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Distance Measurement Using Ultrasonic Sensor and Arduino

Vaibhav Shinde, Rohit Shirsat, Keshav Patil,

Vaibhav Khese, Prof.V.A.Chitale

Mechanical Department
JSPM's Bhivarabai Sawant Institute Of Technology And Research,
Wagholi, Pune, Maharashtra

Abstract: *Ultrasonic Distance Meter working standard depends on ultrasonic waves as the human ear's discernible insight range is 20 Hz to 20KHz, it is inhumane toward ultrasonic waves, and subsequently the ultrasonic waves can be utilized for applications in industries/vehicles without ruining human action. The distance can be estimated utilizing the pulse eco and phase measurement method. The sign is sent by an ultrasonic transducer, reflected by a deterrent, and got by another transducer where a sign is distinguished. The time deferral of the sent and got signal relates to the distance between the framework and the deterrent. The application region of the ultrasonic distance meter is extremely wide and salvage tasks, spy robots, adaptable use in independent innovation, and use in mining: it has tracked down fundamental use in light industry (ex. toy industry) agribusiness, utilized in the vehicle leaving frameworks and any remaining designing practices.*

Keywords: *Ultrasonic Distance Meter, ultrasonic waves, Sensors, Arduino*

1. INTRODUCTION

There are multiple ways of estimating distance without contact. One way is too involved ultrasonic waves at 40Khz for distance estimation. The ultrasonic transducer measures how much time is taken for the beat of sound to go to a specific surface and return as a reflected reverberation. This circuit works out the distance in view of the speed of sound at 25^{o} C encompassing temperature and shows it in the seven-sections show using it, you can quantify distance up to 10 meters. Direct estimation is an issue that a ton of utilization in the modern and customer market section needs to battle with. Ultrasonic innovation is one of the arrangements utilized by the business. In any case, a streamlined harmony among cost and

highlights are an absolute requirement for practically all target application. The ultrasonic distance measurer (UDM) is utilized basically when a noncontact measurer is required.

2. MOTIVATION

In this day and age, vehicles are the spine of the transportation framework. Yet, as it's the case with any run-of-the-mill mechanical progression, there are likewise issues like street mishaps. A portion of the commonplace purposes behind this issue is a distortion of the drivers about the protected distance between two vehicles or a vehicle and a deterrent. Therefore, we are making this Arduino application that will show protected distance and give security to vehicles.

3. PROBLEM STATEMENT

In India, traffic is a significant issue. Likewise, there is a need for acquiescence by drivers about traffic security guidelines and decisions that should be observed. This prompts the street's mishaps. To keep away from such lethal mishaps, we really want to guarantee that there should be a protected distance between two vehicles, and our task plans to give an answer for this.

4. EXISTING SYSTEM

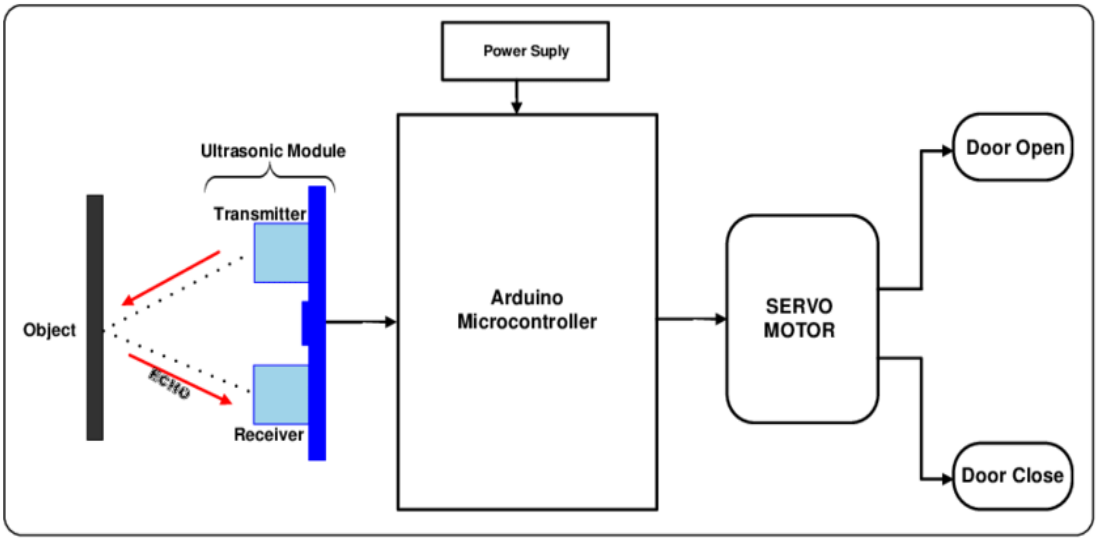

Fig.1: Existing System

5. SYSTEM ARCHITECTURE

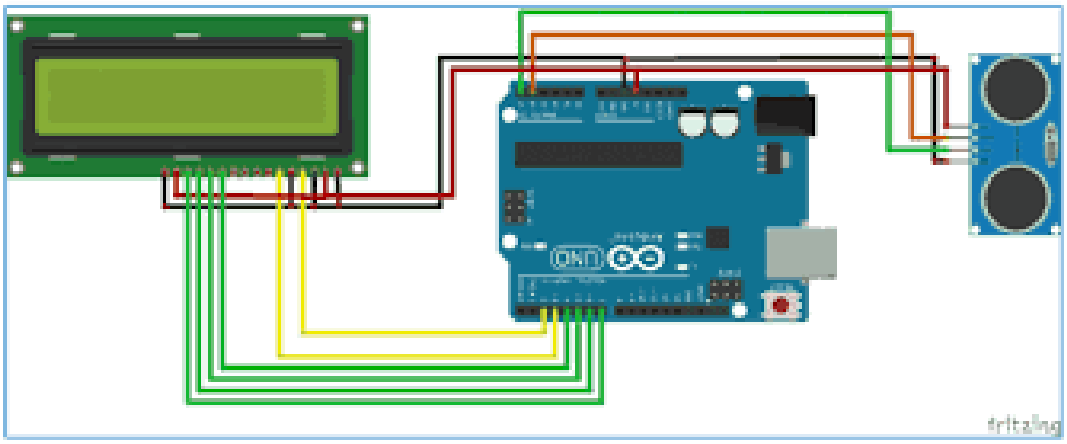

Fig.2: System Architecture

6. PROPOSED SYSTEM

Methodology

At the point when an electrical pulse of high voltage is applied to the ultrasonic transducers, it vibrates across an unambiguous range of frequencies and produces an eruption of sound waves. Whenever any obstruction comes in front of the ultrasonic sensor, the sound waves will reflect back as reverberation and produces an electric pulse. It works out the time taken between sending sound waves and getting reverberation. The reverberation examples will be contrasted and the examples of the sound waves to decide identified signal condition.

7. ARDUINO CODE

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);
#define trigPin 12 //Sensor Echo pin connected to Arduino pin 13
#define echoPin 13 //Sensor Trip pin connected to Arduino pin 12

void setup() {
pinMode(trigPin, OUTPUT);
```

```
  pinMode(echoPin, INPUT);
  lcd.begin();
  lcd.backlight();
  lcd.clear();
  lcd.setCursor(4,0);
  lcd.print("Group 9");
  delay(2000);
  lcd.setCursor(0,0);  //Set LCD cursor to upper left corner, column 0, row 0
  lcd.print("Target Distance:");  //Print Message on First Row
  }
void loop() {
  long duration, distance;
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = (duration/2) / 29.1;

  lcd.setCursor(0,1);  //Set cursor to first column of second row
  lcd.print("               "); //Print blanks to clear the row
  lcd.setCursor(0,1);   //Set Cursor again to first column of second row
  lcd.print(distance); //Print measured distance
  lcd.print(" cm");  //Print your units.
  delay(250); //pause to let things settle
  }


    }
```

8. ADVANTAGES, LIMITATIONS & APPLICATIONS

Advantage

1. Works very accurately
2. low cost
3. As it uses sound waves the operational speed is very high
4. It is when a non-contact measurer is required

Limitations

1. The range of the ultrasonic sensor is low (10m)
2. The power level of the signal is too low for long measurement.

Applications

1. Used as Parking assistance systems in vehicles with high-power ultrasonic transmitters.
2. Used to determine the safe distance between two vehicles.

9. FUTURE SCOPE

The ultrasonic sensor has an extraordinary future degree as it is an on-contact distance measurer. The application region of the ultrasonic distance meter is exceptionally wide in salvage activities, spy robot, adaptable used in independent innovation, , use in mining: it has tracked down fundamental use in light industry(ex. toy industry) agribusiness, utilized in the vehicle leaving frameworks and any remaining designing practices.

10. CONCLUSION

Ultrasonic device measurement is an advantageous method contrasted with conventional one utilizing measurement scales. This sort of measurement is especially material to the reach region where customary means cannot be carried out, for example, high temperature, pressure zones, and so on.

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