nano, Arduino Micro and Arduino Lilypad.

Arduino UNO is a basic and inexpensive Arduino board and is the most popular of all the Arduino boards with a market share of over 50%. Arduino UNO is considered to be the best prototyping board for beginners in electronics and coding. UNO is based on ATmega328P microcontroller. There are two variants of the Arduino UNO: one which consists of through – hole microcontroller connection and other with surface mount type. Through-hole model will be beneficial as we can take the chip out in case of any problem and swap in with a new one.

Arduino UNO comes with different features and capabilities. As mentioned earlier, the microcontroller used in UNO is ATmega328P, which is an 8-bit microcontroller based on the AVR architecture.

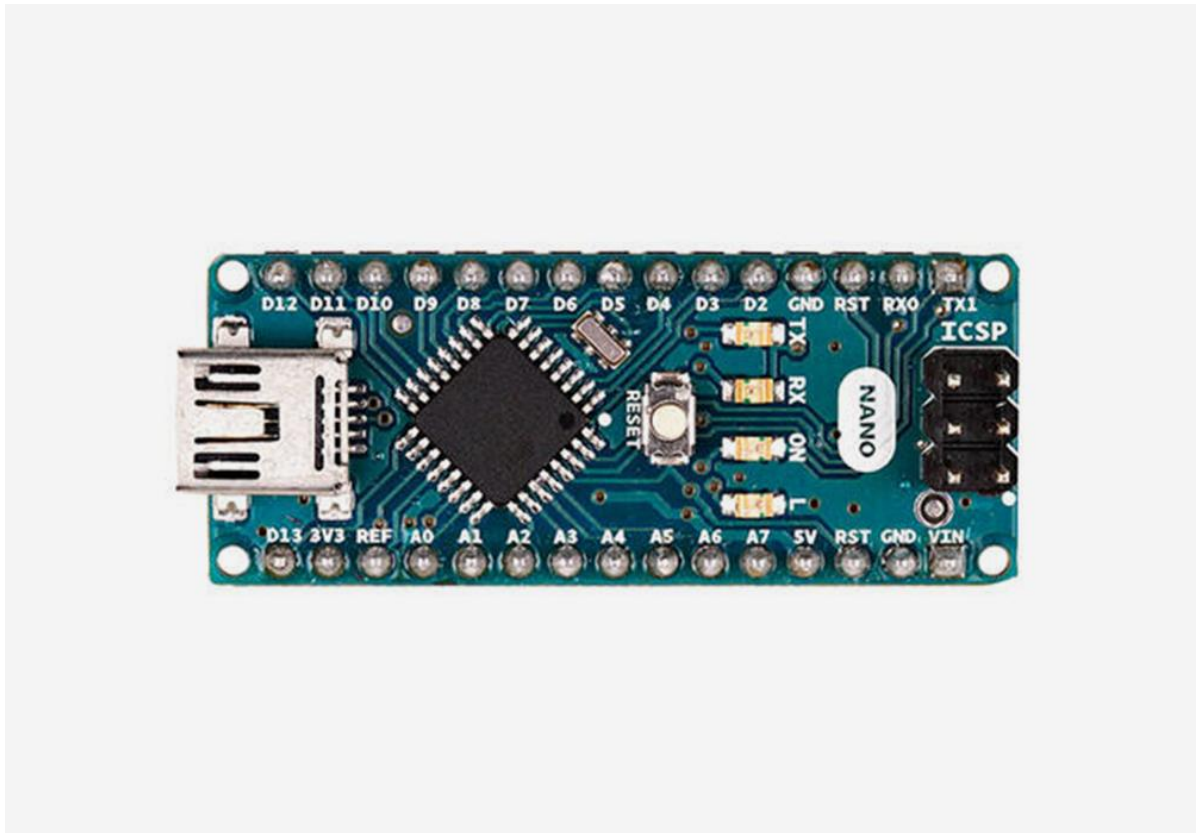
UNO has 14 digital input – output (I/O) pins which can be used as either input or output by connecting them with different external devices and components. Out of these 14 pins, 6 pins are capable of producing PWM signal. All the digital pins operate at 5V and can output a current of 20mA.

Some of the digital I/O pins have special functions which are describe below.

- Pins 0 and 1 are used for serial communication. They are used to receive and transmit serial data which can be used in several ways like programming the Arduino board and communicating with the user through serial monitor.
- Pins 2 and 3 are used for external interrupts. An external event can be triggered using these pins by detecting low value, change in value or falling or rising edge on a signal.
- As mentioned earlier, 6 of the 14 digital I/O Pins i.e. 3, 5, 6, 9, 10, and 11 can provide 8-bit PWM output.
- Pins 10, 11, 12 and 13 (SS, MOSI, MISO AND SCK respectively) are used for SPI communication.
- Pin 13 has a built-in LED connected to it. When the pin is HIGH, the LED is turned on and when the pin is LOW, it is turned off.

Arduino Uno has 6 analog input pins which can provide 10 bits of resolution i.e. 1024 different values. The analog pins on the Arduino UNO are labelled A0 to A5.

About Arduino Nano:



The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

Components:

HC-SR04 ultrasonic sensor:



The HC-SR04 Ultrasonic Distance Sensor is a sensor used for detecting the distance to an object using sonar. It's ideal for any robotics projects you have which require you to avoid objects, by detecting how close they are you can steer away from them.

Applications:

- used to avoid and detect obstacles with robots like biped robot, obstacle avoider robot, path finding robot etc.
- used to measure the distance within a wide range of 2cm to 400cm
can be used to map the objects surrounding the sensor by rotating it
- depth of certain places like wells, pits etc can be measured since the waves can penetrate through water

DC batteries:

DC stands for 'direct current' which means the current only flows in one direction. Batteries and electronic devices like TVs, computers and DVD players use DC electricity - once an AC current enters a device, it's converted to DC. A typical battery supplies around 1.5 volts of DC.

LED:

A light-emitting diode (LED) is **a semiconductor device that emits light when an electric current flows through it**. When current passes through an LED, the electrons recombine with holes emitting light in the process.

Code:

```
// Smart Stick for Blind peoples //
```

```
// By MOHD SOHAIL //
```

```
const int trigPin = 3;
```

```
const int echoPin = 2;
```

```
const int buzzer = 5;
```

```
const int motorPin = 6;
```

```
long duration;
```

```
int distance;
```

```
int safetyDistance;
```

```
void setup() {
```

```
  pinMode(trigPin, OUTPUT);
```

```
  pinMode(echoPin, INPUT);
```

```
  pinMode(buzzer, OUTPUT);
```

```
  pinMode(motorPin, OUTPUT);
```

```
  Serial.begin(9600);
```

```
}
```

```
void loop() {  
  
    digitalWrite(trigPin, LOW);  
    delayMicroseconds(2);  
  
    digitalWrite(trigPin, HIGH);  
    delayMicroseconds(10);  
    digitalWrite(trigPin, LOW);  
  
    duration = pulseIn(echoPin, HIGH);  
  
    distance= duration*0.034/2;  
  
    safetyDistance = distance;  
    if (safetyDistance <= 30){  
        digitalWrite(buzzer, HIGH);  
        digitalWrite(motorPin, HIGH);  
    }  
    else{  
        digitalWrite(buzzer, LOW);  
        digitalWrite(motorPin, LOW);  
    }  
  
    Serial.print("Distance: ");
```

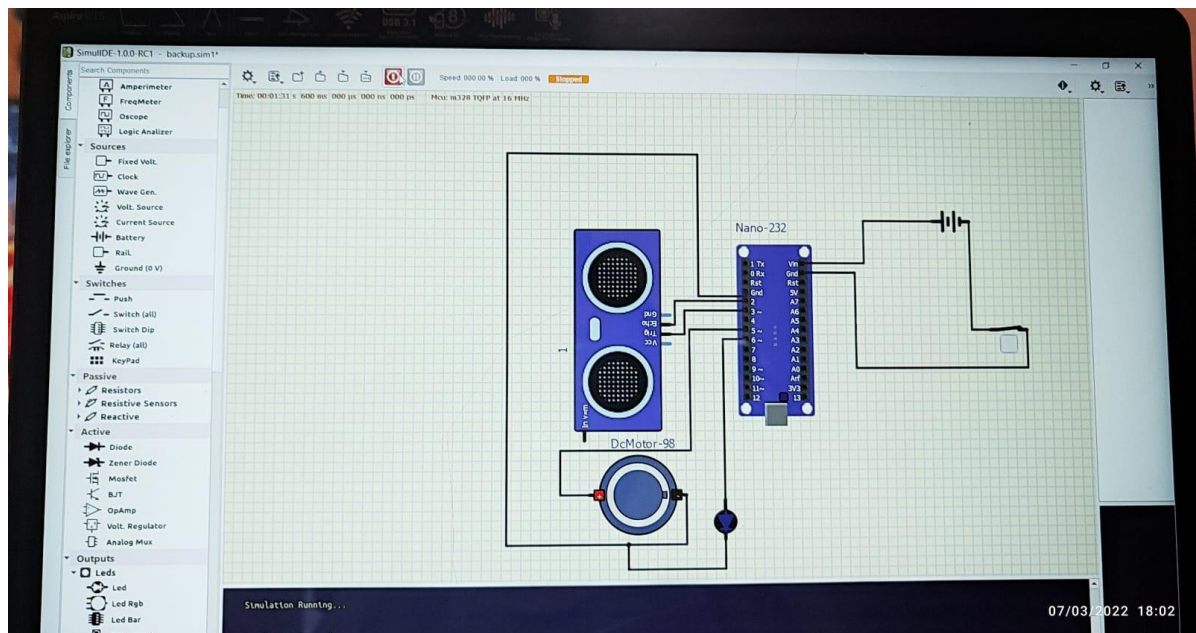


```
Serial.println(distance);
```

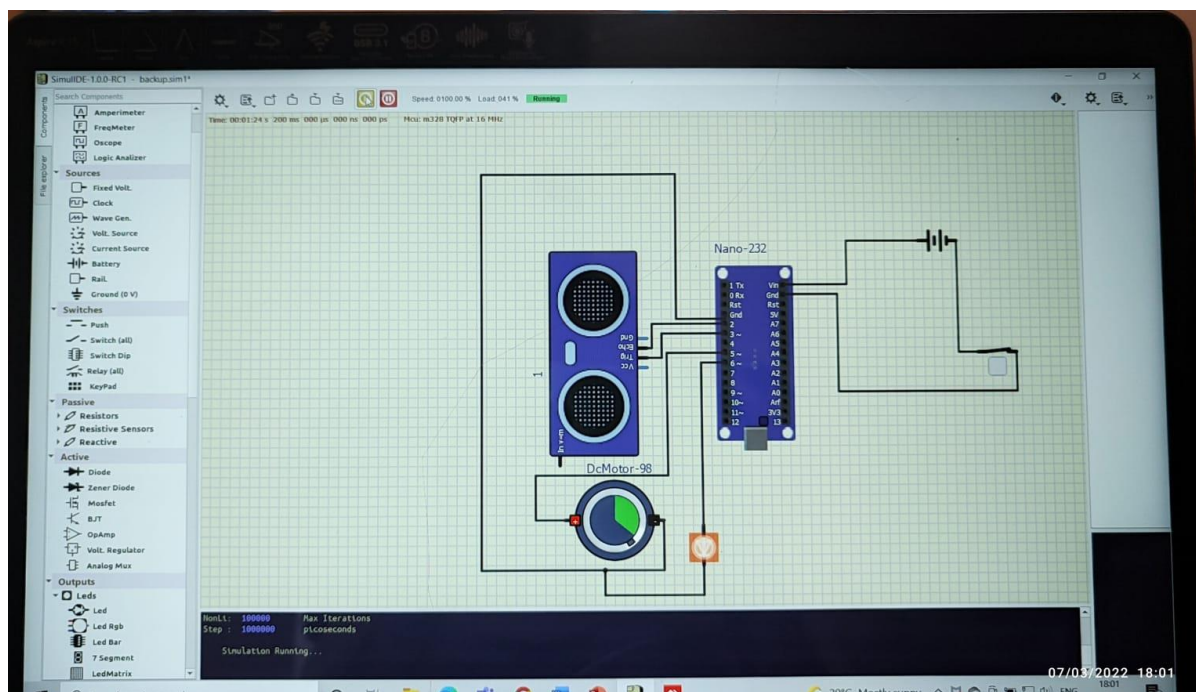
```
}
```

Output:

Before running:



After running:



Conclusion:

In this project we came to know the working of Arduino, its hardware / software features and its applications as to where it is currently being used. We have also learnt how to write sketches for Arduino in its own IDE (software). Developing new ideas with Arduino is endless. The possibilities of using an Arduino to learn and develop new ideas are infinite. Though it does have its own limitations, it is a great tool that can be used in learning.