Social Distancing Alarm Using Arduino Uno

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Abstract- *This project aim is to provide an effective social distance monitoring solution in a pandemic situation. The raging coronavirus disease 2019 (COVID-19) caused by the SARS-CoV-2 virus has brought a global crisis with its deadly spread all over the world. The problem is people all over the country feel that society was insensitive in keeping a distance during the COVID-19 pandemic. There are two method selection procedures which are the software method and the hardware method. Firstly, the software method of encoding with Arduino code was chosen. . The second one is the hardware method of 3D printing.*

I. LITERATURE REVIEW

Created to determine the safe distance between individuals in public places. In this Study, addressing the worldwide Covid-19 pandemic situation, the process of flattening the curve for coronavirus cases will be difficult if the citizens do not take action to prevent the spread of the virus. This paper presents the detection of people with social distance monitoring as a precautionary measure in reducing physical contact between people.

The distance is measured between the central points and the overlapping boundary between persons in the segmented tracking area. With the detection of unsafe distances between people, alerts or warnings can be issued to keep the distance safe. In addition to social distance measure, another key feature of the system is detecting the presence of people in restricted areas, which can also be used to trigger warnings.

CONSTRUCTION

The logic of this system is very simple. In this, Ultrasonic sensors send waves. These waves are absolutely invisible and come back after hitting an optical. The Trig pin activates. In which we have connected LED and Buzzer. We have kept a distance of 1 m. You can increase this parameter by modifying the code.

Social Distancing Device
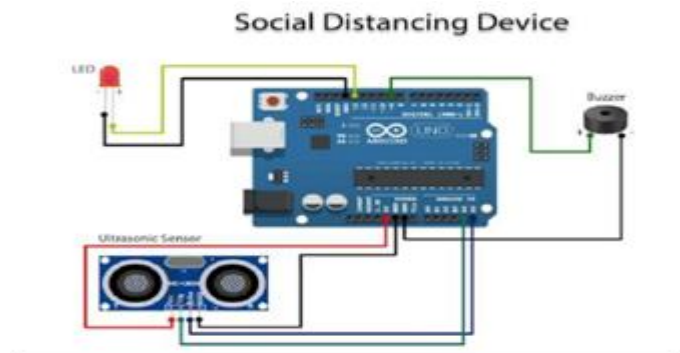
1.1 ArduinoUno

The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the ArduinoUNO board.

Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins(I/O),shields, and other circuits.

TheArduinoUNOincludes6analogpininputs,14digitalpins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms

Figure1.1: Arduino Uno

1.2 Ultrasonic Sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear)Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals)and the receiver (which encounters the sound after it has travelled to and from the target).An ultrasonic sensor is a device that detects an object and measures the distance to it. It measures the distance by emitting ultrasound and receiving the wave that the object reflects.

Figure 1.2 Ultrasonic Sensor

1.3 PiezoBuzzer

In simplest terms, a piezo buzzer is a type of electronic device that's used to produce a tone, alarm or sound. It's lightweight with a simple construction, and it's typically a low-cost product. Yet at the same time, depending on the piezo ceramic buzzer specifications, it's also reliable and can be constructed in a wide range of sizes that work across varying frequencies to produce different sound outputs.

For instance, at APC International, Ltd., we offer piezo buzzers without signal generators, self-oscillating buzzers that have signal generators and even multi-tone sound generators — often used in alarms and sirens. Regardless of the model you choose, our piezo buzzers offer high sound outputs. Plus, since they can be mounted on circuit boards, they're highly useful in a wide range of applications and assemblies.

Figure 1.3:Piezo Buzzer

1.4 Jumper Wires

A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the headerconnector of a circuit board, or a piece of test equipment.There are different types of jumper wires. Some have the same type of electrical connecter at both ends, while others have different connectors

Figure1.4: Jumper Wires

1.5 LED

A light-emitting diode (LED) is a semiconductor device that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.
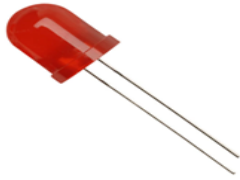
Figure 1.5: LED

LEDs have many advantages over incandescent light sources, including lower power consumption, longer lifetime, improved physical robustness, smaller size, and faster switching.

- Solid tips – are used to connect on/with a breadboard or female header connector. The arrangement of the elements and ease of insertion on a breadboard allows increasing the mounting density of both components and jump wires without fear of short-circuits. The jump wires vary in size and colour to distinguish the different working signals.

- Crocodile clips – are used, among other applications, to temporarily bridge sensors, buttons and other elements of prototypes with components or equipment that have arbitrary connectors, wires, screw terminals, etc

1.6 Battery 9V

A 9V battery is a type of primary (non-rechargeable) batterythat provides a nominal voltage of 9 volts. It is commonly used in portable devices such as smoke detectors, remote controls, and small electronic toys. 9V batteries are also used in some low-power projects such as small robots and simple electronic circuits.

Figure 1.6:Battery 9V

To power the Arduino using a 9V battery, connect the positive terminal of the battery to Vin pin of Arduino and negative terminal with GND pin of Arduino. Below is the connection diagram of the 9V battery with Arduino.

II. SOURCECODE

```
constintpingTrigPin = A4;
constintpingEchoPin = A5;
int led=13; //Buzzer to PIN 4
int buz1=9;
void setup() {
Serial.begin(9600);
pinMode(led, OUTPUT);
pinMode(buz1, 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)   // distance yaha set krna h
 {
int d= map(cm, 1, 300, 10, 1000);
digitalWrite(led, HIGH);
digitalWrite(buz1, HIGH);
delay(50);
digitalWrite(led, LOW);
digitalWrite(buz1, LOW);
delay(d);
 }
Serial.print(cm);
Serial.print("cm");
Serial.println();
delay(40);
 }
longmicrosecondsToCentimeters(long microseconds)
 {
return microseconds / 29 / 2;
 }
```

III. RESULT, CONCLUSION, FUTURESCOPE AND REFERENCES

Result

The project was successful and working well as its detected body heat within 1 meter.Even sometimes its does buzzed suddenly without detected any body heat but so far it was good enough to prove that we achieved our objective.
As been programmed it using ArduinoIDE,its had set up to programming pir motion sensor and ultrasonic sensor to the arduino digital board with the buzzer.

As we can saw above, its had connect the all of the electronic component and programmed it to the suitable pin based on each sprcification of the electronics component.

This is because whenever the sensor detected body heat (the input)and the ultrasonic sensor detected the certain distance,it would sent the information to the buzzer which is the output and it buzzed.So the programmed was success and we finished it with upload to the Arduino board.

Conclusion

For the conclusion , we had conclude that there are advantages and disadvantages of this project.We really hope that the advantages we achive from this product can provide benefits and convenience to the community. Next to the shortage, we also will improve and been looking for more research on this project so that it will had reached its maximum capabilty.

More testing and analysis should be done so that the product will be more accountable in the future. This product is not only meant for the usage in pandemic and in other field as well. As we can change the inputs (the distance) in Arduino code it is used to measure even a very long distance.

Future Scope

1. Wireless Connectivity: The system can be enhanced with wireless connectivity such as WiFi or Bluetooth to allow for remote monitoring and control. This would enable users to detect the object distance and maintain their distance from anywhere without any internet connection.
2. Maintain Safe Distance: This System helps to maintain proper distance between any two objects.It detects the obstacles in that particular allocated distance.
3. Usable in Viral Infectious Diseases :After few years everyone suffered from COVID:19.In such like infectious viral diseases can be handled by this product.
4. Blind People: Speciality of this project is, it is very useful for blind people .It helps them to understand the obstacles in their path as well as to maintain safe distance.

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