KEEP DISTANCE

by

ASHUTOSH KESHWARNI (1841165)

Under the Guidance of

Dr SARAVANA KUMAR

A Project report submitted in partial fulfillment of the requirements for the award of degree of Bachelor Computer Applications of CHRIST (Deemed to be University)

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CERTIFICATE

*This is to certify that the report titled **KEEP DISTANCE** is a bona fide record of work done by **Ashutosh Kesharwani (1841165)** of CHRIST (Deemed to be University), Bengaluru, in partial fulfilment of the requirements of V Semester BCA during the year 2020.*

Head of the Department **Project Guide**

Valued-by:

	Name	: Ashutosh Kesharwani
4.	Register Number	: 1841165
	Examination Centre	: CHRIST (Deemed to be University)
	Date of Exam	:

TABLE OF CONTENTS

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ABSTRACT

We are all locked in our houses in this COVID-19 pandemic situation .When everything will fall into place then also we would all be scared with it .The precaution measures advised by the WHO are to maintain social distancing and to wash hands regularly.

In the present pandemic situation of Covid-19,many countries have been affected by this pandemic. A person could contract this disease if he/ she breathes in the virus by getting in contact with any infected person/ virus carrier within close proximity who has sneezed or coughed, or by touching a contaminated surface and then his/ her eyes, nose or mouth. The precaution measures advised by the WHO are to maintain social distancing and to wash hands regularly.

To maintain social distancing is a tough task. Hence we have designed a smart device which will alert if anyone is at a distance less than 1m. Also it will make him aware by buzzing the buzzer and a red light will be on. The distance will also be displayed to create awareness.

In our project “Keep distance” we ensure that people maintain at least 1 meter of distance from each other. This distance can be changed according to their preferences but it has to be more than 1 metre at each and every case. This device will buzz an alarm when you are less than 1 meter away from any person near you. A bright LED glows when the alarm beeps and also OLED displays how far the person is away from each other.

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

1.1 OVERVIEW OF THE SYSTEM

We are all locked in our houses in this COVID-19 pandemic situation. When everything will fall into place then also we would all be scared with it. The precaution measures advised by the WHO are to maintain social distancing and to wash hands regularly. To maintain social distancing is a tough task. Hence we have designed a smart device which will alert if anyone is at a distance less than 1m. Also it will make him aware by buzzing the buzzer and a red light will be on. The distance will also be displayed in OLED display to create awareness.

1.2 PROJECT PLAN

DATE	PHASE
15st November-30th November	Finalized the concept of the project
1st December-23rd December	Analysis phase
1st January -12th January	Design phase which involves designing of the database and User Interface.
20th January-24th March	Coding
24th March-5th March	Testing
5th March -9th March	Final report submission

Table 1.2 Project Plan

2. SYSTEM ANALYSIS

2.1 EXISTING SYSTEM

There are a few existing iot projects that can measure the distance between people and remind the user about social distancing like given below

A. SOCIAL DISTANCING DETECTOR

Social distancing detector is a social distancing device. Where we can clip this device on our belt and maintain social distancing. This device will buzz an alarm when you are less than 6 feet away from any humans. A bright LED glows when the alarm beeps.

B. SOCIAL DISTANCING CAP

Social distancing detector is another social devising device which can be used to maintain social distancing between people. In this project they used 3 ultrasonic sensors which are placed at 3 sides of the cap, using this we can maintain proper social distance among individuals. If the proper social distance is not maintained in three directions this cap will alert the person. To alert the person we are using the buzzer.

LIMITATIONS OF EXISTING SYSTEMS

1. The existing devices mentioned above focus only on social distancing detectors.
2. There are no messages put up when the person is not following social distancing.
3. And the distance is also not known by people who are using it.

2.2 PROPOSED SYSTEM

The proposed system of this “Keep Distance” project enables us to detect whether social distancing(distance between two or more people) is being practiced properly within a range of 1 meter. This is a detector that can identify objects that entered within a range of 1 meter.

After seeing the present scenario and understanding the importance of Social distancing, this project has tried to achieve the following objectives:

- Remind others to keep away using the LCD Display.
- A touchless doorbell
- Distance measuring tool

BENEFITS OF PROPOSED SYSTEM

This creates awareness of social distancing and reminds people to practice social distancing

1. Able to safely distance yourself from others.
2. It works as an antivirus alarm with adjustable distances, granting the users to set their desirable minimum distance whenever they want.
3. Ensures the safety of our loved ones
4. It is also helpful in work places where the employer is working to serve public needs(Example : counter)

2.3 LITERATURE REVIEW

Social distancing measures (SDMs) protect public health from the outbreak of coronavirus disease 2019 (COVID-19). Social distancing is a method used to control the spread of contagious diseases. As the name suggests, social distancing implies that people should physically distance themselves from one another, reducing close contact, and thereby reducing the spread of a contagious disease (such as coronavirus)

2.4 SOFTWARE TOOLS USED

Arduino IDE

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

This software can be used with any Arduino board.
Libraries to downloaded

1) Wire.h

2) Adafruit -GFX.h

3) Adafruit - SH110g.h

4) SPI.h (Serial Peripheral Interface)

3. SYSTEM REQUIREMENTS

3.1 SYSTEM MODEL

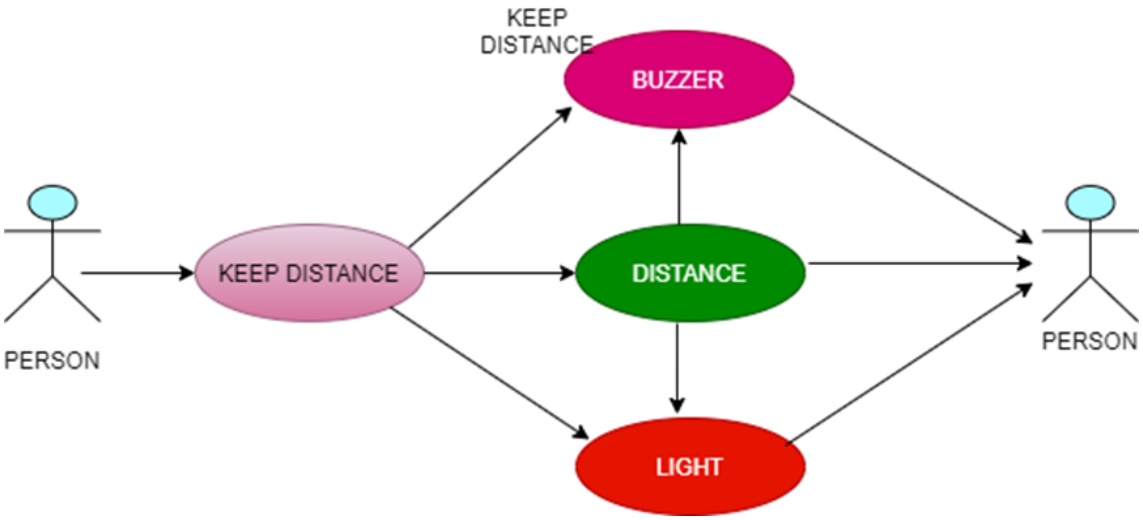

Fig 3.1 System Model

The above use case diagram depicts the system in its user's point of view. Each user available set of defined functionalities as mentioned in the diagram and the system acts according to the user type. Here buzzer will make a sound when the person come near to it and light will glow and it will show the distance.

3.2 FUNCTIONAL REQUIREMENTS

1. ARDUINO IDE

It is the main text editing program used for Arduino programming. Here, the IDE translates and compiles our sketches into code then Arduino will understand. Once the Arduino code is compiled it's then uploaded to the board's memory.

2. ULTRASONIC SENSOR

Here, Ultra Sonic sensor can measure the Distance to the target by measuring the time distance between the emission and reception.

3. OLED DISPLAY 12 C

Once the ultrasonic sensor detects the distance between the people then the distance will be shown in the Oled display.

4. ARDUNIO UNO

It is a microcontroller based on ATmega38. It is able to read inputs when a person comes near to it will trigger a message and turn it to an output.

5. BUZZER

Suppose if the distance is less than 15cm it makes a buzz sound.

6. MALE/FEMALE JUMPER WIRES

It is used to connect all the hardware components to each other .

3.3 HARDWARE REQUIREMENTS

Processor:

- Minimal: 1.6 GHz CPU
- Recommended: 2 x 1.6 GHz CPU

RAM:

- Minimal: 1.75 GB RAM
- Recommended: 3.5 GB RAM

HDD:

50 GB and more is recommended (Non-system drive is preferred).

3.4 SOFTWARE REQUIREMENTS

Arduino IDE

XAMPP Libraries are files written in C or C++ which provide your sketches with extra functionality. It is the ability to control and LED matrix or read an encoder.

Platform: Microsoft Windows 10

Microsoft Windows 10 is a personal computer operating system developed and released by Microsoft as part of the Windows NT family of operating systems.

4. DESIGN SPECIFICATION

4.1 PROPOSED SYSTEM ARCHITECTURE

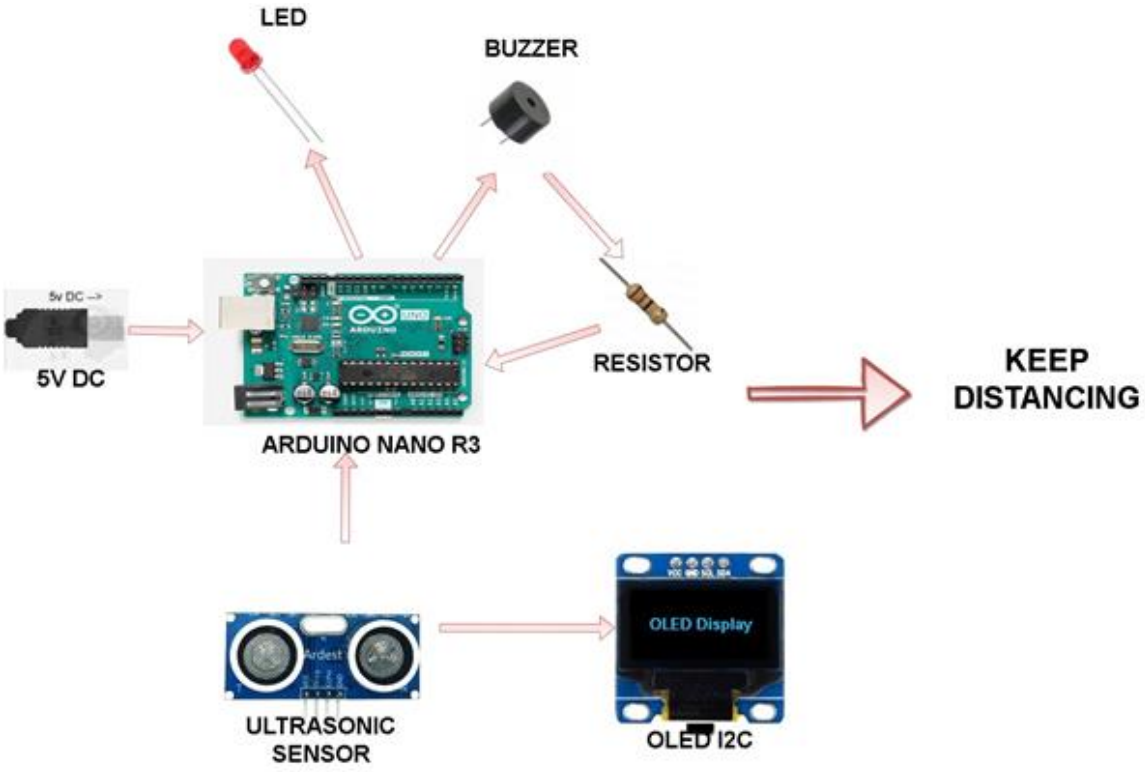

Fig 4.1 Proposed system architecture

4.2. DATA FLOW DIAGRAM

4.2.1 LEVEL 0

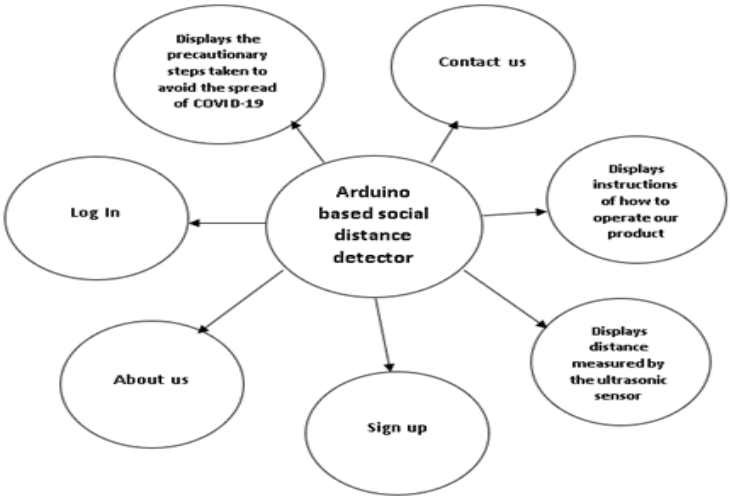

Fig 4.2.1 DFD Level 0

4.2.2 LEVEL 1

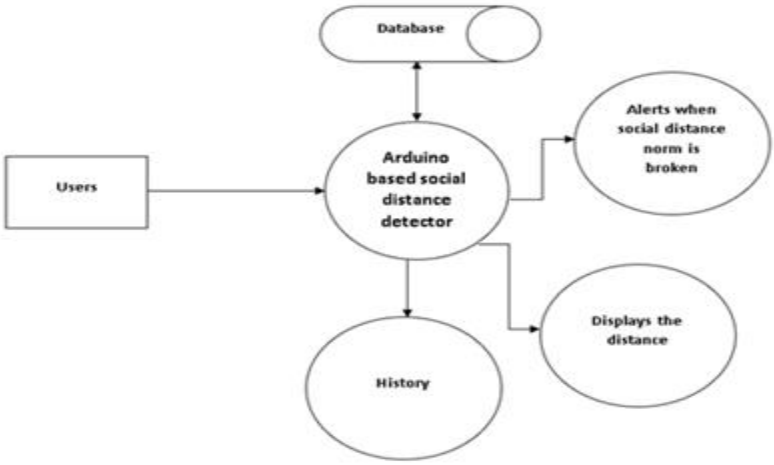

Fig 4.2.2 DFD Level 1

4.2.3 LEVEL 2

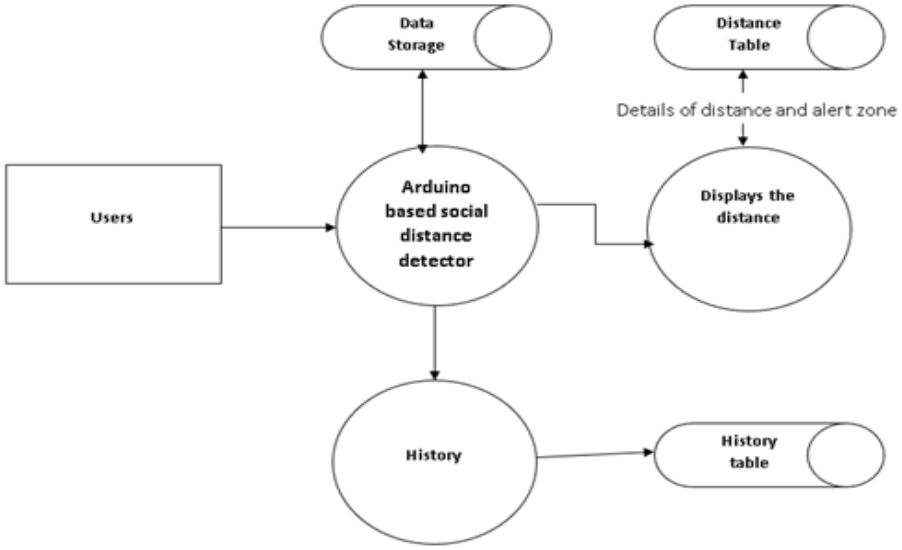

Fig 4.2.3 DFD Level 2

4.3 FLOW CHART

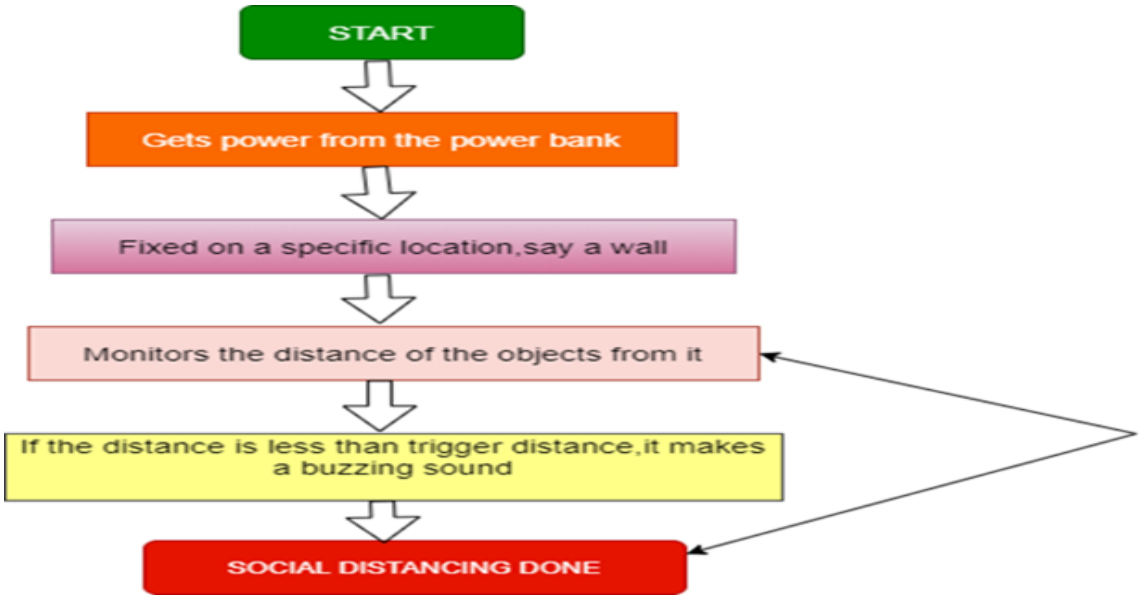

Fig 4.3 Flow Chart

4.4 ALGORITHM

THE ALGORITHM OF OVERALL PROCESS:-

STEP 1: START THE PROCESS

STEP 2: CONNECT TO ANY VOLTAGE SUPPLY

STEP 3:SET THE TRIGGER DISTANCE

STEP 4: GETS THE TRAVEL TIME AND SPEED MEASURED FROM ULTRASONIC SENSORS

STEP 5: DISTANCE IS CALCULATED USING ARDUINO NANO

STEP 6: BUZZER MAKES SOUND AND LED GLOWS

STEP 7: DISPLAYS THE DISTANCE ON THE OLED I2C

STEP 8: REPEAT STEP 3,4,5 & 6 UNTIL THE PROCESS END

STEP 9: END

4.5 BLOCK DIAGRAM

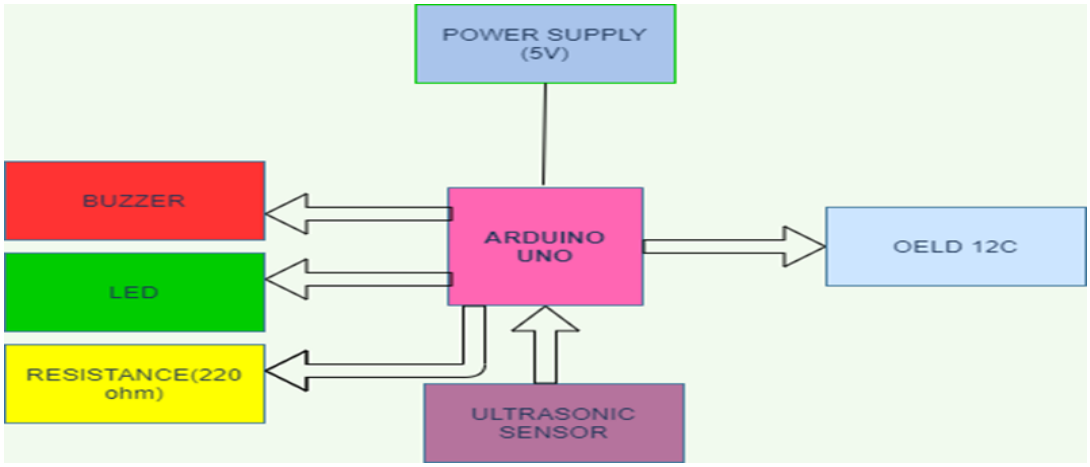

Fig 4.5 Block Diagram

4.6 CIRCUIT DIAGRAM

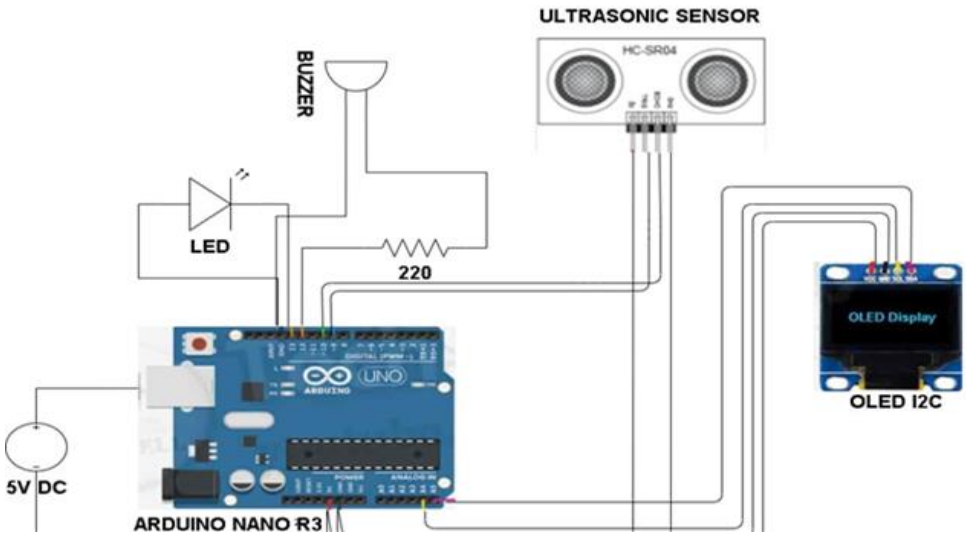

Fig 4.6 Circuit Diagram

5. IMPLEMENTATION

5.1 SOURCE CODE

```
#include <SPI.h>

#include <Wire.h>

#include <Adafruit_GFX.h>

#include <Adafruit_SSD1306.h>


#define SCREEN_WIDTH 128 // OLED display width, in pixels

#define SCREEN_HEIGHT 32 // OLED display height, in pixels


// Declaration for an SSD1306 display connected to I2C (SDA, SCL pins)

#define OLED_RESET     4 // Reset pin # (or -1 if sharing Arduino reset pin)

Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire,
OLED_RESET);


// define pins numbers

const int trigPin = 9;

const int echoPin = 10;

const int greenLedPin = 13;

const int buzzerPin = 12;
```

```
// define Trigger Distance in CM
const int trigDistance = 25; //change this value from 2 to 400

// define variables
long duration;
int distance;
uint32_t delayMS;

void setup() {
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the echoPin as an Input
  pinMode(buzzerPin, OUTPUT); // Sets the greenLedPin as an Output
  pinMode(greenLedPin, OUTPUT); // Sets the redLedPin as an Output
  Serial.begin(9600); // Starts the serial communication
  // SSD1306_SWITCHCAPVCC = generate display voltage from 3.3V internally
  display.begin(SSD1306_SWITCHCAPVCC, 0x3C);  // initialize with the I2C addr
0x3D (for the 128x64)
  // init done
  display.setTextSize(1);
  display.setTextColor(WHITE);
  display.clearDisplay(); // Clear display buffer
  delayMS = 1000;
}

void ledOnOff(int distance){
  if(distance < trigDistance){
```

```
    digitalWrite(greenLedPin, HIGH);   // turn the RED LED on
    digitalWrite(buzzerPin, HIGH);   //
          delay(100);
    digitalWrite(buzzerPin, LOW);   // turn the RED LED OFF
          delay(100);
    digitalWrite(buzzerPin, HIGH);   // turn the RED LED on
  }
  else{
    digitalWrite(greenLedPin, LOW);   // turn the RED LED off
    digitalWrite(buzzerPin, LOW);   //
  }
}

void loop() {
  // Clears the trigPin
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10 micro seconds
  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;
```

```
// Prints the distance on the Serial Monitor
Serial.print("Distance: ");
Serial.println(distance);


if (distance < trigDistance){
   ledOnOff(distance);
   display.setTextSize(1);
   display.setCursor(1,1);
   display.print("STAY BACK!");
   display.println();
   display.setTextSize(2);
   display.setCursor(15,15);
   display.print(distance);
   display.display();
        delay(delayMS);
   display.clearDisplay();
}
else{
   ledOnOff(distance);
   display.setTextSize(1);
   display.setCursor(1,1);
   display.print("Distance:");
   display.println();
   display.setTextSize(2);
   display.setCursor(15,15);
```

```
display.print(distance);
    display.display();
    delay(delayMS);
display.clearDisplay();}}
```

5.2 SCREENSHOTS

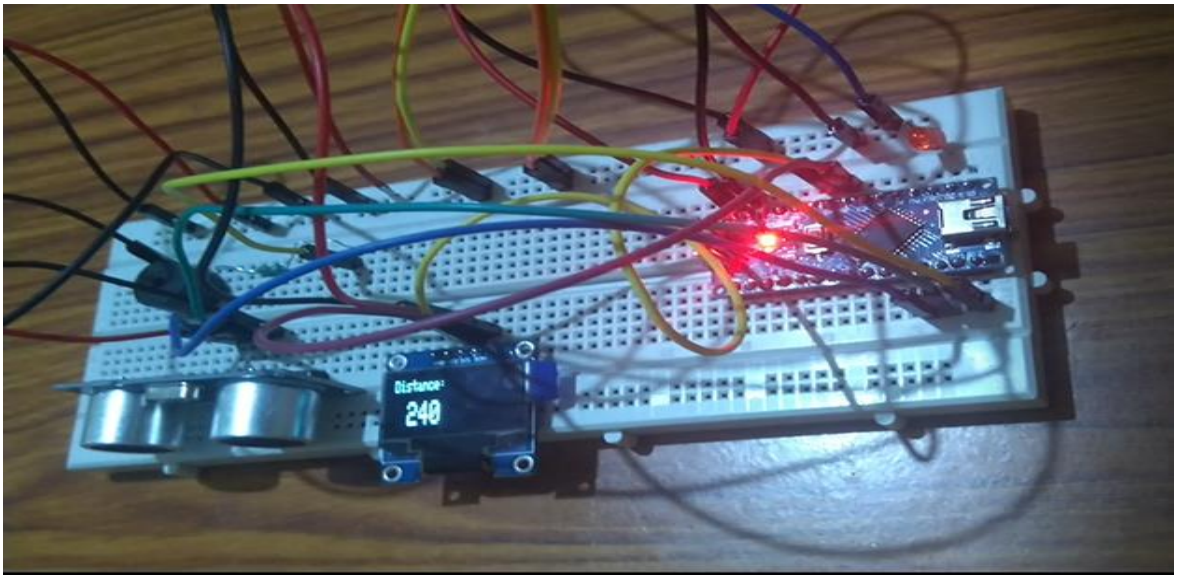

Fig 5.2.1 working circuit

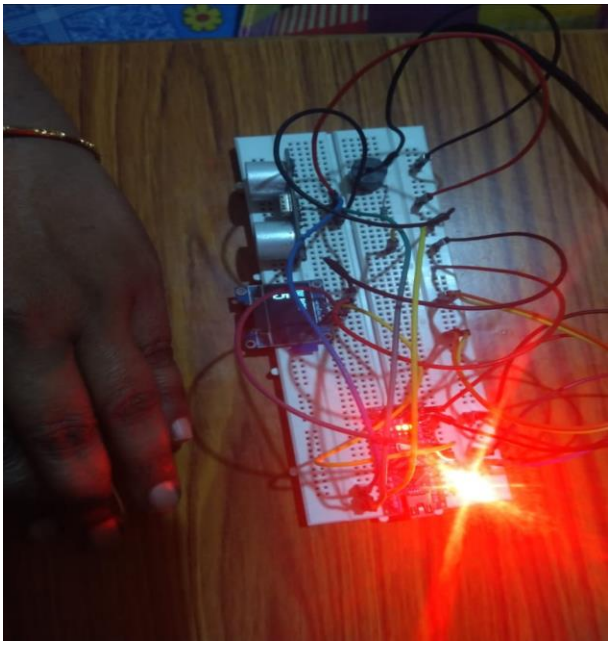

Fig 5.2.2 When hand is brought near to exactly 5 cm

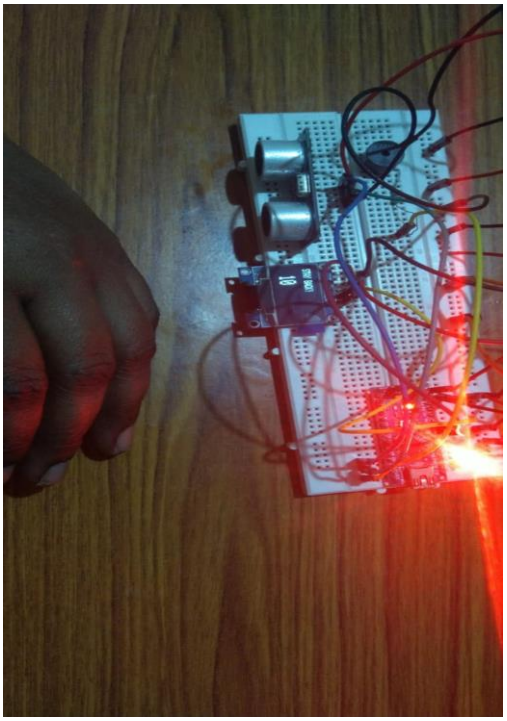

Fig 5.2.3 When hand is brought near to exactly 10 cm

6. TESTING

6.1 TEST STRATEGIES

The project is used to maintain distance among people. The following testing strategies have been applied on the processes on the project: -

i. **Usability Testing**: Usability testing is a technique used in user-centered interaction design to evaluate a product by testing it on users.here it is tested by bringing hands near to it.

ii. **Security Testing:** Security testing is a type of Software Testing that uncovers vulnerabilities of the system and determines that the data and resources of the system are protected from possible intruders. It ensures that the software system and application are free from any threats or risks that can cause a loss.

iii. **Performance Testing**: Performance testing is the process of determining the speed, responsiveness and stability of a computer, network, software program or device under a workload. Performance testing can involve quantitative tests done in a lab, or occur in the production environment in limited scenarios.

iv. **Reliability Testing**: Reliability Testing is an important software testing technique that is performed by the team to ensure that the software is performing and functioning consistently in each environmental condition as well as in a specified period. It ensures that the product is fault free and is reliable for its intended purpose.

6.2 TEST CASES

Sl.No	Module Name	Test Case No	Test Case Description	Expected Result
1	LED LIGHT	TC1	Verify' s whether the led glows when bringing our hand closer to the device lesser than the trigger distance set	To check if the led light glows when the distance between the device and the people is less than the trigger distance
2	OLED DISPLAY	TC2	Verify' s whether the OLED displays the message "Stay back" when bringing our hand closer to the device lesser than the trigger distance set	To check if the OLED display shows the message "Stay back" when the distance between the device and the people is less than the trigger distance

Table 6.2.1 Test cases

6.3 TEST REPORTS

Sl.No	Test Case No	Test Status	TEST Report
1	TC1	Successful	Fig. 6.3.1
2	TC2	Successful	Fig 6.3.2

Table 6.3.1 Test Reports

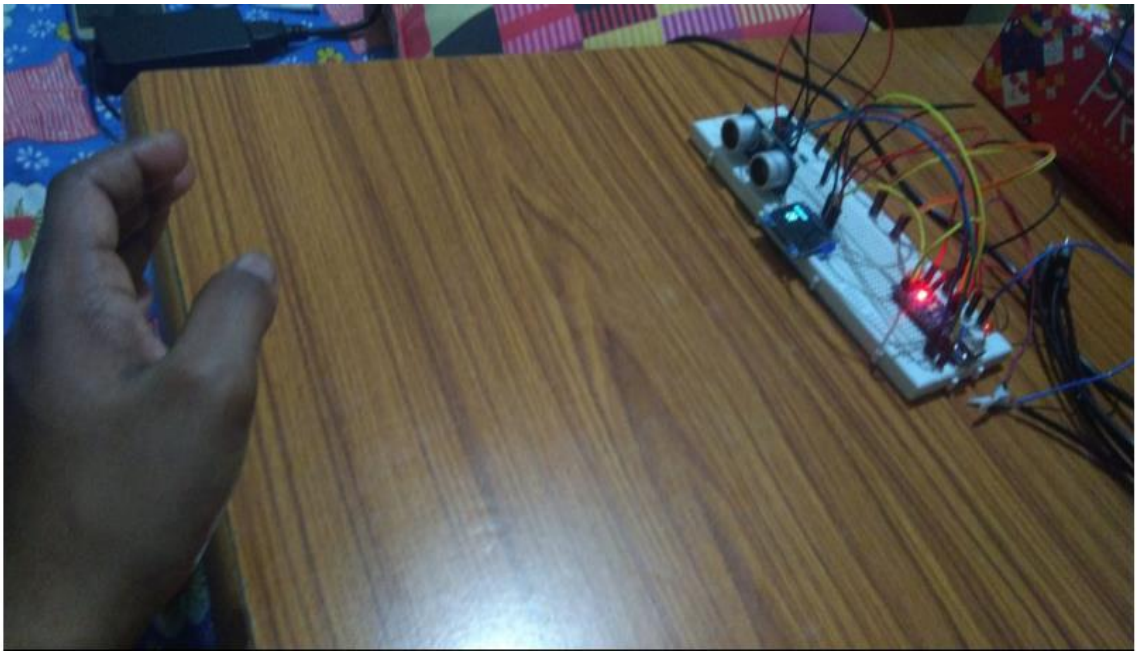

Fig 6.3.1 When we do not bring hand less than 25 cm (Trigger distance)

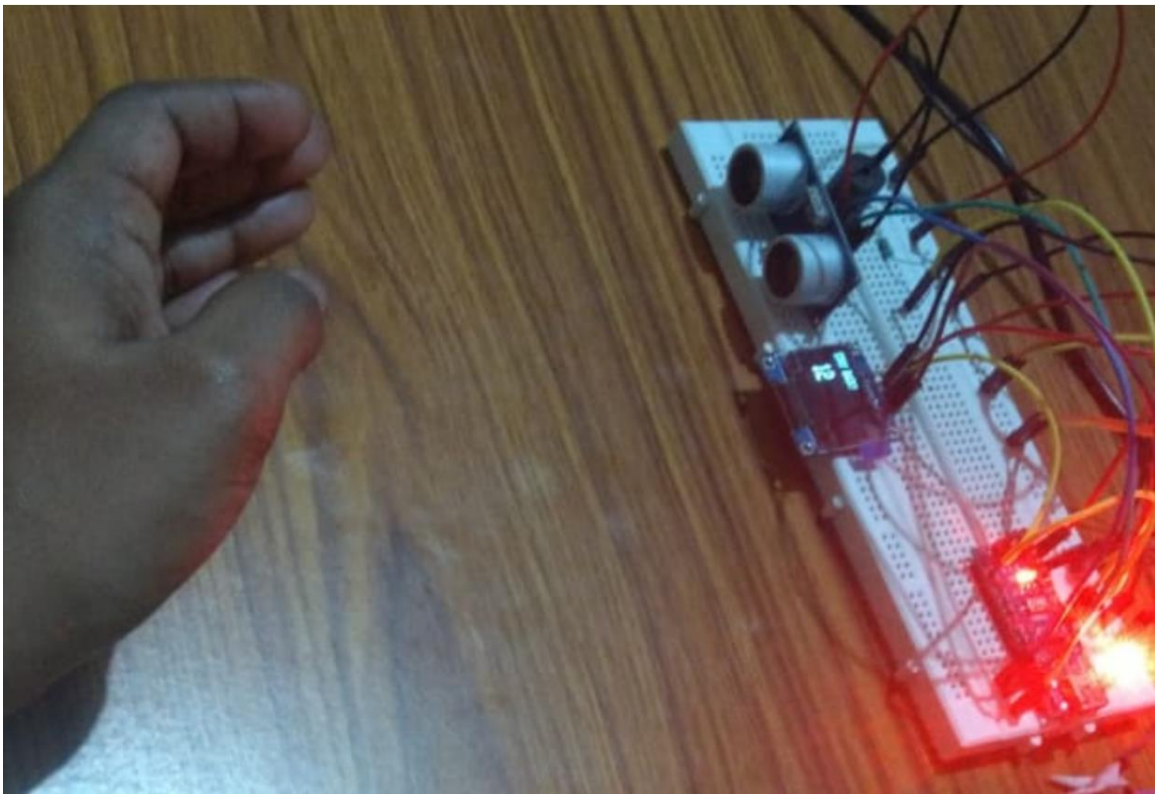

Fig 6.3.2 When we bring hand less than 25 cm (Trigger distance)

7. CONCLUSION

This social distance is most effective practice to prevent and control distance. So as per WHO guidelines minimum 1 meter distance is mandatory. So here the project KEEP DISTANCE is used to maintain distance among people and to alert them about social distancing.

7.1 LIMITATIONS

1. Can’t detect the distance in all directions.
2. There is a chance that the software can be hacked and their personal information misused.
3. Not compatible.
4. Privacy is the big issue in IOT.

7.2 FUTURE ENHANCEMENT

1. Increasing sensors on the system to fetch more data especially with regard to the body temperature .
2. And also integrating the face detector in the system to detect whether the person is wearing a mask or not .
3. Security purposes touch less doorbells.

8. REFERENCES

[1] Social distancing cap, https://www.hackster.io/the-innovators/social-distancing-cap-9d0e7e

[2] Arduino official website, https://store.arduino.cc

[3] Electronics, https://www.electronics-notes.com/

[4] Baker Hughes S, https://www.bakerhughesds.com/