

Department of ECE

Certificate

This is to certify that the technical report entitled "OBJECT DETECTION" is the Bonafide work done and submitted by

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towards the partial fulfillment of the requirement of Social Innovation (SIL) Laboratory of **II B. Tech I-Semester** in ECE is a record of Bonafide work carried out by them during the period Sep 2020 to Jan 2021.

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1. INTRODUCTION

- **WHAT IS SOCIAL INNOVATION?**

The term ‘social innovation ’once rarely heard is, now often used to describe a whole variety of things that fall into general categories of being both new and good. It's understandable that the phrase has become popular-we get excited and hopeful when it seems possible for real change to happen in the world.

Social innovation refers to the Design and implementation of new solutions that imply conceptual, process, product or organizational change which ultimately aim to improve the welfare and wellbeing of individual communities

Social innovation is not a new concept and should not be considered similar to other definitions, such as social entrepreneurship, creativity or invention, improvement or change. 'As with innovation in technology or business, social innovation is distinct from ‘improvement’ or ‘change’ and from ‘creativity’ and ‘invention’. These last two are both crucial to innovation but overlook the important stages of implementation and diffusion which make new ideas useful.

- **What is design thinking process?**

Design Thinking is a design methodology that provides a solution-based approach to solving problems. It's extremely useful in tackling complex problems that are ill-defined or unknown, by understanding the human needs involved, by re-framing the problem in human-centric ways, by creating many ideas in brainstorming sessions, and by adopting a hands-on approach in prototyping and testing. Understanding these five stages of Design Thinking will empower anyone to apply the Design Thinking methods in order to solve complex problems that occur around us — in our companies, in our countries, and even on the scale of our planet.

Design thinking originally came about as a way of teaching engineers how to approach problems creatively, like designers do. One of the first people to write about design thinking was John E. Arnold, professor of mechanical engineering at Stanford University.

1.EMPATHIZE

The first stage of the Design Thinking process is to gain an empathic understanding of the problem you are trying to solve. This involves consulting experts to find out more about the area of concern through observing, engaging and empathizing with people to understand their experiences and motivations, as well as immersing yourself in the physical environment so you can gain a deeper personal understanding of the issues involved.

Empathy requires active listening and rapport-building for a deep understanding that can transcend innate personal bias or pre conceived notions.

Our team has conducted a survey among people at current problems faced by them in day-to-day life. In those problems listed, we found many valid problems, and we have short listed few problems which are being affected by most of the people.

The major problems we perceive is Accidents in that accidents the major cause for accident is mostly at early morning and overnight.

3.IDEATE

In this section, called Ideate, a design thinker is supposed to bring to the table as many ideas as possible. While brainstorming for ideas, it is not checked whether the idea is possible, feasible, and viable or not. The only task of thinkers is to think of as many ideas as possible for them.

Protecting ourselves from obstacles during night or in foggy days in front of car to save us from accidents and it also helps us in saving animals which are getting hit by vehicles during night and it reduces accidents.

The Radar System using Arduino. In this work, the distance of the object is measured through an ultrasonic distance sensor, and the sensor output is connected to the signal conditioning unit. After that, it is processed through the Arduino microcontroller. The measured results are displayed on the personal computer. The sensor is attached to servo motor to find the polar distance around the sensor up to 180 rotations.

A radar system has a transmitter that emits radio waves called a radar signals in predetermined directions. When these come into contact with an object they are usually reflected or scattered in many directions

Example: - let us take example for bat

Bat released the eco sound while travelling. if any object came in middle and it reflect back to the bat

The development of the radar technology took place during the World War II in which it was used for detecting the approaching aircraft and then later for many other purposes which finally led to the development of advanced military radars being used these days. Military radars have a highly specialized design to be highly mobile and easily transportable, by air as well as ground. Military radar should be an early warning, altering along with weapon control functions. It is specially designed to be highly mobile and should be such that it can be deployed within minutes.



Pin Description:

Pin Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to Arduino when using an external power source.
		5V: Regulated power supply used to power microcontroller and other components on the board.
		3.3V: 3.3V supply generated by on-board voltage regulator. Maximum current draw is 50mA.
		GND: ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V
Input/Output Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(Tx)	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.
TWI	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

Table 2: Pin Description of Arduino Uno

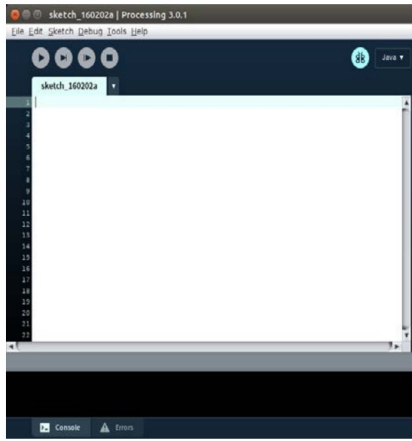


2) Servo Motor:

Tiny and lightweight with high output power. The servo will rotate about 180 degrees (90 in each direction) and operate just as small as the regular types. To monitor these services, you can use any servo code, hardware or library.

The Specifications of servo motor

- Weight: 9 g
- Dimension: 22.2 x 11.8 x 31 mm approx.
- Stall torque: 1.8 kg f cm
- Operating speed: 0.1 s/60 degree
- Operating voltage: 4.8 V (~5V)
- Temperature range: 0 °C – 55 °C



SOURCE CODE:-

```
#include <Servo.h>

int trigPin = 10;

const int echoPin = 11; long duration;
int distance;

Servo myServo; void setup() {
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  Serial.begin(9600);
  myServo.attach(12);
}

void loop() {
  for(int i=15; i<=165; i++){
    myServo.write(i);
    delay(30);
    distance = calculateDistance();
    Serial.print(i);
    Serial.print(",");
    Serial.print(distance);
    Serial.print(".");
  }
  for(int i=165; i>15; i--){
    myServo.write(i);
    delay(30);
```

```

size (1200, 700);

smooth();

myPort = new Serial(this,"COM5", 9600);
myPort.bufferUntil('.');
}

void draw() {
fill(98,245,31);

noStroke();

fill(0,4);

rect(0, 0, width, height-height*0.065);
fill(98,245,31);

drawRadar();

drawLine();

drawObject();

drawText();
}

void serialEvent (Serial myPort) {
data = myPort.readStringUntil('.');
data = data.substring(0,data.length()-1);
index1 = data.indexOf(",");
angle= data.substring(0, index1);
distance= data.substring(index1+1, data.length());
iAngle = int(angle);
iDistance = int(distance);
}

void drawRadar() {
pushMatrix();

translate(width/2,height-height*0.074);

noFill();

strokeWeight(2);

stroke(98,245,31);

arc(0,0,(width-width*0.0625),(width-width*0.0625),PI,TWO_PI);

arc(0,0,(width-width*0.27),(width-width*0.27),PI,TWO_PI);

```

```

noObject = "In Range";

}

fill(0,0,0);

noStroke();

rect(0, height-height*0.0648, width, height);

fill(98,245,31);

textSize(25);

text("10cm",width-width*0.3854,height-height*0.0833);

text("20cm",width-width*0.281,height-height*0.0833);

text("30cm",width-width*0.177,height-height*0.0833);

text("40cm",width-width*0.0729,height-height*0.0833);

textSize(40);

text("Robu.in", width-width*0.875, height-height*0.0277);

text("Angle: " + iAngle + " °", width-width*0.48, height-height*0.0277);

text("Distance: ", width-width*0.26, height-height*0.0277);

if(iDistance<40) {

text(" " + iDistance + " cm", width-width*0.225, height-height*0.0277);

}

textSize(25);

fill(98,245,60);

translate((width-width*0.4994)+width/2*cos(radians(30)),(height-height*0.0907)-width/2*sin(radians(30)));

rotate(-radians(-60));

text("30°",0,0);

resetMatrix();

translate((width-width*0.503)+width/2*cos(radians(60)),(height-height*0.0888)-width/2*sin(radians(60)));

rotate(-radians(-30));

text("60°",0,0);

resetMatrix();

translate((width-width*0.507)+width/2*cos(radians(90)),(height-height*0.0833)-width/2*sin(radians(90)));

rotate(radians(0));

text("90°",0,0);

```


5. TEST

We have tested several times so that we can overcome our problems and improve our solution to develop our prototype. We have got error while running the processing code first we have no idea about that app so it took time to understand and run the code.

We have also found errors in uploading the code to the Arduino that it is showing compile error. we didn't include the library files to code.so, we installed the library file named <servo.h> in the Arduino software. Then code compiled successfully and done uploading.

At last, we have successfully completed our project and we have got the output what we have expected from the idea we have developed.

By innovation in our project, we can save lives of humans and animals from accidents and this can be used near the gates so that watchman can open gate when he gets signal that there is a vehicle at the door.

6.References

- <https://en.wikipedia.org/wiki/Arduino#/media/File:UnoConnections.jpg>
- <http://www.circuitbasics.com/how-to-set-up-the-dht11-humidity-sensor-on-an-arduino/>
- <https://playground.arduino.cc/Main/DHT11Lib>
- <https://www.interaction-design.org/literature/article/stage-5-in-the-design-thinking-process-test#:~:text=Testing%2C%20in%20Design%20Thinking%2C%20involves%20generating%20user%20feedback,as%20gaining%20a%20deeper%20understanding%20of%20your%20users.>
- <https://www.interaction-design.org/literature/article/stage-4-in-the-design-thinking-process-prototype#:~:text=Prototypes%20are%20often%20used%20in%20the%20final%2C%20testing,or%20not%20the%20implemented%20solutions%20have%20been%20successful.>