Project Report

On

“Human Detection in Disaster Management”

Submitted in the partial fulfillment of the requirements for the Degree of

Bachelor of Engineering in Electronic Engineering

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Under the guidance of

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Dept. of Electronics Engineering

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2021-22

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Certificate

This is to certify that this is a bonafide record of project work entitled

" Human Detection In Disaster Management "

carried out by

Name of Student/s	Dalesh Patle	Akanksha Pardhi	Akshay Kawase
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Students of the B.E., Department of Electronic Engineering, during the academic year 2021-2022, in the partial fulfillment of the requirement for the award of the degree of Bachelor of Engineering (Electronic Engineering) offered by the Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

Prof. Rohit C. Iyer	**Dr. S. S. Shriramwar**	**Dr. S. A. Dhale**
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Date:

Place: Nagpur

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DECLARATION

We here declared that the project entitled **Human Detection In Disaster Management** is submitted in partial fulfillment of the degree of Bachelor of Engineering to RTMNU Nagpur is an original work done by us. This work in the same form or any form is not submitted by us or anyone else for the award of any Degree.

Name of Student/ Signature

1. Mr. Dalesh Patle
2. Miss. Akanksha Pardhi
3. Mr. Akshay Kawase

ABSTRACT

The world repetitively suffers from disaster conditions like earthquakes, and gas tragedies and if want to survive we want to helpless from technology because it's very dangerous to come directly face these types of situations so that's why we are focusing on a robot who can make the task easier so human detector plays that kind of role it finds a person in certain areas where risk is there and alarms us if any person detected. Passive Infrared Sensors (PIR) are the most widely used sensors for cheap surveillance. Due to their high ended sensitivity and area of detection PIR sensors are popular in security. PIR sensors are excellent in human and animal detection. They are mostly used in triggering an intruder alarm and activating household appliances in the presence of a human. However, the output from the sensor is proportional to several temporal relationships between an object in the field of view of the sensor, the sensitivity of the sensor, PIR lens features, and the environmental heat conditions.

This project aims to provide a prototype of practice to build a simplified version of a Human detection robot that is to be implemented during calamities to find the casualties. Humans can be used for rescuing people in these areas, but due to the high rate of risk of earthquakes and building collapses it is not possible to enter these areas. Affordable high technology equipment which makes this risky job quicker and safer is needed for the hour, which has been described in this paper. It is a simple, yet efficient equipment to indicate casualties and help them with immediate access to first aid.

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INTRODUCTION

CHAPTER 1

INTRODUCTION

This system was designed as a mobile rescue robotic system to help people on time who are trapped in the natural calamity like disasters, earthquakes, floods, leakage of gas, etc. It gives immediate and accurate information about the human who is in the disaster region so that the rescue team of experts and the doctor can be sent to the victim's primary treatment or take that person to a safe place or hospital.

This entire process is done in a few minutes, the main aim to implement this project is, when a disaster happens forex. The landscape then humans can't go in that region to rescue other people so instead of using humans, we can use this robot who can easily find the human and send us the signal. We are using hear various types of sensors that work independently. When a human is in the danger it emits thermal radiation and that radiation is received and manipulated by the sensor. This robot decides its path of traveling itself and if any obstacle comes in between the path it can sense by the sensor and according to that, it changes its direction. When the human body comes in front of the robot it makes a sound and passes a message to the sensor.

CHAPTER-2

LITERATURE SURVEY

CHAPTER 2

LITERATURE SURVEY

This chapter focuses on existing literature related to key concepts of this report's research and addresses the following research objectives:

1) Electric vehicle working progress

The electric motor gets energy from a controller, which regulates the amount of power—based on the driver's use of an accelerator pedal. The electric car (also known as an electric vehicle or EV) uses energy stored in its rechargeable batteries, which are recharged by common household electricity.

Thus, an electric vehicle will have three basic components:

- Energy Storage Unit
- Controller
- Propulsion system

The energy storage unit will have a way to store power. A chemical battery is the most common energy storage technology currently, although it can be different - for example - A fuel cell (which gets its electricity from hydrogen rather than a battery pack), can be used instead of a chemical battery as the energy storage unit. The controller acts as a pipeline or gateway to the electric motor. The controller will do other things too - it moderates the power and will act acts as a converter - converts power from DC to AC, or might also increase or decrease the amperage et,c. The controller is the brain of the system. The electric motor, which is the propulsion system, converts the electric power and converts this into physical energy for movement.

The whole system is a much simpler, more efficient device than the combustion engine found in most cars, enabling you to get the most mileage for your charge.

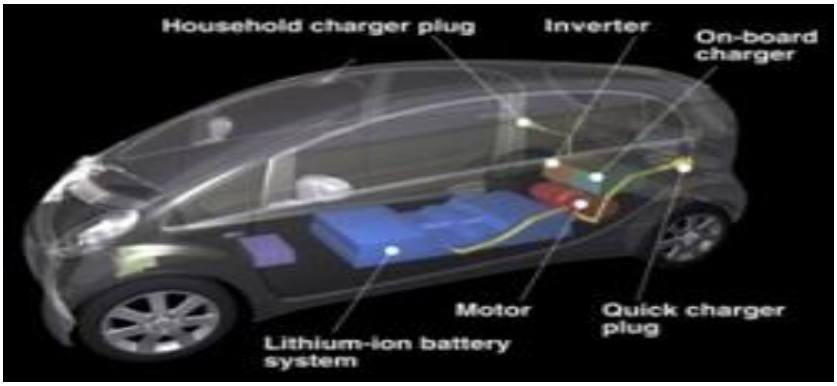


Fig.2.1 Electric Vehicle Internals

Historically, EVs have not been widely adopted because of limited driving range before needing to be recharged, long recharging times, and a lack of commitment by automakers to produce and market electric cars that have all the creature comforts of petrol-powered cars. That's changing. As battery technology improves—simultaneously increasing energy storage and reducing cost—major automakers are expected to begin introducing a new generation of electric cars.

2) Understanding different Rechargeable Batteries

A rechargeable battery is an energy storage device that can be charged again after being discharged by applying DC to its terminals.

Rechargeable batteries allow for multiple usages from a cell, reducing waste and generally providing a better long-term investment in terms of dollars spent for usable device time. This is true even factoring in the higher purchase price of rechargeable and the requirement for a charger.

A rechargeable battery is generally a more sensible and sustainable replacement for one-time use batteries, which generate a current through a chemical reaction in which a reactive anode is consumed. The anode in a rechargeable battery gets consumed as well but at a slower rate, allowing for many charges and discharges.

In use, rechargeable batteries are the same as conventional ones. However, after discharge the batteries are placed in a charger or, in the case of built-in batteries, an AC/DC adapter is connected.

While rechargeable batteries offer better long-term costs and reduce waste, they do have a few cons. Many types of rechargeable cells created for consumer devices, including AA and AAA, C and D batteries, produce a lower voltage of 1.2v in contrast to the 1.5v of alkaline batteries. Though this lower voltage doesn't prevent correct operation in properly-designed electronics, it can mean a single charge does not last as long or offer the same power in a session. This is not the case, however, with lithium polymer and lithium-ion batteries.

Some types of batteries such as nickel-cadmium and nickel-metal hydride can develop a battery memory effect when only partially discharged, reducing the performance of subsequent charges and thus battery life in a given device.

Rechargeable batteries are used in many applications such as cars, all manner of consumer electronics, and even off-grid and supplemental facility power storage

3) Understanding human detection sensor

The ability to detect human presence can be a pretty powerful attribute for several devices. Versions of this technology have been around for quite some time, but artificial intelligence and emerging technologies have bolstered its robustness and use cases. So, just what does this technology do, and how is it accomplished?

Human presence detection or human sensing refers to the technology used to determine if a person is present in a particular environment. This type of technology may be used in a range of applications, whether it's for security or safety, or to enable a device like a smart-home hub to perform key functions.

Some Examples of human detector sensor

a) Ambient light sensors
b) Ultrasonic proximity sensors
c) IR proximity sensors
d) Capacitive proximity sensors
e) Time-of-flight sensors
f) Passive IR detectors
g) Visual sensors

CHAPTER-3

SCOPE OF PROJECT

CHAPTER 3

SCOPE OF THE PROJECT

1. Rescue the Human in Disaster Places

Humans can be used for rescuing people in these areas, but due to the high risk of earthquakes and building collapses it is not possible to send human rescue teams to these areas. Thus affordable high technology equipment which makes this risky job quicker and safer is needed for the hour, which has been described in this paper. It is a simple, yet efficient equipment to indicate casualties and help them
with immediate access to first aid.

2. Reduced the Human risk for Survey purposes.

In any Disaster place for rescue team is away be in the risk of finding the person in a Disaster place. it may also happen while a survey in unfavorable Conditions rescuers are trapped in bad conditions, so instead of any human we can use our human detector to survey the prospective area and an analyze the le area without any human risk

3. Give Priority to Automation and self-drive Capabilities.

Autonomous cars create and maintain a map of their surroundings based on a variety of sensors situated in different parts of the vehicle. Due to the sensor vehicle knows about any obstacle if it comes in front of the vehicle it changes its direction by calculating the desirable direction the vehicle run so there is no human interference of human and the vehicle decides its path from itself and goes all the place without any interference of human being

CHAPTER-4

METHODOLOGY

CHAPTER – 4

METHODOLOGY

1. Measurement of Distance Using Ultrasonic sound

Ultrasonic distance sensors are designed for non-contact distance measurement and these types consist of a transmitter and receiver or transceiver which can transmit and receive ultrasonic sound (Figure 1)The main idea is to measure the time to fly of an ultrasonic sound wave from the sensor to the detected object. An ultrasonic transmitter sends a sound frequency of above 18 kHz in the air at the speed of 344 meters per second (at 20°C) and the receiver receives the reflected sound from the object. Distance between the transmitter and the object can be calculated by simple calculation by considering the time taken by the ultrasonic wave to travel from the transmitter and received back (reflected) by the receiver. The measurement range is up to several meters.

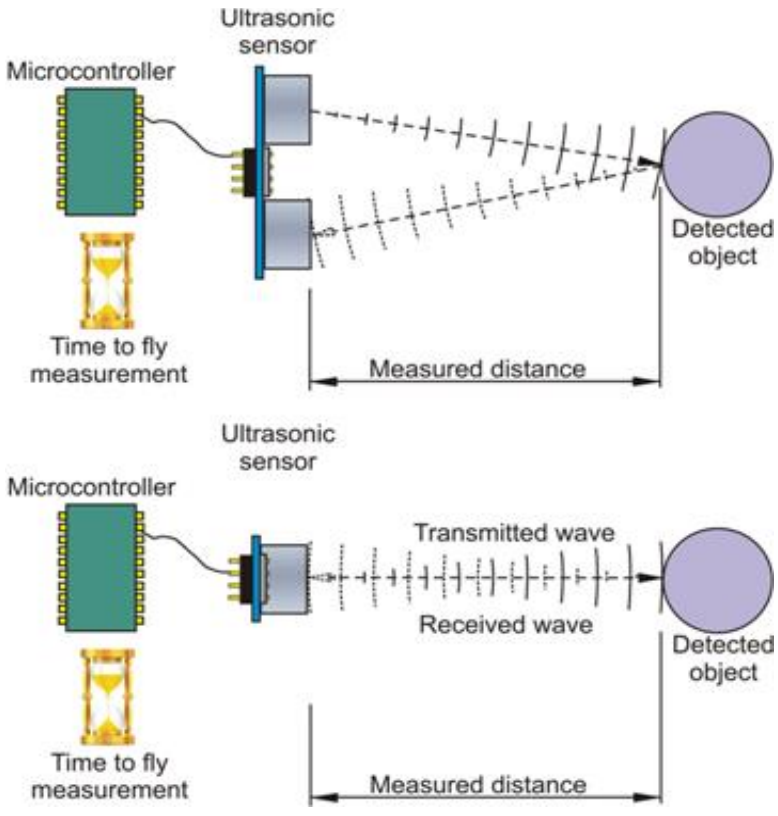


Fig 4.1 ultrasonic while detecting

2. Use of Infrared to Detect the person

a) Infra-red radiation from the human body

Huaman body itself also emits infrared radiation (and even some radio waves) because it is warm. You can read more about this in the section “Mobile telephone”. While infrared light and radio waves are converted to heat, electromagnetic fields with (extremely) low frequency produce an electric current in the body.

b) Infrared detector

An infrared detector is a detector that reacts to infrared (IR)radiation. The two main types of detectors are thermal and photonic (photodetector).

The thermal effects of the incident IR radiation can be followed through many temperature-dependent phenomena. Bolometers and Micrometers are based on changes in resistance. thermocouple and thermopiles use the thermoelectric effect. Golay cells follow thermal expansion. In IR Spectrometers the pyrogenic is the most widespread.

The response time and sensitivity of photonic detectors can be much higher, but usually, these have to be cooled to cut thermal noise. The materials in these are semiconductors with narrow band gaps. Incident IR photons can cause electronic excitations. In photoconductive detectors, the resistivity of the detector element is monitored. photovoltaic detectors contain a p-n junction on which photoelectric current appears upon illumination.

An infrared detector is hybridized by connecting it to a readout integrated circuit with indium bumps. This hybrid is known as a focal plane array.

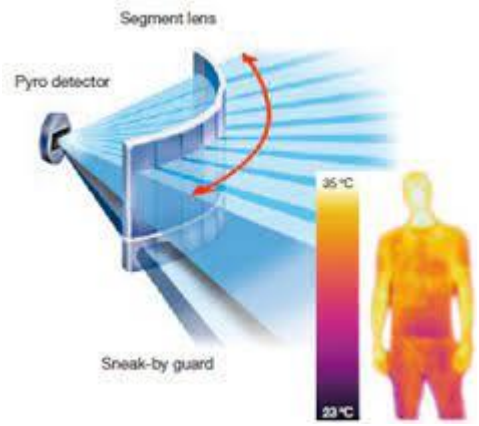


Fig 4.2 Detection of infrared of human body

c) Material for Infrared Detection

- Lead (II) sulfide (PbS)
- Mercury Cadmium telluride (Known as MCT, HgCdTe)
- Indium antimonide (InSb)

- Indium arsenide
- Indium gallium arsenide
- Lead selenide
- QUIPIP
- Lithium tantalate (LiTaO3)
- Triglycine sulfate (TGS)
- Platinum silicide (PtSi)

CHAPTER-5

LIST OF THE COMPONENTS

CHAPTER 5

LIST OF THE COMPONENTS

1. Arduino Uno

Arduino UNO is a microcontroller board based on the **ATmega328P**. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, in the worst-case scenario you can replace the chip for a few dollars and start over again.

a) ATmega328P

The classic high-performance, low-power AVR® microcontroller.

b) Replaceable chip

The ATmega328P can easily be replaced, as it is not soldered to the board.

c) EEPROM

The ATmega328P also features 1kb of EEPROM, a memory that is not erased when powered off.

d) Battery Connector

The Arduino UNO features a barrel plug connector, that works great with a standard 9V battery.

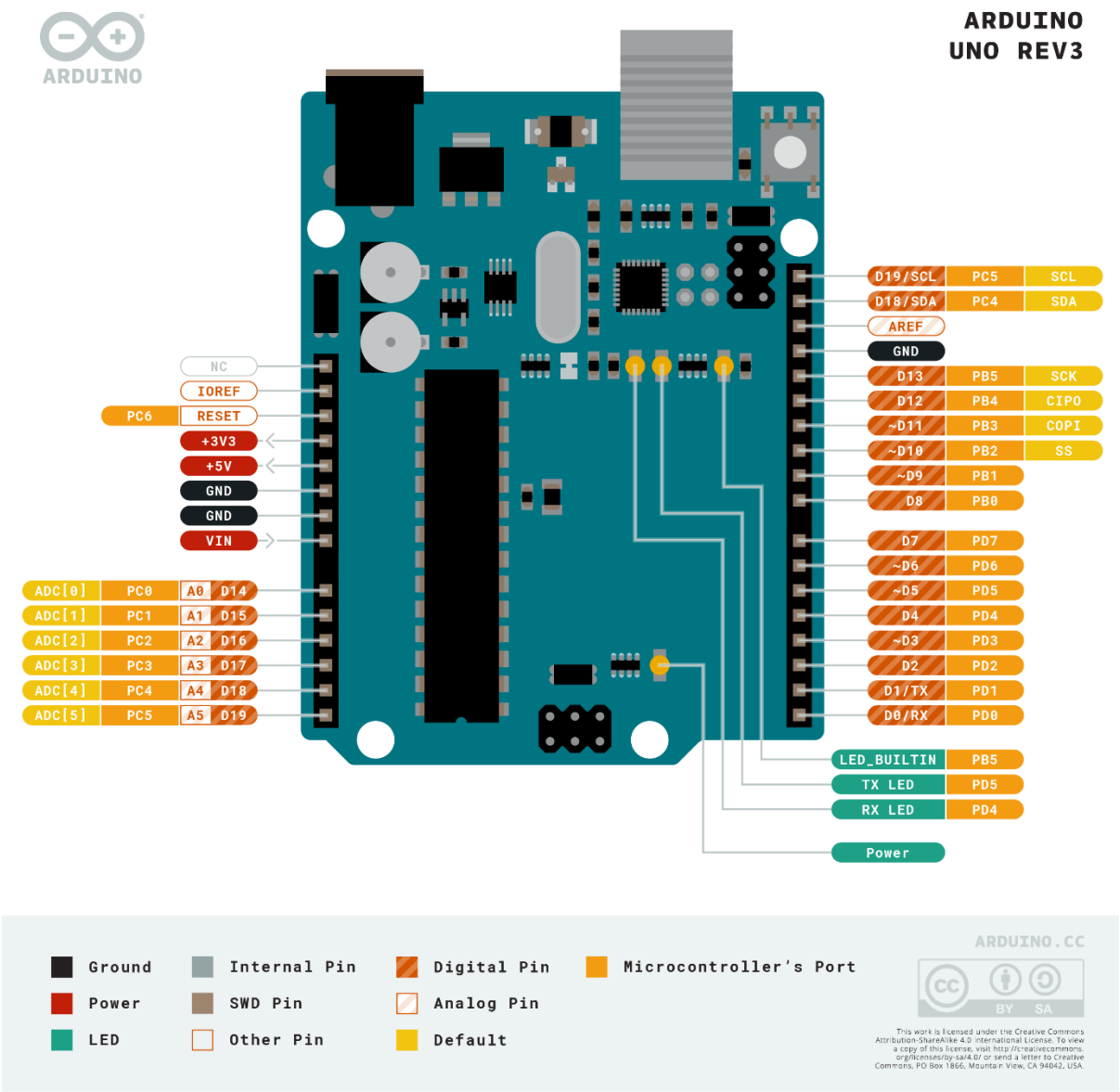


Fig 5.1 Arduino Pinout diagram

Features

ATMega328P Processor

Memory

AVR CPU at up to 16 MHz

32KB Flash

2KB SRAM

1KB EEPROM

Security

Power-On Reset (POR)

Brown Out Detection (BOD)

Peripherals

2x 8-bit Timer/Counter with a dedicated period register and compare channels

1x 16-bit Timer/Counter with a dedicated period register, input capture, and compare channels

1x USART with fractional baud rate generator and start-of-frame detection

1x controller/peripheral Serial Peripheral Interface (SPI)

1x Dual-mode controller/peripheral I2C

1x Analog Comparator (AC) with a scalable reference input

Watchdog Timer with separate on-chip oscillator

Six PWM channels

Interrupt and wake up on pin change

2. PIR sensor

PIR sensors are more complicated than many of the other sensors explained in these tutorials (like photocells, FSRs, and tilt switches) because multiple variables affect the sensor's input and output. To begin explaining how a basic sensor works, we'll use this rather nice diagram

The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first intercepts one-half of the PIR sensor, which causes a positive differential change between the two halves. When the warm body leaves the sensing area, the reverse happens, whereby the sensor generates a negative differential change. These change pulses are what are detected.

The IR sensor itself is housed in a hermetically sealed metal can to improve noise/temperature/humidity immunity. There is a window made of IR-transmissive material (typically coated silicon since that is very easy to come by) that protects the sensing element. Behind the window are the two balanced sensors.

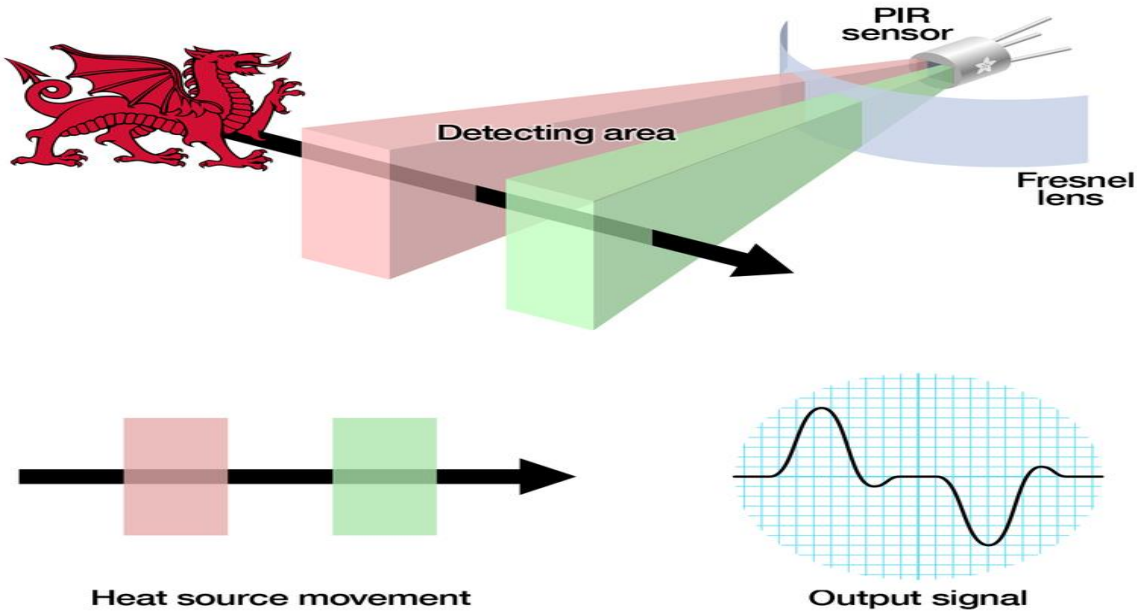


Fig 5.2 Detecting living things with plotted output

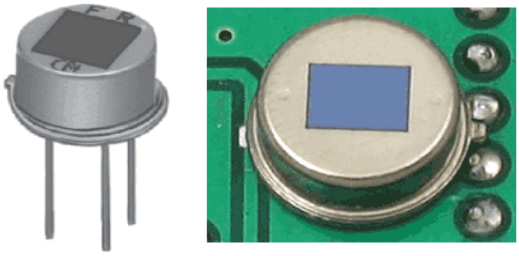


Fig 5.3 Infrared Sensor

The below image shows the internal schematic. There is a JFET inside (a type of transistor) which is very low-noise and buffers the extremely high impedance of the sensors into something a low-cost chip (like the BIS0001) can sense.

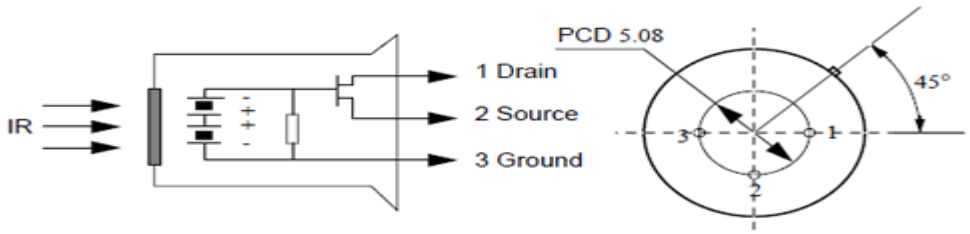


Fig 5.4 Internal Schematic

3. Ultrasonic Sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves and converting 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 traveled to and from the target).

To calculate the distance between the sensor and the object, the sensor measures the time it takes between the emission of the sound by the transmitter to its contact with the receiver. The formula for this calculation is D = ½ T x C (where D is the distance, T is the time, and C is the speed of sound ~ 343 meters/second). For example, if a scientist set up an ultrasonic sensor aimed at a box and it took 0.025 seconds for the sound to bounce back, the distance between the ultrasonic sensor and the box would be:

D = 0.5 x 0.025 x 343

or about 4.2875 meters.

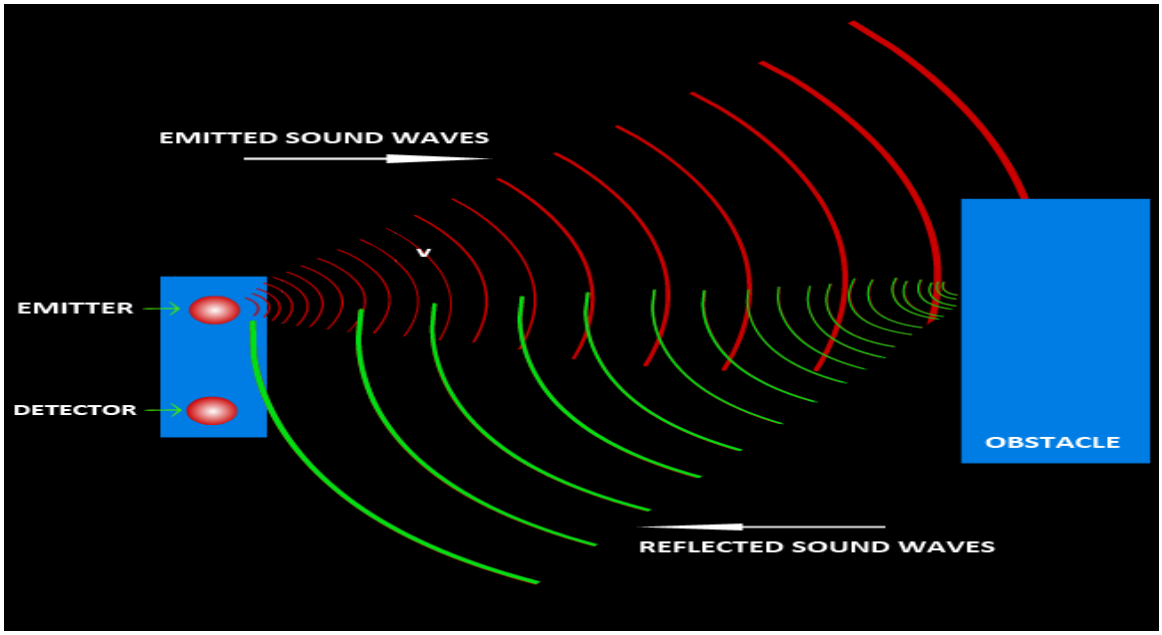


Fig 5.5 Ultrasonic sensor diagram

Ultrasonic sensors are used primarily as Proximity sensors They can be found in automobile self-parking technology and anti-collision safety systems. Ultrasonic sensors are also used in robotic obstacle detection systems, as well as manufacturing technology. In comparison to infrared sensors in proximity sensing applications, ultrasonic sensors are not as susceptible to interference from smoke, gas, and other airborne particles (though the physical components are still affected by variables such as heat).

Ultrasonic sensors are also used as level sensors to detect, monitor, and regulate liquid levels in closed containers (such as vats in chemical factories). Most notably, ultrasonic technology

has enabled the medical industry to produce images of internal organs, identify tumors, and ensure the health of babies in the womb.

4. Buzzer

There are many ways to communicate between the user and a product. One of the best ways is audio communication using a buzzer IC. So during the design process, understanding some technologies with configurations is very helpful. So, this article discusses an overview of an audio signaling device like a beeper or a buzzer and its working with applications.

An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

Fig 5.6 Buzzer pin Configuration

The pin configuration of the buzzer is shown below. It includes two pins namely positive and negative. The positive terminal of this is represented with the '+' symbol or a longer terminal. This terminal is powered through 6Volts whereas the negative terminal is represented with the '-'symbol or short terminal and it is connected to the GND terminal.

The specifications of the buzzer include the following.

- Color is black
- The frequency range is 3,300Hz
- Operating Temperature ranges from – 20° C to +60°C
- Operating voltage ranges from 3V to 24V DC
- The sound pressure level is 85dBA or 10cm
- The supply current is below 15mA

5. Servo motor

A servo motor is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor. It is just made up of a simple motor that runs through a servo mechanism. If the motor is powered by a DC power supply then it is a led DC servo motor, and if it is an AC-powered motor then it is called an AC servo motor. For this tutorial, we will be discussing only the DC servo motor working. Apart

from these major classifications, there are many other types of servo motors based on the type of gear arrangement and operating characteristics. A servo motor usually comes with a gear arrangement that allows us to get a very high torque servo motor in small and lightweight packages. Due to these features, they are being used in many applications like toy cars, RC helicopters, planes, Robotics, etc.

It consists of three parts:

1. Controlled device
2. Output sensor
3. Feedback system

Servo Motor Working Principle :

A servo consists of a Motor (DC or AC), a potentiometer, gear assembly, and a controlling circuit. First of all, we use gear assembly to reduce RPM and increase the queue of the motor. Say at the initial positive on of servo motor shaft, the position of the potentiometer knob is such that there is no electrical signal generated at the output port of the potentiometer. Now an electrical signal is given to another input terminal of the error detector amplifier. Now the difference between these two signals, one comes from the potentiometer and another comes from other sources, will be processed in a feedback mechanism and output will be provided in the terms of the error signal. This error signal acts as the input for the motor the and motor starts rotating. Now motor shaft is connected with the potentiometer and as the motor rotates so the potentiometer will generate a signal. So as the potentiometer's angular position changes, its output feedback signal changes. After some time the position of the potentiometer reaches a position where the output of the potentiometer is the same as the external signal provided. At this condition, there will be no output signal from the amplifier to the motor input as there is no difference between the externally applied signal and the signal generated at the potentiometer, and in this situation, on motor stops rotating.

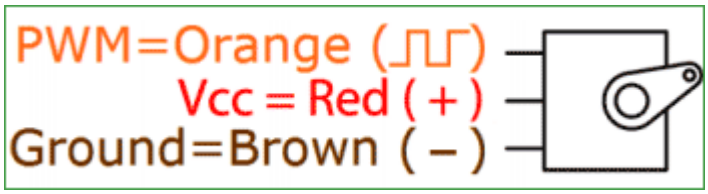


Fig 5.7 Servo Pin Configuration

6. L293D motor driver shield

The Arduino L293D motor driver shield guide is a robotics project that involves driving various types of motors. The most common types used for robotic applications include DC, servo, and stepper motors. However, these motors typically cannot be driven directly by Arduino or another microcontroller. This is because of their higher current and power ratings, so motor shields or driver ICs are used instead. These shields or ICs isolate a motor's power supply and use control logic from the microcontroller circuitry. One of the most popular motor driver shields used with Arduino is the L293D. The full-featured L293D motor driver shield can control up to four bi-directional DC motors with 8-bit span eed selection, two stepper motors,

and two servo motors.
The L293D is a popular 16-Pin Motor Driver IC. As the name suggests it is mainly used to drive motors. A single L293D IC is capable of running two DC motors at the same time; also the direction of these two motors can be controlled independently. So if you have motors that have an operating voltage less than 36V and an operating current less than 600mA, which are to be controlled by digital circuits like Op-Amp, 555 timer, digital gates, or even Microcontrollers like Arduino, PIC, ARM, etc.. this IC will be the right choice for you.

It can drive :

- 4 bi-directional DC motors with 8-bit speed selection(0-255)
- 2 stepper motors (unipolar or bipolar) with single coil, double coil, interleaved, or micro-stepping.
- 2 servo motors

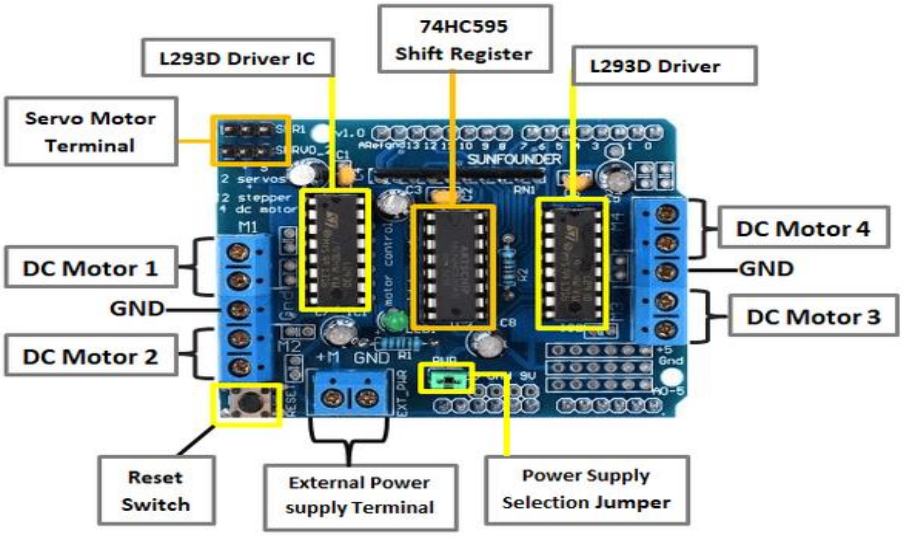


Fig 5.8 L293D Motor Driver Shield

7. TT gear motor with chassis

The chassis is made up of acrylic plastic to fix all components on there is a different socket is already given to the assembly. the dimension of the chassis is 26 x 17 x 4 cm; 800 Grams, it is a High-quality 6WD robotic rover DIY kit at the Lowest Price. The tt gear motor has 150 RPM high-quality BO motors and wider Wheels. Chassis have Ultrasonic-sensor-holder and servo-motor-holder included (sensor and servo not included, Holder included, Rocker-bogie suspension wheel mechanism

8. 18650 Li-on battery

A 18650 battery is a lithium-ion battery. The name derives from the battery's specific measurements: 18mm x 65mm. For scale, that's larger than an AA battery. The 18650 battery has a voltage of 3.6v and has between 2600mAh and 3600mAh (mili-amp-hours). (Osborne, 2019) These batteries are used in flashlights, laptops, electronics, and even some electric cars because of their reliability, long run times, and ability to be recharged hundreds of times

over. 18650 batteries are what would be considered a “high drain battery.” This means that the battery is designed to generate high output voltage and current to meet the power demands of the portable device in which it is being used. Hence why these powerful little batteries are utilized in more complex, power-hungry electronics that require a constant, high level of power for operation. It also has a high depth of discharge, meaning that the battery can be drained down to 0% and still have the capacity to fully recharge the battery. However, this is not recommended practice, as over time this will cause long-term damage to the battery and affect its overall performance. Learn more about caring for and enhancing the life of your 18650 later in the article.

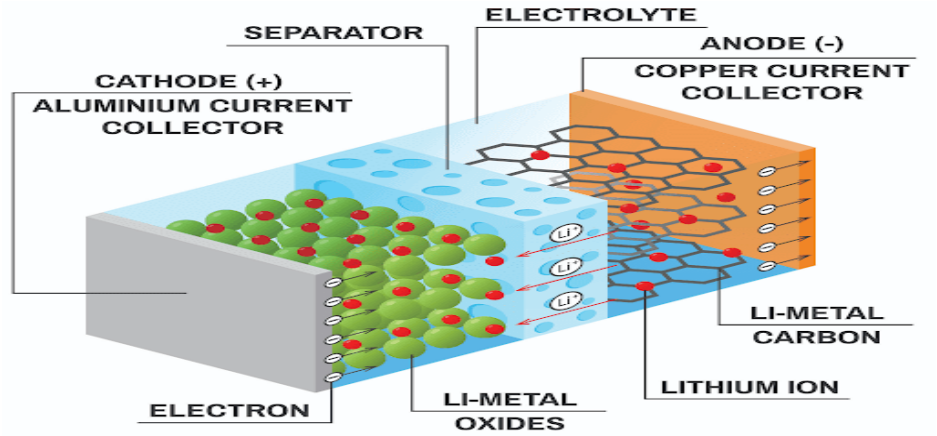


Fig 5.9 Internal Structure of Lithium-ion battery

There are two types of 18650 batteries: protected and unprotected. As a rule of thumb, we always recommend using protected 18650 batteries. 18650-protected batteries have an electric circuit embedded within their packaging. This circuit protects the battery from overcharges” and “over discharges.” Both are situations you want to avoid. When a battery overcharges it can overheat, burst, or catch fire.

It doesn’t take much imagination to understand how this malfunction can cause some serious problems for both the user and the manufacturer of the batteries. In fact, In 2016, Samsung released its newest smartphone, the Galaxy Note 7. didn’t take long for reports to begin coming that the phones were exploding while charging. There had been a flaw in the design of the phone’s lithium-ion battery that caused it to short circuit and catches fire.

9. Jumper wire

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.[1]Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

Fig 5.10 jumper wire

10. Switches

One of the most elementary and easy-to-overlook circuit components is the switch.

Fig 5.11 Mechanical Switch

Switches don’t require any fancy equations to evaluate. All they do is select between an open circuit and a short circuit. Simple. But how could we live without buttons and switches!? What good is a blinky circuit with no user input? Or a deadly robot with no kill switch? What would our world be without big red buttons you should never push.

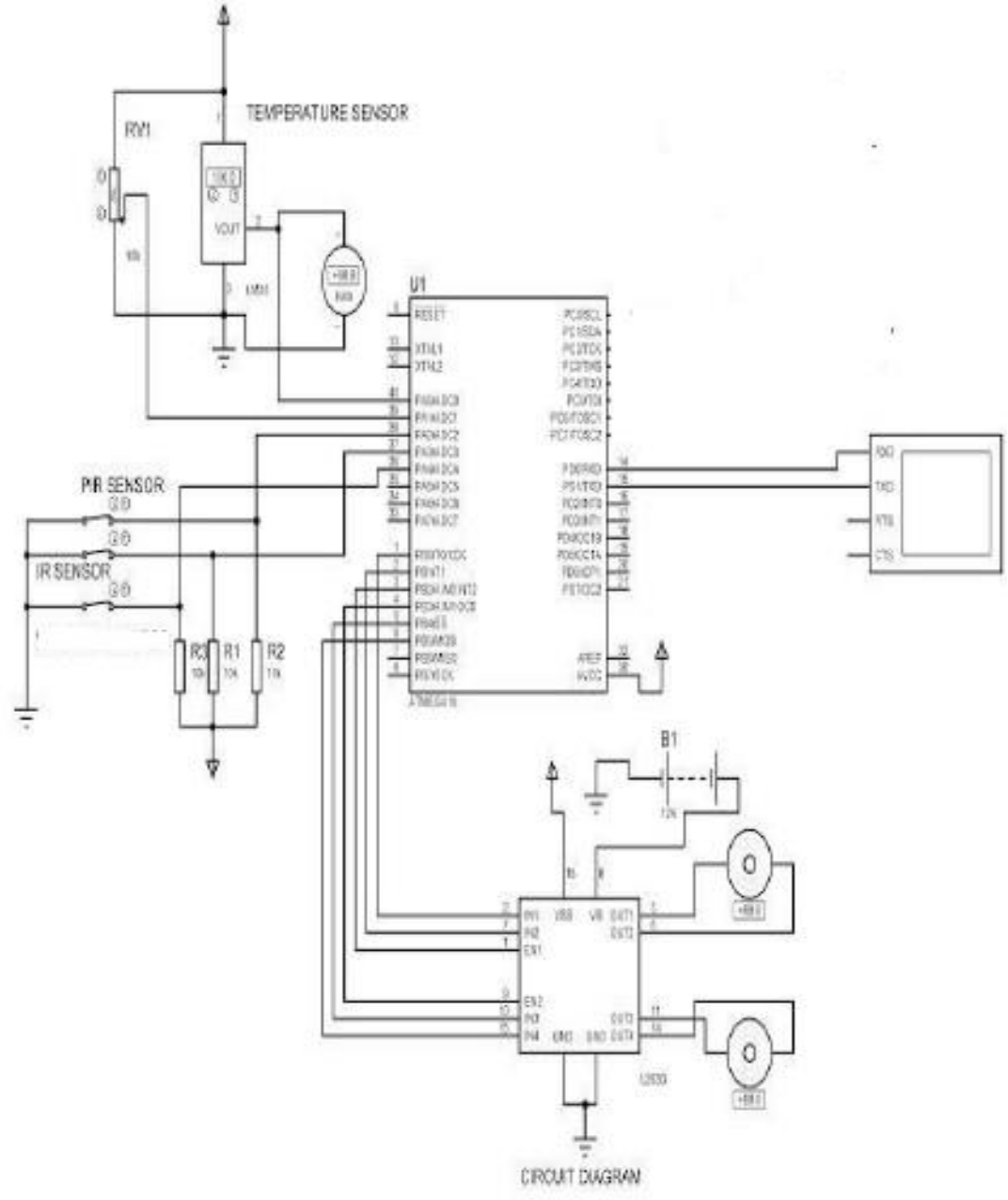
CHAPTER-6

WORKING AND DETAILS OF THE PROJECT

CHAPTER-6

WORKING AND DETAILS OF THE PROJECT

1. Circuit diagram of the project



CIRCUIT DIAGRAM

6.1. Circuit diagram of the project

2. Coding of the project Coding is done by C Language

```
#include <AFMotor.h>
#include <NewPing.h>
#include <Servo.h>

#define TRIG_PIN A0
#define ECHO_PIN A1
#define MAX_DISTANCE 200
#define MAX_SPEED 210 // sets speed of DC  motors
#define MAX_SPEED_OFFSET 20

NewPing sonar(TRIG_PIN, ECHO_PIN, MAX_DISTANCE);

AF_DCMotor motor1(1, MOTOR12_1KHZ);
AF_DCMotor motor2(2, MOTOR12_1KHZ);
AF_DCMotor motor3(3, MOTOR34_1KHZ);
AF_DCMotor motor4(4, MOTOR34_1KHZ);
Servo myservo;

boolean goesForward=false;
int distance = 100;
int speedSet = 0;

int pirin =2;
int pbuz= 13;
int value;

void setup() {
```

```
 myservo.attach(10);
 myservo.write(112);
 delay(2000);
 distance = readPing();
 delay(100);
 distance = readPing();
 delay(100);
 distance = readPing();
 delay(100);
 distance = readPing();
 delay(100);

 pinMode(pirin,INPUT);
 pinMode(pbuz,OUTPUT);
 Serial.begin(9600);
}

void loop() {
 int distanceR = 0;
 int distanceL =  0;

 detecting();
 delay(40);

 if(distance<=25)
 {
  moveStop();
  delay(100);
  moveBackward();
```

```
 delay(300);
 moveStop();
 delay(200);
 distanceR = lookRight();
 delay(200);
 distanceL = lookLeft();
 delay(200);

 if(distanceR>=distanceL)
 {
  turnRight();
  moveStop();

   detecting();
   delay(40);

 }else
 {
  turnLeft();
  moveStop();

   detecting();
   delay(40);

 }
}else
{
 moveForward();
detecting();
delay(40);
```

```
 }
 distance = readPing();
}

int lookRight()
{
   myservo.write(70);
   delay(500);
   int distance = readPing();
   delay(100);
   myservo.write(112);
   delay(100);
   return distance;

   detecting();
 delay(40);
}

int lookLeft()
{
   myservo.write(200);
   delay(500);
   int distance = readPing();
   delay(100);
   myservo.write(112);
   delay(100);
   return distance;
   delay(100);

   detecting();
```

```
 delay(40);
}

int readPing() {
  delay(70);
  int cm = sonar.ping_cm();
  if(cm==0)
  {
    cm = 250;
  }
  return cm;
}

void moveStop() {
  motor1.run(RELEASE);
  motor2.run(RELEASE);
  motor3.run(RELEASE);
  motor4.run(RELEASE);
  }

void moveForward() {

 if(!goesForward)
  {
    goesForward=true;
    motor1.run(FORWARD);
    motor2.run(FORWARD);
    motor3.run(FORWARD);
    motor4.run(FORWARD);
    detecting();
```

```
 delay(40);
   for (speedSet = 0; speedSet < MAX_SPEED; speedSet +=2) // slowly bring the speed up to avoid loading down the batteries too quickly
   {
    motor1.setSpeed(speedSet);
    motor2.setSpeed(speedSet);
    motor3.setSpeed(speedSet);
    motor4.setSpeed(speedSet);
    delay(5);
    detecting();
 delay(40);
   }
  }
}


void moveBackward() {
    goesForward=false;
    motor1.run(BACKWARD);
    motor2.run(BACKWARD);
    motor3.run(BACKWARD);
    motor4.run(BACKWARD);
  for (speedSet = 0; speedSet < MAX_SPEED; speedSet +=2) // slowly bring the speed up to avoid loading down the batteries too quickly
  {
    motor1.setSpeed(speedSet);
    motor2.setSpeed(speedSet);
    motor3.setSpeed(speedSet);
    motor4.setSpeed(speedSet);
    delay(5);
    detecting();
 delay(40);
```

```
  }
}

void turnRight() {
  motor1.run(FORWARD);
  motor2.run(FORWARD);
  motor3.run(BACKWARD);
  motor4.run(BACKWARD);
  delay(1200);
  motor1.run(FORWARD);
  motor2.run(FORWARD);
  motor3.run(FORWARD);
  motor4.run(FORWARD);

     detecting();
 delay(40);
}

void turnLeft() {
  motor1.run(BACKWARD);
  motor2.run(BACKWARD);
  motor3.run(FORWARD);
  motor4.run(FORWARD);
  delay(1200);
  motor1.run(FORWARD);
  motor2.run(FORWARD);
  motor3.run(FORWARD);
  motor4.run(FORWARD);

  detecting();
```

```
 delay(40);
}
void detecting(){
  value = digitalRead(pirin);
Serial.println(value);
while(value==1){
  moveStop();
  digitalWrite(pbuz,HIGH);
   delay(7000);
   value = digitalRead(pirin);
   Serial.println(value);

}
digitalWrite(pbuz,LOW);
}
```

CHAPTER-7

WORKING OF THE PROJECT

CHAPTER-7

Working of the Project

The main principle used in this project is the 'circuit principle'. The circuit is to detect the human using a detection sensor. The wireless technology used here is radiofrequency technology. The data is transmitted to the receiver through RF. using the received data, the robot is operated and controlled.

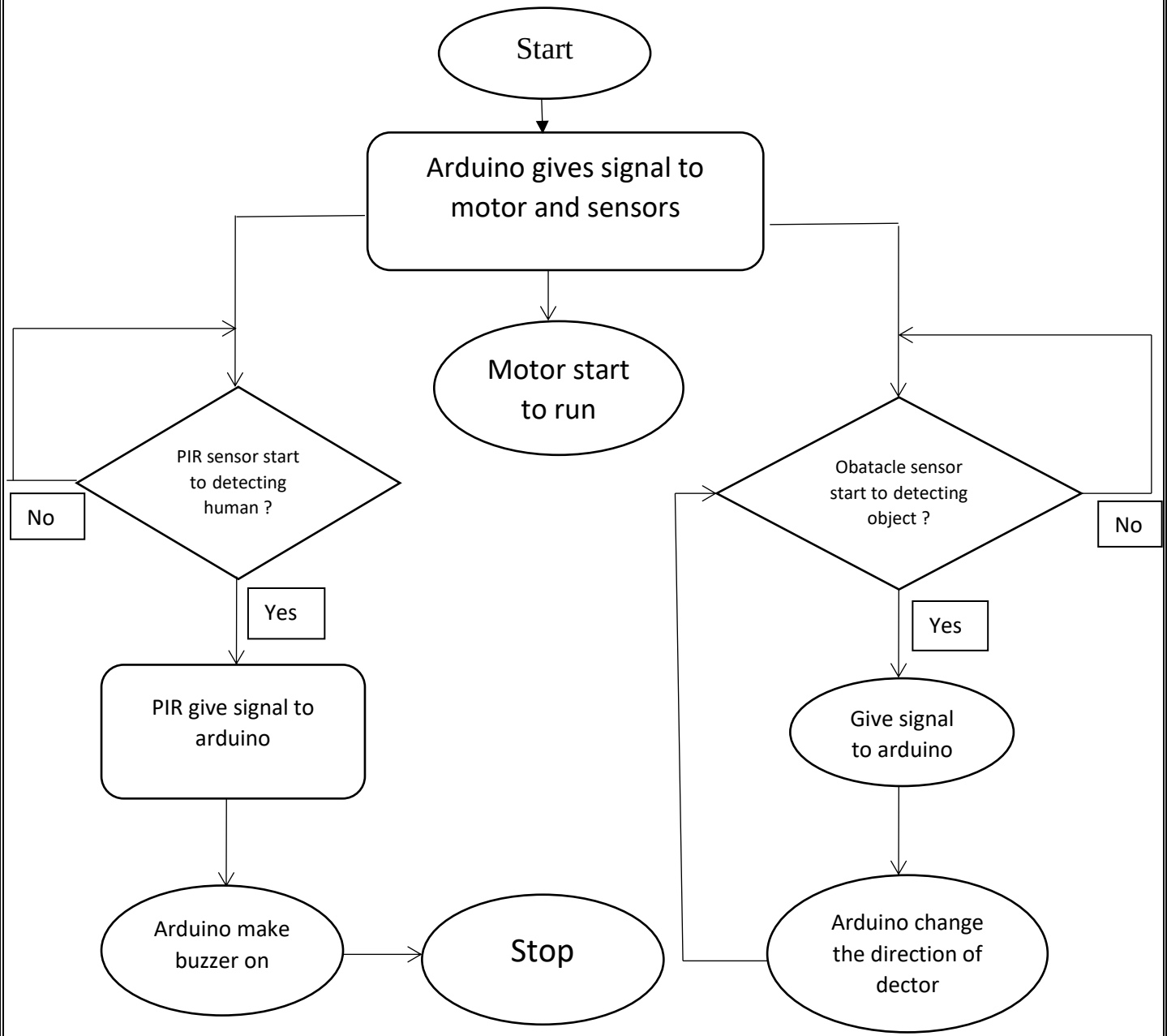


Fig 7 Flow chart

In a disaster condition when the rescue team, can't go to that place, we can use this robot and rescue that person. When it starts Arduino gives a signal to the motor and sensor, then the motor gets started and the robot starts walking. After the start, all the sensors are activated and start working. The obstacle sensor starts detecting the object there are two different conditions one is the when the obstacle sensor starts finding the object then it's it might be possible to detect any obstacle in way of finding the people, then it gives a signal to the Arduino, and then Arduino change the direction of the motor. In the other case when any obstacle is not found in his way it works continuously. PIR sensor starts detecting the humans who are trapped in a disaster. There are also two conditions positive and negative. If the PIR sensor can't find any human, it continuously searches the human. If a human is found out, then the PIR sensor sends a signal to the Arduino. After receiving the signal from the sensors it makes a buzzer, and the robot is automatically stopped. Then rescue team can go to that place and save that person

CHAPTER-8

RESULT, APPLICATION, CONCLUSION, FUTURE SCOPE

CHAPTER-8

1. RESULT

In our project, we build a human rescuer who can find out the person in a disaster place, the rescuer has the ability to self-drive and decision-making skills to find appropriate direction in certain disaster conditions, and it can immediately give an alarm signal when he detects a person in its range, the detector is rechargeable and we can recharge batteries by the simple mobile charger, so we can charge multiple time and use as we want.

2. APPLICATION

The main application of this project is to save the lives of humans during natural calamities. This can also be used to detect the humans in the war field. can be used for security purposes in jewelry shops, museums, etc. It holds a great advantage over others because the PIR sensor sensors help detect human radiation emitting from a live human being.

3. CONCLUSION

A simple, efficient solution for helping rescue workers in disaster management. As it is a wired robot, it has its limitations. PIR sensors can detect radiation only from living persons etc. This prototype can be further enhanced by making it wireless using Bluetooth or Wi-Fi technology, an infrared camera can be used for visualizing the entire situation before entering the area. This robot can be further integrated with a software application. This solution is very reliable, safe, easy to operate, and cost-effective. Periodic maintenance is not required.

4. FUTURE SCOPE

The robot may also include a bomb disposal kit To defuse the bomb on the war field. By including PIR sensors, it can also detect human motion near robots or the area under consideration. We can also include voice recognition technology in the future, which can give commands to the robot.

CHAPTER-7

PUBLICATION

CHAPTER-9

PUBLICATION

" HUMAN DETECTION IN DISASTER "International Research Journal of Modernization in Engineering Technology and Science (IRJMETS) (Peer-Reviewed, Open Access, Fully Refereed International Journal) Volume:04/Issue:04/April-2022 Impact Factor- 6.752 e-ISSN: 2582-5208

HUMAN DETECTOR IN DISASTER MANAGEMENT

Prof R. Iyer*1, Dalesh Patle*2, Akanksha Pardhi*3, Akshay Kawase*4

*1Guide, Department Of Electronics, Priyadarshini College Of Engineering, Nagpur, India.

*2,3,4UG Student, Priyadarshini College Of Engineering, Nagpur, India.

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ABSTRACT

The world repetitively suffer from disaster condition like earthquake, gas tragedies and if want to survive we want to take helps from technology because it's very dangerous to come directly face these type of situations so that's why we are focusing on a robot who can make the task easier so human detector plays that kind of role it finds a person in certain areas where risk is there and alarms us if any person detected. Passive Infrared Sensors (PIR) are the most widely used sensors for cheap surveillance. Due to their high ended sensitivity and area of detection PIR sensors are popular in security. PIR sensors are excellent in human and animal detection. They are mostly used in triggering an intruder alarm and activating household appliances in the presence of a human. However, the output from the sensor is proportional to several temporal relationships between an object in the field of view of the sensor, the sensitivity of the sensor, PIR lens features, and the environmental heat conditions.

Keywords: Pir Sensor, Aurdino Uno, Buzzer, Avoidance Sensor, Jumper Sensor, Servo Motor.

I. INTRODUCTION

This system was designed as a mobile rescue robotic system to help people on time who are trapped in the natural calamity like disasters, earthquakes, floods, leakage of gas, etc. It gives immediate and accurate information about the human who is in the disaster region so that the rescue team of expert

and the doctor can be sent to the victim's primary treatment or take that person to a safe place or hospital. This entire process is done in a few minutes, the main aim to implement this project is, when a disaster happens forex. The landscape then humans can't go in that region to rescue other people so instead of using humans, we can use this robot who can easily find the human send us the signal. We are using hear various types of sensors that work independently. When a human is in the danger it emits thermal radiation and that radiation is received and manipulated by the sensor. This robot decides its path of traveling itself and if any obstacle comes in between the path it can sense by the sensor and according to that, it changes its direction. When the human body comes in front of the robot it makes a sound and passes a message to the sensor.

II. MICROCONTROLLER BOARD-ARDUINO

The Arduino UNO is an open-source microcontroller board on the microchip ATmega328P microcontroller and developed by Arduino 14 digital input/output pin. Arduino is programmed to guide the robot automatically depending on the obstacle detected and to send the human being information to a remote control place through Bluetooth technology. Arduino Uno checks the logic level on the sensor's output pin and performs further tasks such as activating the buzzer and led, sending alert messages, etc. Arduino boards can read inputs and turn them into output. It is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board.

III. PIR SENSOR

PIR sensors are more complicated than many other sensors because multiple variables affect the sensor's input and output. PIR sensors are passive infrared sensors that detect the movement of people with the help of

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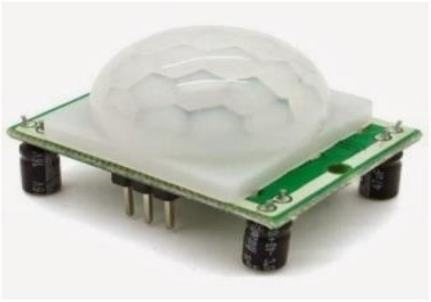
changes in infrared levels emitted by surrounding objects. The human body emits thermal radiation at a wavelength of about 10 microns. It is received and manipulated by the PIR sensor to detect. PIR sensors allow you to sense motion. They are small, inexpensive, low-power, easy to use, and don't were out. For that reason, they are commonly found in appliances and gadgets used in homes or businesses. Passive infrared alarms are classified into infrared detector and alarm control sections. PIR is made of a pyroelectric sensor, which can detect the different levels of infrared

Radiation. Passive infrared alarms are classified into infrared detectors and the alarm control section. The most widely used infrared detector is pyroelectric. It uses as a sensor for converting human infrared radiation into electricity.



PIR SENSOR

IV. AVOIDANCE SENSOR

Obstacle detection (IR sensor) output signal sends to the microcontroller. The microcontroller controls the movement by using a DC motor which is placed in the project. Placed inline the IR sensor fails to receive the light ray and gives a signal to the microcontroller. Because of this sensor, when an obstacle comes in front of the robot in that situation, the robot takes some time and searches in both left and right positions, and then it takes to design and change the direction automatically.

V. AVOIDANCE SENSOR

Obstacle detection (IR sensor) output signal sends to the microcontroller. The microcontroller controls the movement by using a DC motor which is placed in the project. Placed inline the IR sensor fails to receive the light ray and gives a signal to the microcontroller. Because of this sensor, when an obstacle comes in front of the robot in that situation, the robot takes some time and searches in both left and right positions and then it takes to design and change the direction automatically.

VI. GEAR MOTOR

A gear motor is an all-in-one combination of a motor and gearbox. The addition of a gear head to a motor reduces the speed while increasing the torque output. DC motor is a rotating electrical device that converts the direct current, of electric energy into mechanical energy.

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VII. BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical use of buzzers and beepers includes alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

❖ **BLOCK DIAGRAM:**

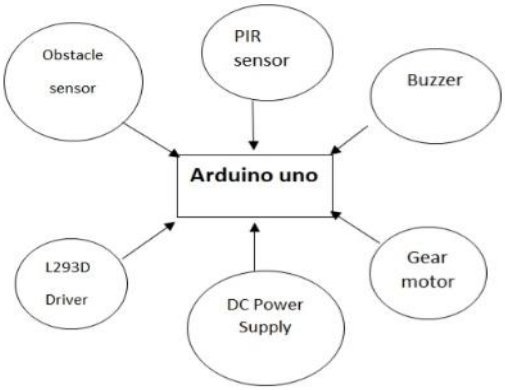

Fig: Block diagram of human detector robot:

The main component of this project is Arduino Uno. This device is a software tool. In this device, we can control the hardware by using programming. we provide a 12v lithium-ion battery to the Arduino to control the dc motor we are using an L293D motor driver which is connected to Arduino and DC motor we are providing a 12v power supply. 4DC motors are connected to the driver. We are using a PIR sensor that has 3 terminals, one terminal is grounded, the second terminal is connected to VCC and the remaining signal terminal is connected to the digital pin2 of an Arduino. The buzzer has two terminals one is connected to digital pin no.13 and the other is grounded. The avoidance sensor has 4 terminals. It's used to determine the distance between object and detector.

❖ **ADVANTAGE:**

- The main application of this project is to save the lives of humans during natural calamities.
- This can also be used to detect the humans in the war field.
- This can be used for security purposes in jewelry shops, museums, etc.
- It holds a great advantage over others because the PIR sensor sensors help detect human radiation emitting from a live human being.

❖ **FUTURE SCOPE:**

The robot may also include a bomb disposal kit To defuse the bomb on the war field. By including PIR sensors, it can also detect human motion near robots or the area under consideration. We can also include voice recognition technology in the future, which can give commands to the robot.

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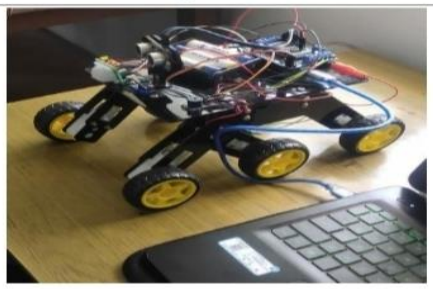

Fig: Hardware representation.

VIII. WORKING PRINCIPLE

- **Principle:** The main principle used in this project is the 'circuit principle'. The circuit is to detect the human using a detection sensor. The wireless technology used here is radiofrequency technology. The data is transmitted to the receiver through RF. using the received data, the robot is operated and controlled.
- **Working:** In a disaster condition when the rescue team If we can't go to that place, we can use this robot and rescue that person. When it starts Arduino gives a signal to the motor and sensor, then the motor gets started and the robot starts walking. After the start, all the sensors are activated and start working. The obstacle sensor starts detecting the object there are two different conditions one is the when the obstacle sensor start finding the object then it's it might be possible to detect any obstacle in way of finding the people, then it gives a signal to the Arduino, and then Arduino change the direction of the motor. In the other case when any the obstacle is not found in his way it works continuously. PIR sensor starts detecting the humans who are trapped in a disaster. There are also two conditions positive and negative. If the PIR sensor can't find any human, it continuously searches the human. If a human is found out, then the PIR sensor sends a signal to the Arduino. After receiving the signal from the sensors it makes a buzzer, and the robot is automatically stopped. Then rescue team can go to that place and save that person.

IX. CONCLUSION

A simple, efficient solution for helping rescue workers in disaster management. As it is a wired robot, it has its limitations. PIR sensors can detect radiation only from living persons etc. This prototype can be further enhanced by making it wireless using Bluetooth or Wi-Fi technology, an infrared camera can be used for visualizing the entire situation before entering the area. This robot can be further integrated with a software application. This solution is very reliable, safe, easy to operate, and cost-effective. Periodic maintenance is not required.

❖ **OUTPUT:**

X. REFERENCE

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[2] A. Swapna and K. Archana. (2017). "A new approach for detecting living human beings in devastating environments using a low-cost autonomous robot" in International research journal of engineering and technology, vol. 4, no. 4 (pp. 3078-3081)

[3] M. S. Nagakanya Lakshmi , S. Sridhar, M. Navya, G. V. V. Saikiran, B. Swathi and D. Mohan Krishna.(2017). "Human detection and tracking via radar module robot" in International journal of innovative research in computer and communication engineering, vol. 5, no. 2(pp. 2653-2659

[4] Binoy Shah and Howie Choset,(2004) "Survey on Urban Search and Rescue Robotics," Journal of the Robotics Society of Japan, vol. 22; no. 5(pp. 582-586)

[5] Robin R. Murphy, Vasant Srinivasan, Zachary Henkel, Jesus Suarez, Matthew Minson, J C Straus, Stanley Hempstead, Tim Valdez, Shinichi Egawa. (2013). "Interacting with trapped victims using robots" in Technologies for Homeland Security (HST) 2013 IEEE International Conference(pp. 32-37)

[6] R. Fuksis, M. Greitans, and E. Hermanis, (2008). "Motion Analysis and Remote Control System using pyroelectric Infrared Sensors" in IEEE, vol. 6, no. 86(pp. 69-72).

CHAPTER-10

WORKING OF THE PROJECT

CHAPTER- 10

REFERENCE

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CHAPTER-11

ANNEXURE

CHAPTER-11

Annexure 1

Certificates of Paper Publication

IRJMETS

International Research Journal Of Modernization in Engineering Technology and Science

(Peer-Reviewed, Open Access, Fully Refereed International Journal)

e-ISSN: 2582-5208

Ref: IRJMETS/Certificate/Volume 4/Issue 04/40400111896 *Date: 28/04/2022*

Certificate of Publication

*This is to certify that author "**Prof R. Iyer**" with paper ID "**IRJMETS40400111896**" has published a paper entitled "HUMAN DETECTOR IN DISASTER MANAGEMENT" **in International Research Journal Of Modernization In Engineering Technology And Science (IRJMETS), Volume 4, Issue 04, April 2022***

Editor in Chief

IRJMETS Impact Factor 6.752

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International Research Journal Of Modernization in Engineering Technology and Science

(Peer-Reviewed, Open Access, Fully Refereed International Journal)

e-ISSN: 2582-5208

Ref: IRJMETS/Certificate/Volume 4/Issue 04/40400111896 Date: 28/04/2022

Certificate of Publication

This is to certify that author "**Dalesh Patle**" with paper ID "**IRJMETS40400111896**" has published a paper entitled "HUMAN DETECTOR IN DISASTER MANAGEMENT" **in International Research Journal Of Modernization In Engineering Technology And Science (IRJMETS), Volume 4, Issue 04, April 2022**

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e-ISSN: 2582-5208

Ref: IRJMETS/Certificate/Volume 4/Issue 04/40400111896 Date: 28/04/2022

Certificate of Publication

This is to certify that author "**Akanksha Pardhi**" with paper ID "**IRJMETS40400111896**" has published a paper entitled "HUMAN DETECTOR IN DISASTER MANAGEMENT" **in International Research Journal Of Modernization In Engineering Technology And Science (IRJMETS), Volume 4, Issue 04, April 2022**

Editor in Chief

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e-ISSN: 2582-5208

Ref: IRJMETS/Certificate/Volume 4/Issue 04/40400111896 Date: 28/04/2022

Certificate of Publication

This is to certify that author "**Akshay Kawase**" with paper ID "**IRJMETS40400111896**" has published a paper entitled "HUMAN DETECTOR IN DISASTER MANAGEMENT" **in International Research Journal Of Modernization In Engineering Technology And Science (IRJMETS), Volume 4, Issue 04, April 2022**

Editor in Chief

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Annexure 2

Certificate of Project Competition

LOKMANYA TILAK JANAKALYAN SHIKSHAN SANSTHA'S
PRIYADARSHINI COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS & POWER ENGINEERING

TECH FIESTA 2k22

Certificate of Participation

This certificate is presented to

Dalesh Patle

for participating in "Tech Fiesta 2k22" organised by Department of Electrical (E&P) Engineering. He/She participated in the event

Project Competition.

Mrs. K. M. Bogawar (FACULTY COORDINATOR) | Dr. K. B. Porate (HOD, E&P, PCE) | Dr. V. K. Taksande (DEAN, STUDENT AFFAIRS) | Dr. G. M. Asutkar (VICE-PRINCIPAL, PCE) | Dr. S. A. Dhale (PRINCIPAL, PCE)

LOKMANYA TILAK JANAKALYAN SHIKSHAN SANSTHA'S
PRIYADARSHINI COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS & POWER ENGINEERING

TECH FIESTA 2k22

Certificate of Participation

This certificate is presented to

Akansha Pardhi

for participating in "Tech Fiesta 2k22" organised by Department of Electrical (E&P) Engineering. He/She participated in the event

Project Competition.

Mrs. K. M. Bogawar | Dr. K. B. Porate | Dr. V. K. Taksande | Dr. G. M. Asutkar | Dr. S. A. Dhale

LOKMANYA TILAK JANAKALYAN SHIKSHAN SANSTHA'S
PRIYADARSHINI COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS & POWER ENGINEERING

TECH FIESTA 2K22

Certificate of Participation

This certificate is presented to

Akshay Kawase

for participating in "Tech Fiesta 2k22" organised by Department of Electrical (E&P) Engineering. He/She participated in the event Project Competition.

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Dr. K. B. Porate (HOD, E&P, PCE)
Dr. V. K. Taksande (DEAN, STUDENT AFFAIRS)
Dr. G. M. Asutkar (VICE-PRINCIPAL, PCE)
Dr. S. A. Dhale (PRINCIPAL, PCE)

CHAPTER – 12

PROJECT TEAM AT A GLANCE

- **GROUP DETAILS:**

Group photo

Prof. Rohit C. Iyer (Guide)

Akanksha Pardhi

Dalesh Patle

Akshay Kawase

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