Ultrasonic Distance Sensor

**Introduction**

Hello, my name is Jarif. I began learning the Arduino not too long ago and decided to create a small project using my knowledge. I decided to create an ultrasonic distance sensor that uses the HC-SR04. The purpose of this project is to provide a cheap distance measurement tool that can be used in a variety of applications, such as alarms.

**How It Works**

How it works is that it uses a sound sensor (HC-SR04) to measure the distance from it, to an object. The sensor sends out a signal from one end and waits until an object obstructs the signal and causes it to bounce back. I use the time it takes for this and the speed of sound in room temperature to calculate the distance. This distance is then outputted to a display. In addition, if the distance is less than 0.1 m a buzzer turns on and an rgb led turns yellow. Otherwise, the rgb led is green to notify that the device is operational.

**Materials**

-Arduino UNO

-Potentiometer

-LCD Display

-Active Buzzer

-RGB LED

-2 Current Limiting Resistors for the LED

-Jumper wires

**Code**

#include <LiquidCrystal.h>

int trigger = 12; //The trigger and echo are for the sound sensor. Trigger is where the signal is //released and echo is where it waits for the signal to bounce back

int echo = 11;

int travelTime = 0;

int rs= 5;

int en = 6;

int d4 = 7;

int d5 = 8;

int d6 = 9;

int d7 = 10;

LiquidCrystal lcd(rs, en, d4, d5, d6, d7); //The object used by the Arduino to instantiate the LCD display

float distance;

int ledBuzzPin = 13; //The pin that outputs to the buzzer and led

void setup() {

// put your setup code here, to run once:

//Sets up the pins as either input or output

pinMode(trigger, OUTPUT);

pinMode(echo, INPUT);

pinMode(ledBuzzPin, OUTPUT);

lcd.begin(16,2); //Sets up the display

Serial.begin(9600); //Sets up the serial monitor

}

void loop() {

//To set up the cursor on the lcd display

lcd.setCursor(0,0); //Horizontal column by row

lcd.print("The distance is:");

lcd.setCursor(0,1);

lcd.print(distance); //This prints at the selected position of the cursor on the display

//This is for the echo and trigger

digitalWrite(trigger, LOW);

delayMicroseconds(10);

digitalWrite(trigger, HIGH);

delayMicroseconds(10);

digitalWrite(trigger, LOW);

travelTime =pulseIn(echo, HIGH); //Looks for how long a pulse is, in this case high

delay(1000);

//echo will stay high until the trigger hits echo, which is how travelTime works

distance = travelTime\*(1.0/1000000.0)\*346.0; //speed\*time = distance

distance/=2;

Serial.println(distance);

if(distance <= 0.1){ //if and only if the distance is less than 0.1 m turn the led yellow and activate the buzzer

digitalWrite(ledBuzzPin, HIGH);

}

else{

digitalWrite(ledBuzzPin, LOW);

}

}

Credits to Paul McWhorter for teaching me how to use the Arduino and its components

**Setup**

