POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

# ELECTRICAL ENGINEERING DEPARTMENT

## SESSION 2 2022/2023

# HUMAN DETECTION ROBOT

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# POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

# HUMAN DETECTION ROBOT

**AIMAN AZFAR BIN MOHD ALI 08DJK20F2005**

This project is submitted in partial fulfillment of requirements for the award of Diploma in Electrical Engineering (Control)

## ELECTRICAL ENGINEERING DEPARTMENT

## SESSION 2 2022/2023

## CONFIRMATION OF THE PROJECT

The project report titled "HUMAN DETECTION ROBOT" has been submitted, reviewed and verified as a fulfills the conditions and requirements of the Project Writing as stipulated

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Supervisor's name :
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Date :

Verified by :
Project Coordinator name :
Signature of Coordinator :
Date :

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## DECLARATION OF AUTHENTICATION AND OWNERSHIP

**TITLE** **: HUMAN DETECTION ROBOT**
**SESSION** **: 2 2022/2023**

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2. We verify that **Human Detection Robot** and its intellectual properties are our original work without plagiarism from any other sources.

**3.** We agree to release the project's intellectual properties to the above said polytechnic in order to fulfil the requirement of being awarded **Diploma in Electrical Engineering (Control).**

# ACKNOWLEDGEMENT

Our initiative would not have been possible without the participation and assistance of many individuals who contributed to our effort and. However, we would want to express our thanks and responsibility to our supervisor, Encik.Idris Bin Kamaruddin, for providing the necessary expertise and resources for this project. We would also want to express our heartfelt gratitude to our loving parents and friends for their kind encouragement and spiritual support throughout the project's implementation phase. There were many demands and obstacles that I had to face in finishing this final assignment, but I turned it into a very useful lesson and experience since the weariness I encountered ultimately paid off when this final project was finally done within the given time.Thank you very much.

## ABSTRACT

Earthquakes, wildfire, bomb blasts, landslides, cyclones, and floods are just a few of the natural disasters that continually reminding us that there is no force greater than that of nature. With the unrestrained expansion of science and technology, as well as the construction of sky scraper structures, residences, and encroachments everywhere, the dangers of losing life due to such tragedies have multiplied. Furthermore, as nuclear technology advances, the dangers of man-made disasters such as nuclear explosions and nuclear radiation leakage have reached an all-time high. When natural or man-made calamities strike a place, many people are murdered instantaneously.Many others become buried under rubble for hours or days since their existence cannot be easily recognised by rescue crews. As a result, they die in agony since aid could not reach them in time. Certain areas in such disaster-hit areas are off-limits to rescue crews. If they do, a rescue worker may become a victim himself.As a result, we propose a person detection robot that can find alive individuals among debris and provide victims with immediate assistance.

Keywords: Internet of things (IOT)

## ABSTRAK

Gempa bumi, kebakaran hutan, letupan bom, tanah runtuh, taufan dan banjir hanyalah sebahagian daripada bencana alam yang sentiasa mengingatkan kita bahawa tiada daya yang lebih besar daripada alam semula jadi. Dengan perkembangan sains dan teknologi yang tidak terkawal, serta pembinaan struktur pengikis langit, kediaman, dan pencerobohan di mana-mana, bahaya kehilangan nyawa akibat tragedi sedemikian telah berlipat kali ganda. Tambahan pula, dengan kemajuan teknologi nuklear, bahaya bencana buatan manusia seperti letupan nuklear dan kebocoran sinaran nuklear telah mencapai tahap tertinggi sepanjang masa. Apabila bencana alam atau buatan manusia melanda sesuatu tempat, ramai orang terbunuh serta-merta. Ramai yang lain tertimbus di bawah runtuhan selama berjam-jam atau hari kerana kewujudan mereka tidak dapat dikenali dengan mudah oleh kru penyelamat. Akibatnya, mereka mati dalam kesakitan kerana bantuan tidak dapat sampai pada masanya. Kawasan tertentu di kawasan yang dilanda bencana sedemikian adalah terlarang untuk kru penyelamat. Jika mereka berbuat demikian, seorang pekerja penyelamat mungkin menjadi mangsa sendiri. Akibatnya, kami mencadangkan robot pengesan orang yang boleh mencari individu yang masih hidup di antara serpihan dan memberikan bantuan segera kepada mangsa.

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# CHAPTER 1
# INTRODUCTION

## 1.1 INTRODUCTION

The internet of things, or IoT, is a networked system of interconnected computing devices, mechanical and digital machines, objects, animals, or people with unique identifiers (UIDs) and the ability to transfer data without requiring human-to-human or human-to-computer interaction.A thing in the internet of things can be a person implanted with a heart monitor, a farm animal implanted with a biochip transponder, a car with built-in sensors to alert the driver when tyre pressure is low, or any other natural or man-made object that can be assigned an Internet Protocol (IP) address and can transfer data over a network.

Nowadays, cities are developing quicker, and most people are moving to cities, resulting in a significant rise in population. Because of the rapid population growth, each natural or man-made calamity becomes a far more severe accident. Indeed, catastrophes can damage numerous massive facilities, resulting in complicated and hazardous disaster sites that affect the dependability and efficacy of rescue teams. The complicated and dangerous nature of these unintentional sites poses a significant concern and risk to rescue workers and hostages caught in the tragedy. These tragedies upset the social and economic balance of the society.

This system creates a mobile rescue robotic vehicle system based on Arduino to assist individuals who are stranded in natural disasters such as earthquakes, and floods.It provides a timely and accurate reflection of the dynamic situation of humans in disaster areas, such as underground regions, to the control room, so that a rescue team of experts and doctors can be dispatched to the victim's location for primary treatment and can be dispatched to a safe location or hospital. Because the system is controlled by an ESP32 unit, the entire procedure takes only a few seconds. The ESP32-CAM is a compact, low-power camera module based on the ESP32. It includes an OV2640 camera and an inbuilt TF card slot. The ESP32-CAM is suitable for a broad range of intelligent IoT applications, including wireless video monitoring, WiFi picture upload, QR identification, and so on. 3V DC have been used in this project,which is a type of electric machine that converts electrical energy into mechanical energy.DC motors take electrical power through direct current,and convert this energy into mechanical rotation.DC motors use magnetic fields that occur from the electric currents generated,which powers the movement of a rotor fixed within the output shaft.The output torque and speed depends upon both the electrical input and the design of the motor.

## 1.2 BACKGROUND RESEARCH

According to the study and research, we hear about accidents virtually every day, such as natural disasters such as fires or gas leaks in buildings or companies that emit toxic gases. These instances are frequently broadcast on television, newspapers, radio, and other media outlets. Such stories are common among manufacturing workers and other labourers. For example, three communications cable installation workers perished recently in an underground cable sewer hole

attributable to the increase in the number of fatalities. We have developed concepts and techniques to assist minimise the amount of deaths, including those of rescuers.Human detection robots have the potential to help in a variety of fields where detecting and monitoring human presence is critical. These robots are expected to become much more effective, dependable, and adaptable in the future as research and development continue

### 1.3 PROBLEM STATEMENT

Because of the lack of physical control, an autonomous robot may become entangled in the debris and may not be recovered by the crew.The fundamental concept behind such a project is to develop a small but effective robot that can sneak into crisis situations such as earthquakes or bomb blasts, where we must detect living human beings as rapidly as possible in order to save a life.Though the widespread deployment of robots technology would result in the loss of many human occupations and increased unemployment in society. The usage of robots in various occupations would result in the decline of human jobs, hence the transition should be done gradually. Robot advancements will reduce the need for many high-end precision professions and will benefit industries such as agriculture, military, and health care.

### 1.4 OBJECTIVE OF THE PROJECT

One of the main objectives of this project is to propose a wireless robot operated by electronic devices such as a laptop or mobile phone that can show images via a camera, manoeuvre around regions, and locate humans in need of assistance. The robots can be considered future rescuers without putting human lives at danger.

### 1.5 SCOPE OF THE PROJECT

Many items are created in today's world of contemporary technology to make life simpler and faster for people.This project will need you to deal with both hardware and software.Materials like as batteries, switches, sensors, cameras, and so on will be included in the hardware.The hardware will be purchased on the spot.The software will be designed and coded to see how it works, and the programming will be concurrently with the apps.This will involve system hardware and software implementation.The ultimate output of the project will be deterministic in terms of software programming and hardware architecture.The project's goal is to detect humans who are trapped within the structure.Aside from that, this initiative may assist us in avoiding or increasing the number of victims.

### 1.6 CONTRIBUTION OF THE PROJECT

As the world moves towards the Fourth Industrial Revolution, it is critical to have technology in innovation and invention to increase economic growth. Although there are many projects to assess human detection robots, our research has integrated an IoT component by supplying sensors.

### 1.7 SUMMARY

In a summary, this chapter may be ended by stating that the research study has aided in the development of this project, as it has been mentioned that it can solve the usual obstacles encountered by individuals. Despite the fact that the major purpose of this effort is to meet the objectives, the project has also incorporated the relevance of technology in the production. This is because technical progress allows for the development of more and better assets in a more efficient manner.

# CHAPTER 2
# LITERATURE REVIEW

## 2.1 INTRODUCTION

This chapter intends to use Internet discoveries to focus on how a person detecting robot sensor should be. A review of the literature supports the conclusion that the Human Detection Robot Sensor was developed to prevent target users from wasting time and energy while performing more efficient tasks. The evaluation will also analyse the current Human Detection Robot sensor by improving the features to make the users more advantageous.

## 2.2 HISTORY

The notion of robots and self-driving cars has been around for decades. Significant advances in robotics, however, occurred in the twentieth century with the advent of modern electronics and computing. Initially, robotic systems were mostly utilised in industrial settings for activities such as assembly line automation and material handling.

Sensor development was critical in the advancement of human detecting robots. Researchers began investigating the use of different sensors, such as infrared and ultrasonic sensors, to detect and estimate distances to objects in the 1960s and 1970s. These sensors served as the foundation for early detection systems.

As computer vision and image processing capabilities advanced, researchers began to investigate the use of cameras and visual sensors for human detection. Vision-based systems began to develop in the 1980s and 1990s, allowing robots to identify and track human presence using visual input. Algorithms for image processing, pattern recognition, and motion analysis were used in these systems.

The notion of human detection robots grew as mobile robot platforms improved, adding sensors and computer capabilities. Researchers began constructing autonomous mobile robots outfitted with a variety of sensors, such as cameras, lasers, and range finders, in the early 2000s to identify and navigate around humans in dynamic surroundings.

The history of human detection robots is a continuous process of breakthroughs and innovations, fueled by technology advancements and the growing need for automation and robotics in a variety of sectors. As technology advances, we may expect additional improvements in human detecting skills as well as the incorporation of robots into our daily lives.

## 2.3 PREVIOUS RESEARCH ON HUMAN DETECTION ROBOT

- USAR Robocup

A B C

Figure 2.3.1

to raise understanding of the difficulties associated with search and rescue applications, to enable objective evaluation of robotic implementations in realistic situations, and to stimulate collaboration Diploma WorkRobotic Urban Search and Rescue with Human DetectionWhile searching for simulated victims in unstructured areas, robots demonstrate their ability in movement, sensory perception, planning, mapping, and practical operator interfaces. In addition to location sensors (such as GPS), the robots were outfitted with victim detecting sensors. All three robots utilised vision, although in distinct ways. The (c) employed omnidirectional vision via a spherical mirror, whereas the (d) employed a pan tilt head. Other sensors linked to these robots included a microphone, non-touch infrared thermometer, and ultrasonic transceiver. (c) also employed visual motion detection to identify victims. More details on these robots may be found here.

- Live Human Detection Robot

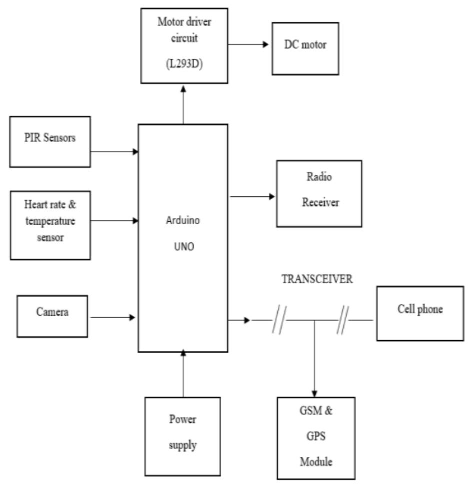



**FIGURE 2.3.2:**

The detection of living humans The robot is divided into two parts: the transmitter and the receiver. The transmitter side is made up of an Arduino Uno microcontroller, which receives information from a PIR sensor, a temperature sensor, and a heart rate sensor. The outputs are the L293D motordrive module, to which a DC motor is linked for the robot's vehicle wheels. A DC motor is utilised to drive the robot left, right, forward, and backward.The L293D motor driving circuit directs the DC motor to travel in the direction specified by the user.The remote control signals determine the direction of the robot's movement. A Passive infrared sensor can detect humans. A PIR sensor is a sensing device that generates PIR signals, which may measure temperature. Humans normally emit heat, which is sensed by this PIR sensor. Humans generate 9 to 10 microns of temperature or heat. The detecting angle of a PIR sensor is limited to 1800 degrees.

- Detection Robot

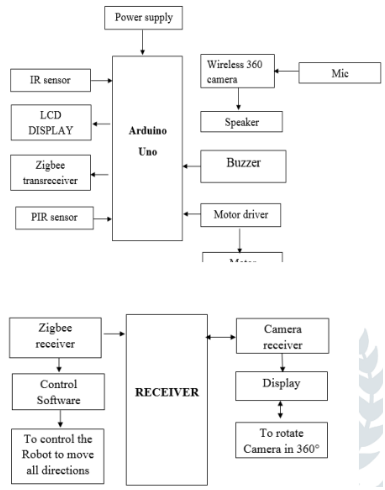



**FIGURE 2.3.3**

video transmission is accomplished by high-speed picture transfer. Initially, the robot will be outfitted with an Android smartphone that will capture the scene in front of it and send the photographs to a server from which the user will manage and monitor the live video. This research describes a novel cost-effective robot control system solution.The robots are often controlled over a connected network. Programming the robot takes time, and if there is a change in the project, programming must be done again. As a result, they are not user friendly and function in accordance with the user's wishes. They are meant to make user-commanded work to make a robot more user-friendly and to get the multimedia tone in the control of the robot.To do this, current technology must be used. All users must be aware of how to use current technology in order for it to be implemented. To meet and fulfil all of these requirements, we are employing an Android cell phone as a multimedia, user-friendly device to operate the robot. This concept serves as both the project's impetus and its fundamental topic. In today's contemporary world, everyone has a smartphone that they utilise on a daily basis. All of their daily activities, such as newspaper reading, daily updates, social networking, and all of the apps, such as home automation control, vehicle security, human body anatomy, health maintenance, and so on, have been designed in the form of applications that can be easily installed in their hand held smart phones.

- Snake Robot


**FIGURE 2.3.4**

Kohga: Tokyo University

According to, they are working on snake robots to explore confined places in disaster zones. They are meant to be disassembled into several sections for transit to the catastrophe site, albeit their mobility in a disaster region is rather limited. The snake robots are just equipped with a camera and a microphone and do not attempt to find victims on their own.

- Alive Human Detector in War Fields,Using IR Sensor and Live Video Streaming

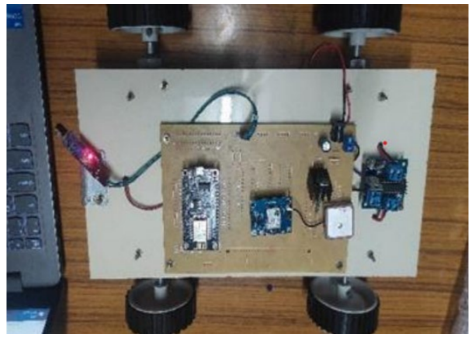


**FIGURE 2.3.5**

Infrared Detector present in the military areas makes the evidence of the adversary/ mortal detection. However, the essence sensor in there gets detected and suggestion was given, If the detected adversary/ human is with any essence. IOT- grounded GPS (Global Positioning System) tracking technology is used which gives an accurate result further than normal GPS technology. The cloud- grounded monitoring system has been enforced which can be viewed by a concerned person anywhere. Announcement cautions can be initiated for a particular moment. In our proposed machine regulator used is Node MCU. It has a USB to3.3 V power pressure at the board. The NodeMcu (ESP8266) which is included with the Wi-Fi Module has the functionality to give any microcontroller get admission to on your Wi-Fi community. The complete robotic capability is managed by means of this regulator. It controls the vehicle through a voice-controlled firebase cloud. Skype videotape calling is used to manipulate the robotic in homemade mode. Whenever any detector becomes active an alert communication is transferred to Mobile

- Human Detection Robotics System Using Arduino Uno

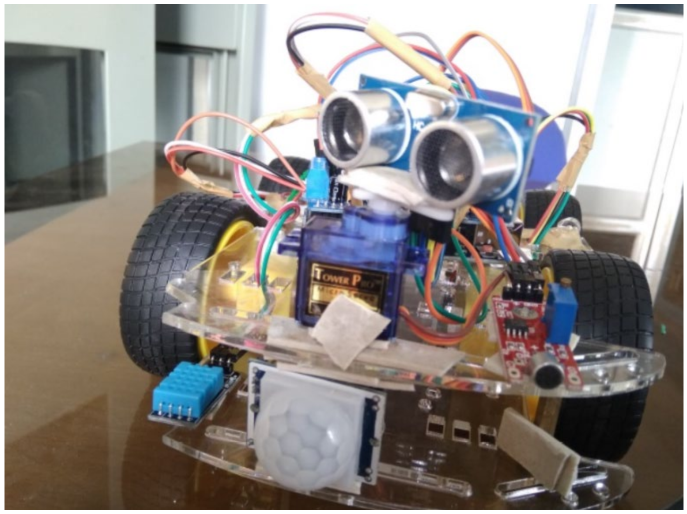


**FIGURE 2.3.6**

PIR sensors are passive infrared sensors that detect human movement by detecting changes in infrared (heat) levels radiated by nearby objects. Thermal radiation from the human body has a wavelength of roughly 10 microns. The PIR sensor receives and manipulates it in order to detect humans. It runs on 5V DC. The human mobility can be identified by looking for a quick shift in the surrounding IR patterns. When an impediment is detected, the obstacle sensor provides analogue signals to the Arduino. Arduino is designed to autonomously direct the robot based on obstacles encountered and to communicate human information to a remote control location through Bluetooth Technology.The Base Station (Control Centre) receives the data. The Rescue team can take the required procedures to rescue the imprisoned humans after analysing the data.

## 2.4 SUMMARY

The use of robots for human detection has gained significant attention in various domains,including surveillance,search and rescue operations,and human-robot interaction.This literature review aims to summarize and analyze the existing research on human detection robots,focusing on the technologies,methodologies, and challenges associated with their development and implementation.

It explores different sensor technologies used in human detection robots,such as infrared sensor,ultrasonic sensors,camera,LIDAR, and radar.It discusses their strenghts,limitations, and suitability for various applications.Additionally,it examines the integration of multiple sensors to improve the accuracy and reliability of human detection systems.

The review digs into the algorithms used in robots to recognise humans. Traditional techniques such as Haar cascades, HOG (Histogram of Oriented Gradients), and SVM (Support Vector Machines) are covered, as are modern deep learning approaches such as convolutional neural networks (CNNs), recurrent neural networks (RNNs), and object detection models such as YOLO (You Only Look Once) and SSD (Single Shot MultiBox Detector). These algorithms' benefits, drawbacks, and performance ratings are described.

The literature review provides a comprehensive overview of human detection robots, covering sensor technologies, detection algorithms, localization and tracking techniques, applications, and challenges. It highlights the advancements made in this field and emphasizes the potential for future research and development to enhance the capabilities and usability of human detection robots in various domains.

# CHAPTER 3

# METHODOLOGY

## 3.1 INTRODUCTION

This chapter will go through the procedures utilised to complete this project. This chapter will also cover the functions of each component installed in this project. The total cost of completing this project is indicated at the end of this chapter.

### 3.2 FLOW CHART

The flow chart below supports us in the completion of the Human Detection Sensor project.

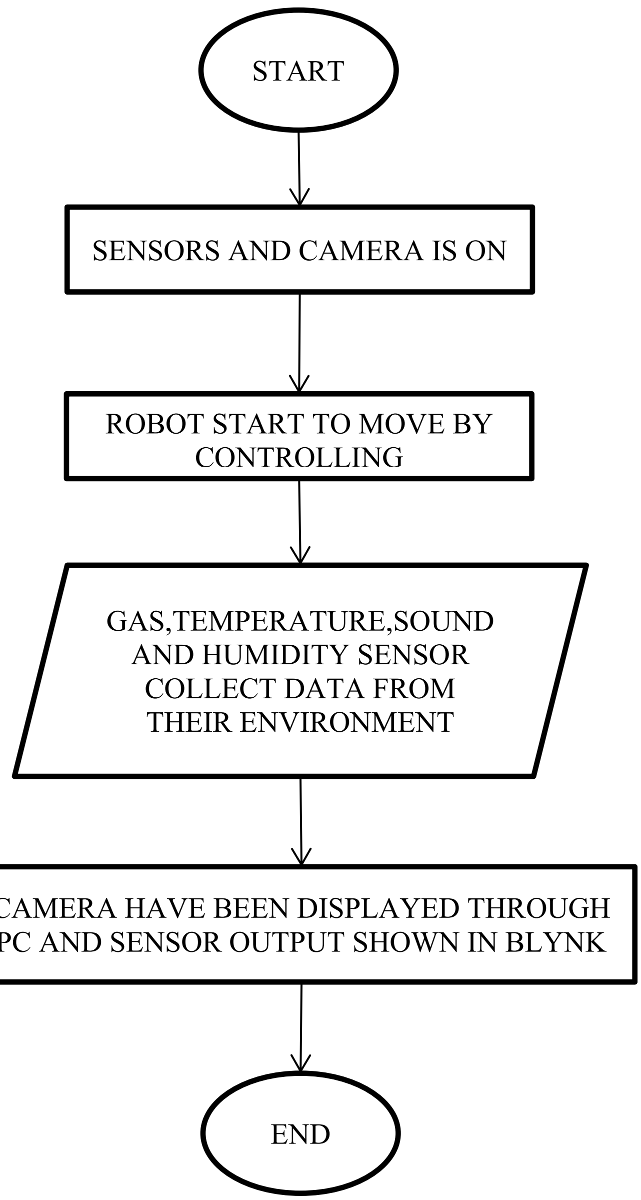



**FIGURE 3.2.1**: Flow chart

### 3.3 Project Description

The Human Detection Robot is a research project.The Human Detection Robot is a self-contained robotic system that detects and recognises human presence in a variety of settings. Its duties are carried out utilising contemporary sensors and computer vision methods. The primary purpose of this research is to increase safety and security in a variety of scenarios by providing a reliable and effective solution for human detection.

### 3.4 Project Hardware

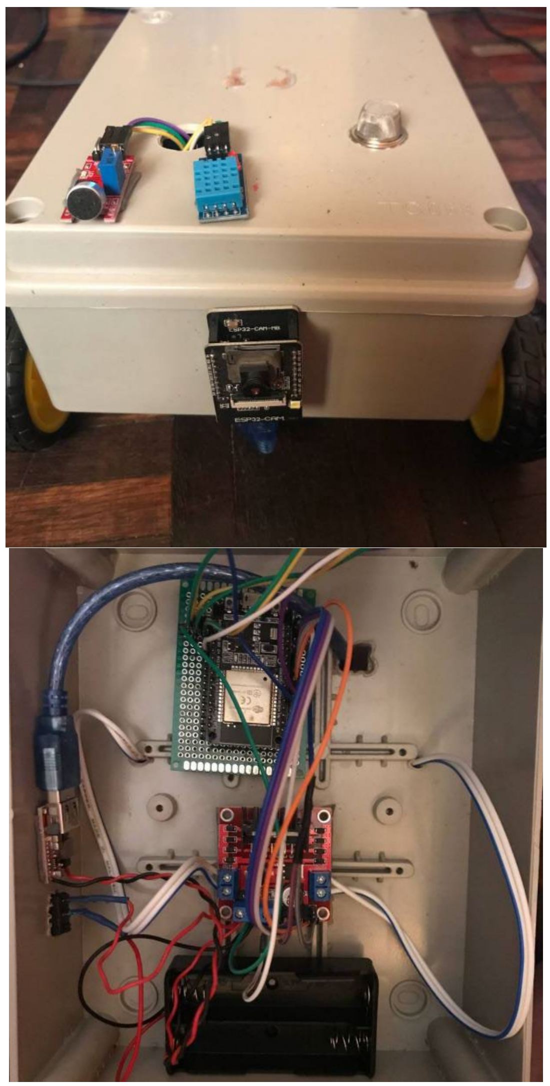


**FIGURE 3.4.1**: Project Hardware

## 3.5 Schematic Circuit

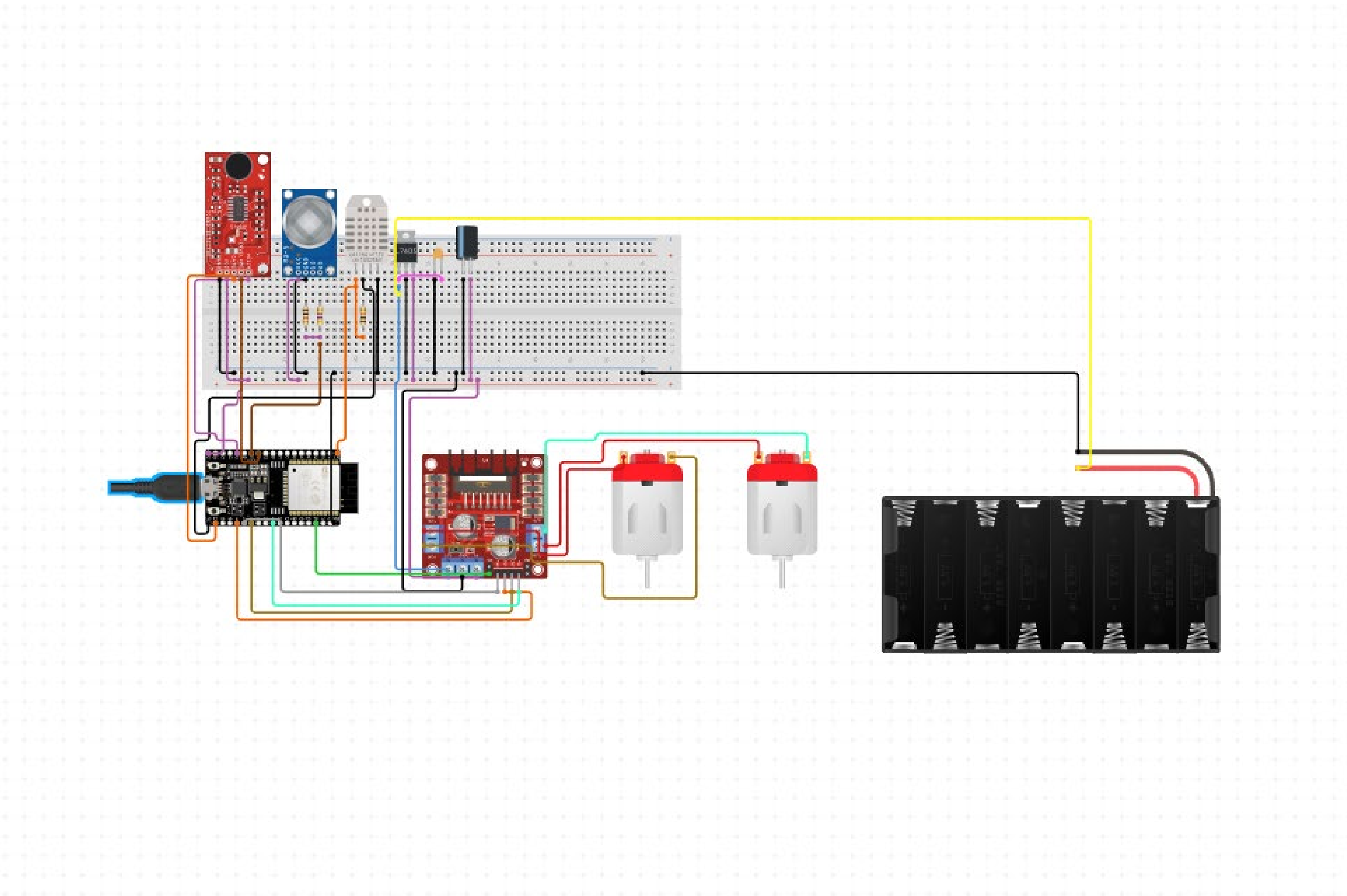


**FIGURE 3.5.1**: Schematic Circuit

### 3.6 Description of Main Component

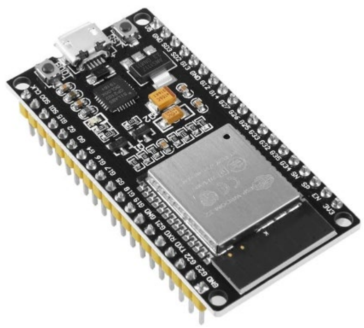


FIGURE 3.6.1: ESP32

ESP32 is powered by a dual-core tensilica Xtensa LX6 microprocessor,which runs at up to 249MHz.It also as a floating-point unit (FPU) for efficient numerical processing.Offers built-in 2.4GHz Wi-Fi connectivity,supporting both 802.11b/g/n and 802.11ac standardsThe board has a number of General-Purpose Input/Output (GPIO) pins,which can be used to connect and control various external devices and sensors


FIGURE 3.6.2: ESP32-CAM

The ESP32-CAM is a compact, low-power camera module based on the ESP32. It includes an OV2640 camera and an inbuilt TF card slot. The ESP32-CAM may be utilised in a variety of sophisticated IoT applications, including wireless video monitoring, WiFi picture upload, QR identification, and so on.

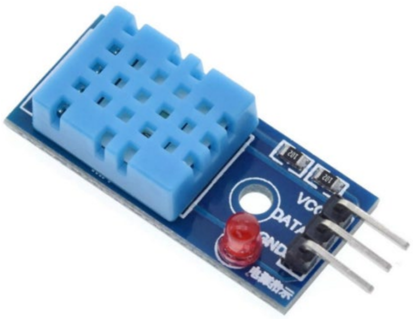


FIGURE 3.6.3: DHT11 SENSOR

The DHT11 is a simple and inexpensive digital temperature and humidity sensor. It measures the ambient air with a capacitive humidity sensor and a thermistor and outputs a digital signal on the data pin (no analogue input connections are required).

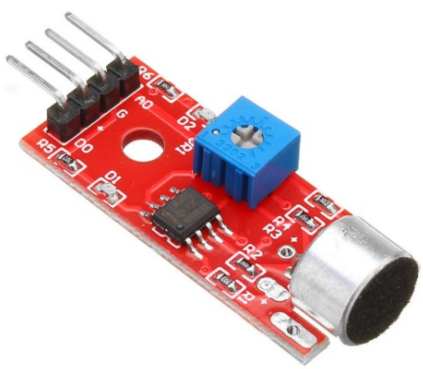


FIGURE 3.6.4: SOUND SENSOR

A sound sensor is a basic, low-cost gadget that detects sound waves as they pass through the air. It can also quantify its strength and, most significantly, transform it to an electrical signal that we can read using a microcontroller.


FIGURE 3.6.5: GAS SENSOR

beneficial for detecting gas leaks (in the house and in industrial). It is appropriate for detecting H2, LPG, CH4, CO, and alcohol. Measurements may be conducted as quickly as feasible because to its high sensitivity and quick reaction time. The potentiometer may be used to modify the sensor's sensitivity.

FIGURE 3.6.6: DC MOTOR

an electric machine that transforms electrical energy into mechanical energy. Direct current motors use direct current to convert electrical power into mechanical rotation.

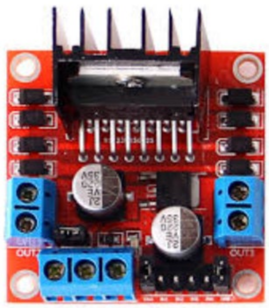


FIGURE 3.6.7: L298N MOTOR DRIVER

a dual H-Bridge motor driver that controls the speed and direction of two DC motors at the same time. The module can power DC motors with voltages ranging from 5 to 35V and peak currents of up to 2A.

### 3.5.1 PROJECT STRUCTURE BUILDING

i. **Wiring Connection**

Connect the wiring for each component according to the schematic diagram that has been designed.

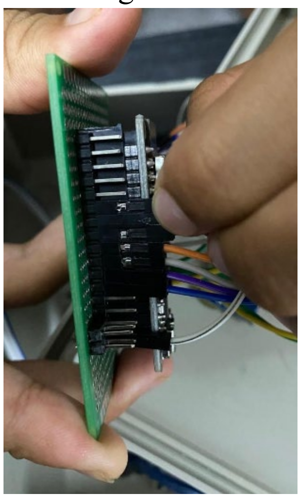


**FIGURE 3.5.2.1 : Wiring Connection**

ii. **Casing**

Place all of the components inside the case and glue them together to make it seem neater.

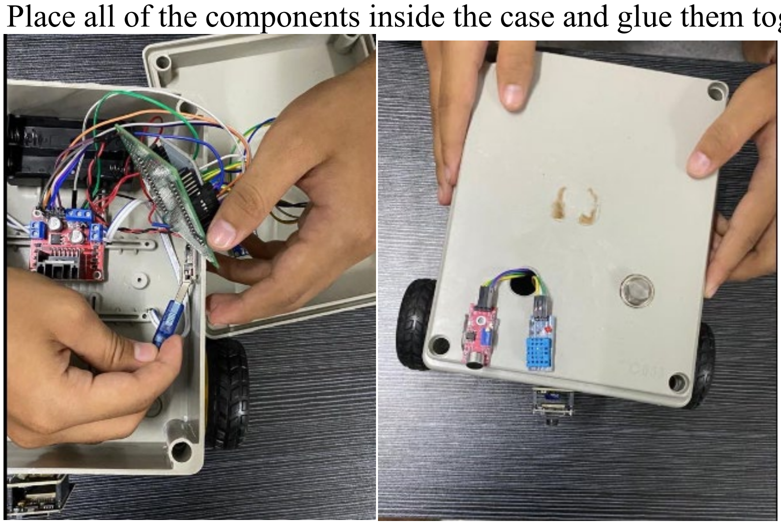


**FIGURE 3.5.3.1 : Casing Process**

### 3.5.2 PROJECT MOVING MECHANISM

i. **Arduino Uno board**

We employed a wheel base for movement with two DC motors to provide movement assistance for the project mechanism.Choosing a material tyre appropriate wheels depends on the size, weight, and anticipated terrain of your robot. Consider things like traction, diameter, and substance. Depending on the use and area, you may choose normal wheels, off-road wheels, or even custom wheels.

**FIGURE 3.5.4.1.: down look robot**

### 3.5.3 CODING AND PROGRAMMING

Coding is the process of translating codes from one language to another. It may also be regarded a subset of programming because it implements the first steps of programming. It is necessary to write programming in a range of languages as directed. The machine can only understand machine code, sometimes known as binary language, and cannot converse with people. A coder's primary responsibility is to translate requirements into machine-readable language. Coders must be fluent in the working language of the project. However, they generally code in line with the project's standards and directives. This is the first stage in creating a software product. Programming is the process of creating a machine-level executable programme that can be executed without mistake. It is the practise of developing formal codes to maintain the consistency of human inputs and machine outputs.The first stage involves the creation of code, which is then analysed and applied to provide the necessary machine level output.

It also includes all of the key factors, including debugging, compilation, testing, and implementation. To create the appropriate machine outputs, programmers must analyse and grasp the different communication components. The Arduino Integrated Development Environment (IDE) is used to generate Arduino programming. The Arduino IDE is a computer application that allows you to create sketches (Arduino slang for programmes) for numerous Arduino boards. Processing, a relatively simple hardware programming language akin to C, is the foundation of the Arduino programming language. The sketch should be uploaded to the Arduino board for execution after being written in the Arduino IDE.

**FIGURE 3.5.5.1:** Arduino Software

CODING FOR SENSOR AND MOVEMENT ROBOT

```
#define BLYNK_TEMPLATE_ID "TMPL6JK9loHYZ"
#define BLYNK_TEMPLATE_NAME "Human Detection Robot"
#define BLYNK_AUTH_TOKEN "LLTY1K0IcRmG2fDwfgunZSQeOS6rTLHU"

#define BLYNK_PRINT Serial
#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>
#include "DHT.h"
#define DHTPIN 4
#define DHTTYPE DHT11

char ssid[] = "HUMAN";
char pass[] = "12345678";

int motor1Pin1 = 27;
int motor1Pin2 = 26;
int motor2Pin1 = 14;
int motor2Pin2 = 25;

int gasSen = 35;
int micSen = 32;

int pwmMotor = 185;
const int motorPin = 33;
const int freq = 5000;
const int ledChannel = 0;
const int resolution = 8;

DHT dht(DHTPIN, DHTTYPE);
BlynkTimer timer;

BLYNK_WRITE(V8)
{
  int pinValue = param.asInt();
  Serial.println(pinValue);
  pwmMotor = pinValue;
  ledcWrite(ledChannel, pwmMotor);
}

BLYNK_WRITE(V1)
{
  int pinValue = param.asInt();
```

```
  Serial.println(pinValue);
  if (pinValue == 1) {
    forward();
  }
  else {
    stopp();
  }
}

BLYNK_WRITE(V2)
{
  int pinValue = param.asInt();
  Serial.println(pinValue);
  if (pinValue == 1) {
    backward();
  }
  else {
    stopp();
  }
}

BLYNK_WRITE(V3)
{
  int pinValue = param.asInt();
  Serial.println(pinValue);
  if (pinValue == 1) {
    left();
  }
  else {
    stopp();
  }
}

BLYNK_WRITE(V0)
{
  int pinValue = param.asInt();
  Serial.println(pinValue);
  if (pinValue == 1) {
    right();
  }
  else {
    stopp();
  }
}
```

```
void setup() {
  Serial.begin(115200);
  ledcSetup(ledChannel, freq, resolution);
  ledcAttachPin(motorPin, ledChannel);
  dht.begin();
  pinMode(motor1Pin1, OUTPUT);
  pinMode(motor1Pin2, OUTPUT);
  pinMode(motor2Pin1, OUTPUT);
  pinMode(motor2Pin2, OUTPUT);
  pinMode(gasSen, INPUT);
  pinMode(micSen, INPUT);
  ledcWrite(ledChannel, pwmMotor);
  Blynk.begin(BLYNK_AUTH_TOKEN, ssid, pass);
  Blynk.virtualWrite(V8, pwmMotor);
  timer.setInterval(1500L, myTimerEvent);
}

void myTimerEvent() {
  float h = dht.readHumidity();
  float t = dht.readTemperature();
  if (isnan(h) || isnan(t)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }
  int gas = analogRead(gasSen);
  int mic = analogRead(micSen);

  Serial.println(String(h) + "  " + t + "  " + gas + "  " + mic);

  Blynk.virtualWrite(V4, h);
  Blynk.virtualWrite(V5, t);
  Blynk.virtualWrite(V6, gas);
  Blynk.virtualWrite(V7, mic);
}

void loop()
{
  Blynk.run();
  timer.run(); // Initiates BlynkTimer
}

void backward() {
  digitalWrite(motor1Pin1, LOW);
  digitalWrite(motor1Pin2, HIGH);
  digitalWrite(motor2Pin1, LOW);
```

```
  digitalWrite(motor2Pin2, HIGH);
}

void forward() {
  digitalWrite(motor1Pin1, HIGH);
  digitalWrite(motor1Pin2, LOW);
  digitalWrite(motor2Pin1, HIGH);
  digitalWrite(motor2Pin2, LOW);
}

void right() {
  digitalWrite(motor1Pin1, HIGH);
  digitalWrite(motor1Pin2, LOW);
  digitalWrite(motor2Pin1, LOW);
  digitalWrite(motor2Pin2, HIGH);
}

void left() {
  digitalWrite(motor1Pin1, LOW);
  digitalWrite(motor1Pin2, HIGH);
  digitalWrite(motor2Pin1, HIGH);
  digitalWrite(motor2Pin2, LOW);
}

void stopp() {
  digitalWrite(motor1Pin1, LOW);
  digitalWrite(motor1Pin2, LOW);
  digitalWrite(motor2Pin1, LOW);
  digitalWrite(motor2Pin2, LOW);
}
```

```
}
        } else {
          _jpg_buf_len = fb->len;
          _jpg_buf = fb->buf;
        }
      }
    }
    if(res == ESP_OK){
      size_t hlen = snprintf((char *)part_buf, 64, _STREAM_PART, _jpg_buf_len);
      res = httpd_resp_send_chunk(req, (const char *)part_buf, hlen);
    }
    if(res == ESP_OK){
      res = httpd_resp_send_chunk(req, (const char *)_jpg_buf, _jpg_buf_len);
    }
    if(res == ESP_OK){
      res = httpd_resp_send_chunk(req, _STREAM_BOUNDARY, strlen(_STREAM_BOUNDARY));
    }
    if(fb){
      esp_camera_fb_return(fb);
      fb = NULL;
      _jpg_buf = NULL;
    } else if(_jpg_buf){
      free(_jpg_buf);
      _jpg_buf = NULL;
    }
    if(res != ESP_OK){
      break;
    }
    //Serial.printf("MJPG: %uB\n",(uint32_t)(_jpg_buf_len));
  }
  return res;
}

void startCameraServer(){
  httpd_config_t config = HTTPD_DEFAULT_CONFIG();
  config.server_port = 80;

  httpd_uri_t index_uri = {
    .uri       = "/",
    .method    = HTTP_GET,
    .handler   = stream_handler,
    .user_ctx  = NULL
```

```
  };

  //Serial.printf("Starting web server on port: '%d'\n", config.server_port);
  if (httpd_start(&stream_httpd, &config) == ESP_OK) {
    httpd_register_uri_handler(stream_httpd, &index_uri);
  }
}

void setup() {
  WRITE_PERI_REG(RTC_CNTL_BROWN_OUT_REG, 0); //disable brownout detector

  Serial.begin(115200);
  Serial.setDebugOutput(false);

  camera_config_t config;
  config.ledc_channel = LEDC_CHANNEL_0;
  config.ledc_timer = LEDC_TIMER_0;
  config.pin_d0 = Y2_GPIO_NUM;
  config.pin_d1 = Y3_GPIO_NUM;
  config.pin_d2 = Y4_GPIO_NUM;
  config.pin_d3 = Y5_GPIO_NUM;
  config.pin_d4 = Y6_GPIO_NUM;
  config.pin_d5 = Y7_GPIO_NUM;
  config.pin_d6 = Y8_GPIO_NUM;
  config.pin_d7 = Y9_GPIO_NUM;
  config.pin_xclk = XCLK_GPIO_NUM;
  config.pin_pclk = PCLK_GPIO_NUM;
  config.pin_vsync = VSYNC_GPIO_NUM;
  config.pin_href = HREF_GPIO_NUM;
  config.pin_sscb_sda = SIOD_GPIO_NUM;
  config.pin_sscb_scl = SIOC_GPIO_NUM;
  config.pin_pwdn = PWDN_GPIO_NUM;
  config.pin_reset = RESET_GPIO_NUM;
  config.xclk_freq_hz = 20000000;
  config.pixel_format = PIXFORMAT_JPEG;

  if(psramFound()){
    config.frame_size = FRAMESIZE_UXGA;
    config.jpeg_quality = 10;
    config.fb_count = 2;
  } else {
    config.frame_size = FRAMESIZE_SVGA;
    config.jpeg_quality = 12;
    config.fb_count = 1;
  }
```

```
  // Camera init
  esp_err_t err = esp_camera_init(&config);
  if (err != ESP_OK) {
    Serial.printf("Camera init failed with error 0x%x", err);
    return;
  }
  // Wi-Fi connection
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");

  Serial.print("Camera Stream Ready! Go to: http://");
  Serial.print(WiFi.localIP());

  // Start streaming web server
  startCameraServer();
}

void loop() {
  delay(1);
}
```

### 3.5.4 APPLICATION SOFTWARE

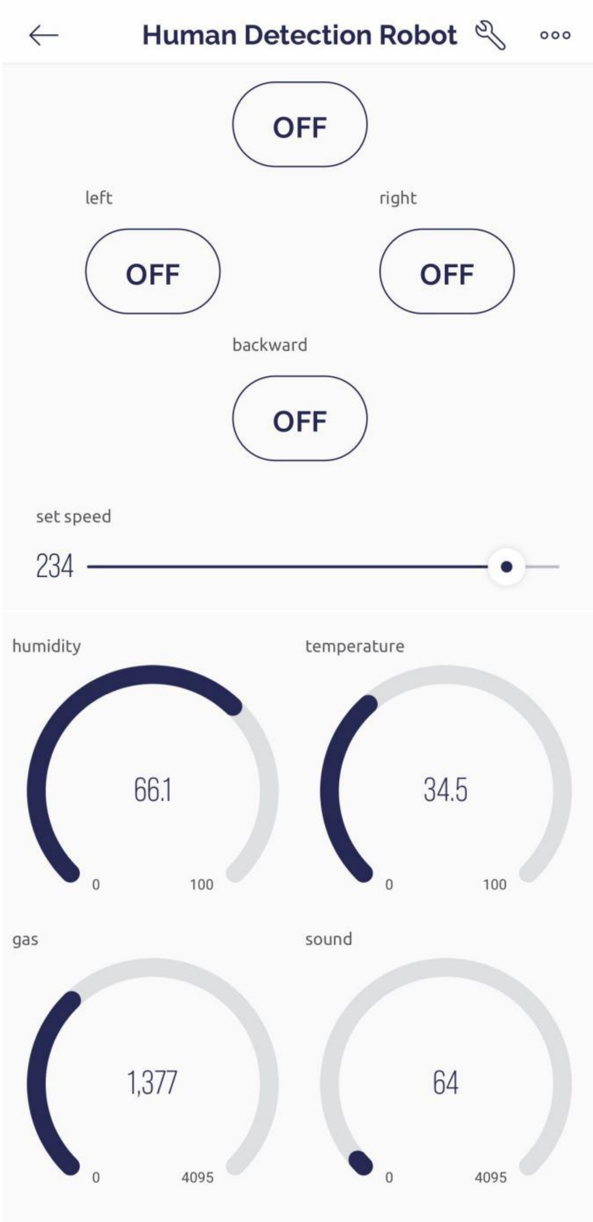
Blynk is a popular Internet of Things (IoT) platform that allows you to create apps that control and monitor linked devices. It includes a smartphone app and a cloud-based server that make it simple to create IoT projects. The following are some significant features of the Blynk application software:

Blynk is a mobile app development platform that enables you to design customised interfaces for managing and monitoring IoT devices. The mobile app has an easy-to-use interface where you can create dashboards with various widgets such as buttons, sliders, graphs, and displays.Widget Configuration: Blynk offers a variety of pre-built widgets that you can customise and add to your mobile app interface. These widgets can be tied to certain IoT device functionalities or capabilities. A button widget, for example, may be used to switch on/off a connected device, while a graph widget can display real-time sensor data.Blynk supports a wide range of hardware platforms and communication protocols, making it simple to integrate your IoT devices with the Blynk platform. Blynk offers libraries and documentation for popular hardware platforms like as Arduino, Raspberry Pi, ESP8266, and others. These libraries can be used to establish connection between your devices and the Blynk cloud server.Blynk's cloud server serves as a link between the mobile app and the connected devices. It is in charge of communication, data storage, and synchronisation between the mobile app and IoT devices. The server establishes a secure internet connection with the devices, allowing you to control and monitor them remotely.

Data Visualisation and Logging: Blynk lets you see real-time sensor data from your IoT devices using widgets such as graphs and displays. Historical data may also be logged and stored on the Blynk server for subsequent analysis and visualisation.messages and Event Handling: Because Blynk enables event handling, you may trigger certain actions or send messages depending on certain situations. For example, you may configure an event to send a push notice to your mobile app if a sensor value surpasses a certain threshold.Blynk offers APIs and interfaces with popular third-party services such as IFTTT (If This Then That) and Zapier. This lets you to link your IoT devices to other platforms and services, allowing you to automate and communicate with other systems.Blynk maintains the security of your IoT applications by offering secure connections, data encryption, and user authentication. It accepts a variety of authentication methods, including email/password, social login, and token-based authentication.You can easily design intuitive mobile applications to control and monitor your IoT devices with the Blynk application platform, providing seamless engagement and automation in your IoT projects.

**FIGURE 3.5.6.1:** Application Software

## 3.7 THE FINISHING PROJECT



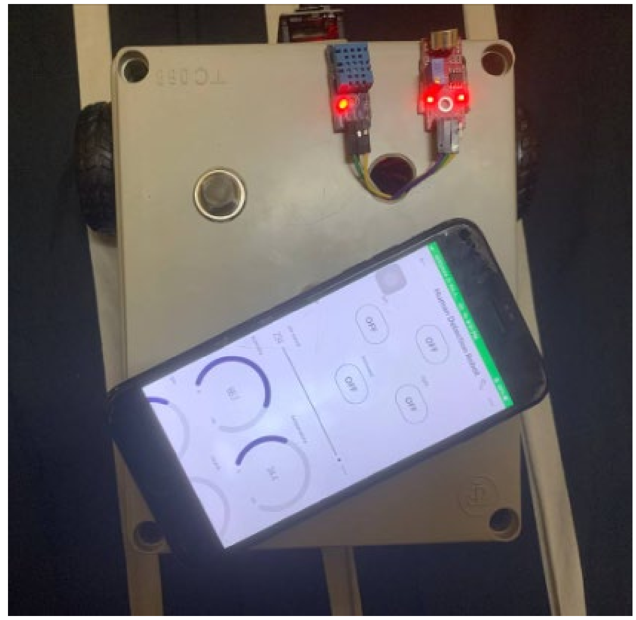



**FIGURE 3.6.1:** Project Final Look

## 3.8 PROJECT BUDGET

Table below shows the amount of money spent to purchase the materials needed to produce the project.

| Items | Units | Price (per unit) |
|---|---|---|
| ESP32 | 1 unit | RM 39.00 |
| ESP32-CAM with USB Connectivity | 1 unit | RM 58.00 |
| DHT 11 SENSOR | 1 unit | RM 8.00 |
| MQ5 GAS SENSOR | 1 unit | RM 9.00 |
| SOUND SENSOR | 1 unit | RM 8.90 |
| DC MOTOR | 2 unit | RM 6.00 |
| L298N MOTOR DRIVER | 1 unit | RM 10.00 |
| BATTERY | 2 pieces | RM 16.00 |
| TOTAL | | RM 154.90 |

**TABLE 3.7.1:** Project Budget

## 3.9 SUMMARY

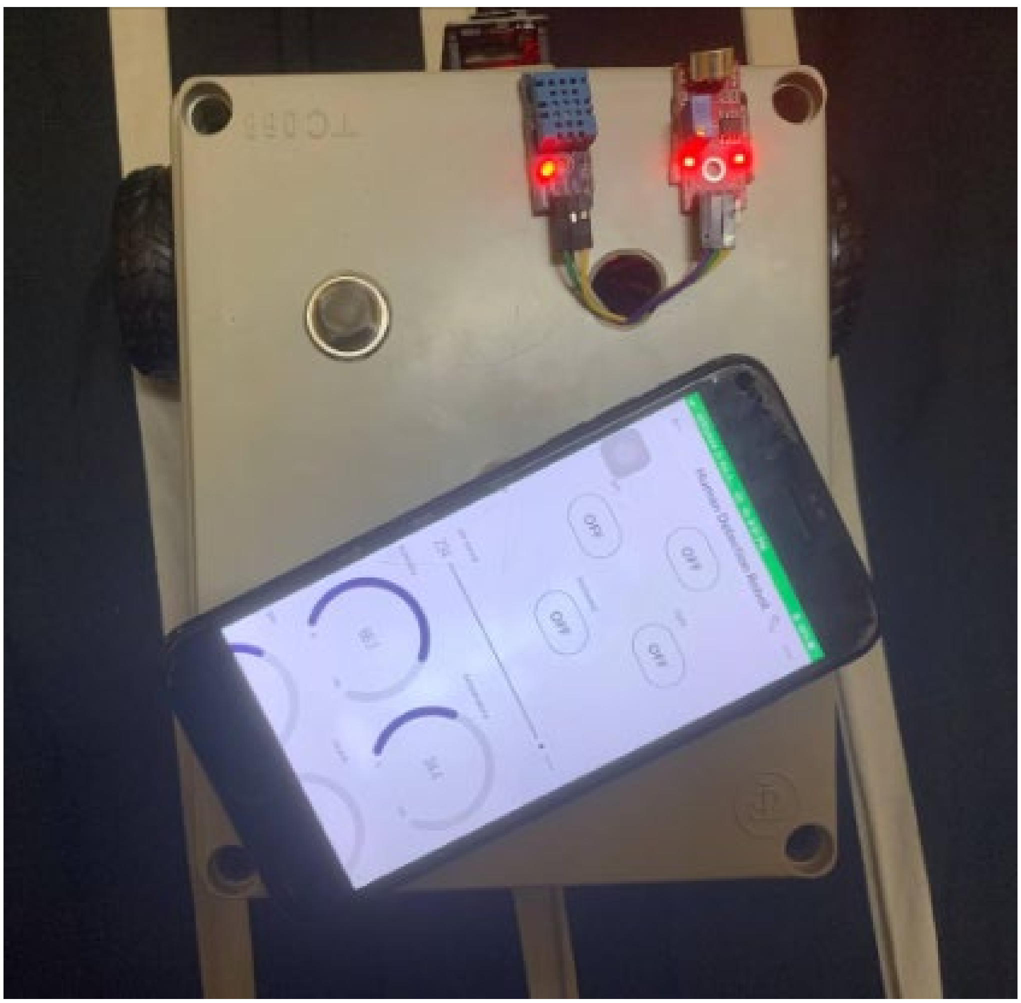
At the end of this chapter, a detailed diagram of how I built the Human Detection Robot was provided.We also conducted a poll before choosing the equipment and supplies on Shopee, Lazada, and at several hardware stores to get the best products at a fair project budget.

# CHAPTER 4

# ANALYSIS DATA & DISCUSSIONS

## 4.1 INTRODUCTION

This chapter will explain about the importance of doing data analysis before planning a project. We have collected some data while using Human Detection Robot. Not only that, doing discussion from the analyzed data is also very useful because there is where we learn and improve our thinking to determine the materials for the project. On the other hand, ensuring safety measures is the must element that have been considered while doing the project.



## 4.2 RESPONDENT OPINION

RESULTS FROM GOOGLE FORM

Have you ever been in a position when you were in danger and no one could help you?

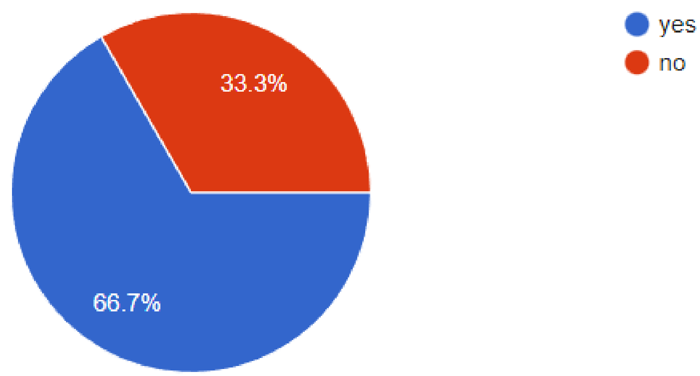



FIGURE 4.2.1:Have you ever been in a position when you were in danger and no one could help you?

What are your thoughts on the use of human detecting robot technology to identify presence and aid in the rescue of individuals in emergency situations?

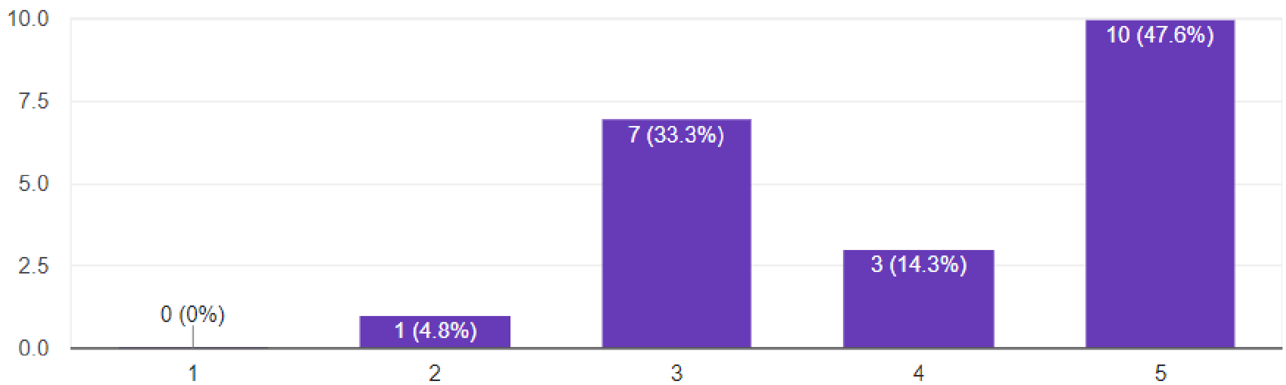



FIGURE 4.2.2:What are your thoughts on the use of human detecting robot technology to identify presence and aid in the resuce of individuals in emergency situations?

Do you worry about your privacy and security if a human-detecting robot can watch and detect activity around you?

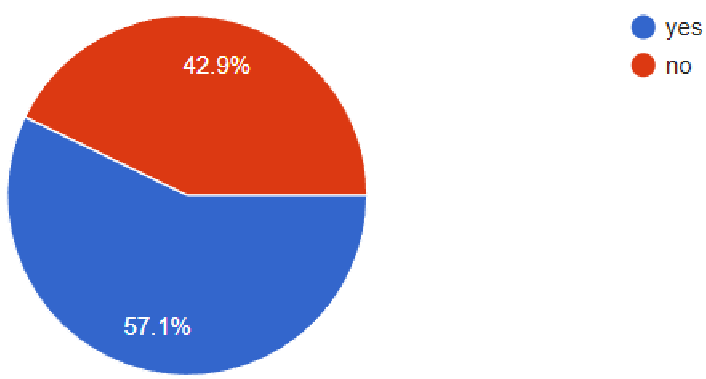



FIGURE 4.2.3: Do you worry about your privacy and security if a human-detecting robot can watch and detect activity around you?

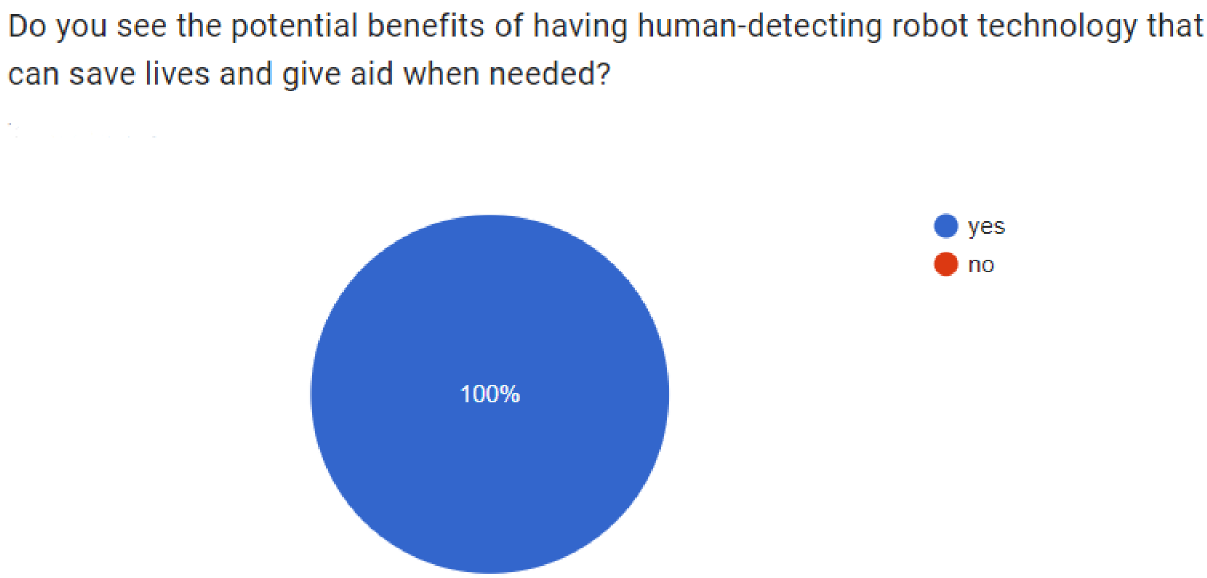



FIGURE 4.2.4: Do you see the potential benefits of having human-detecting robot technology that can save lives and give aid when needed?

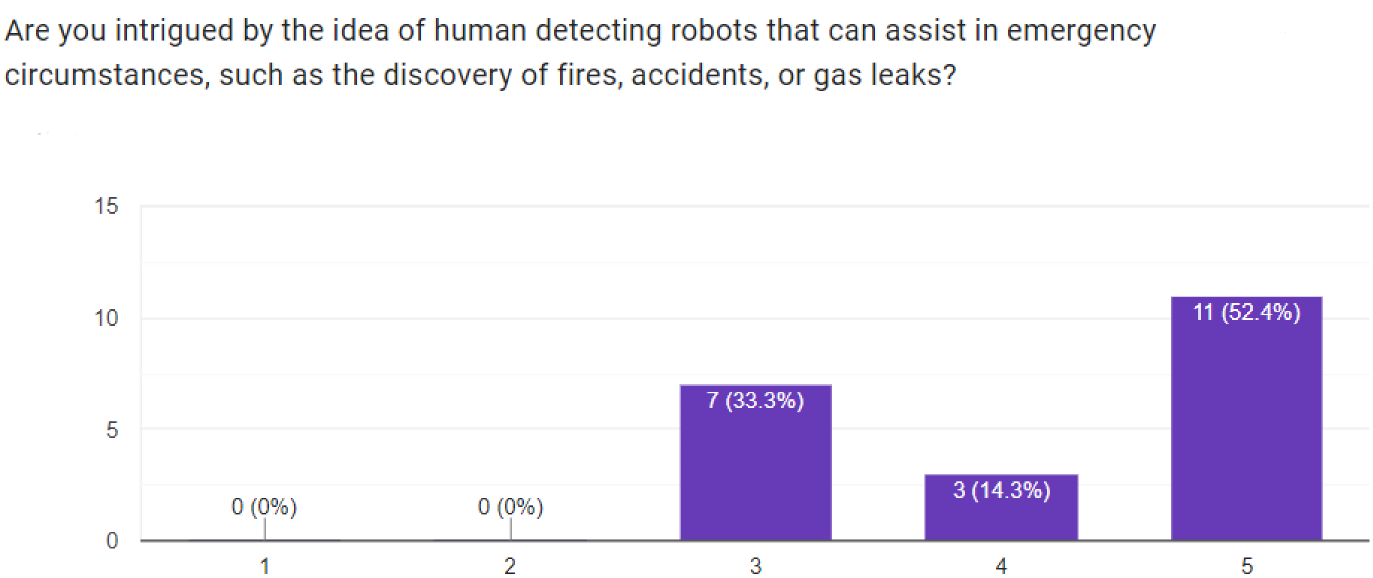



FIGURE 4.2.5: Are you intrigued by the idea of human detecting robots that can assists in emergency circumstances,such as the discovery of fires,accidents,or gas leaks?

How do you handle a scenario in which you require quick assistance and there is no one available to assist you?

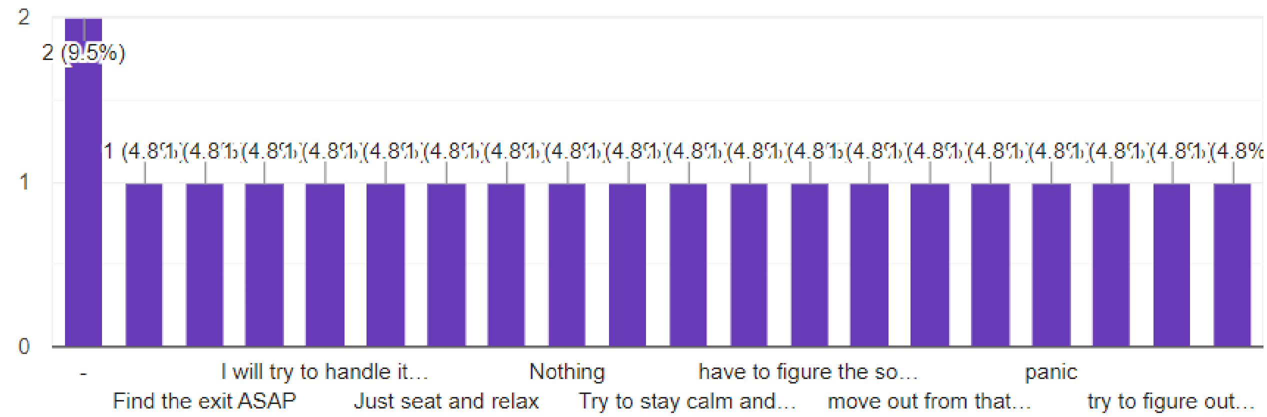



FIGURE 4.2.6: How do you handle a scenario in which you require quick assistance and there is no one available to assist you ?

## 4.3 SUMMARY

The study of data acquired from the human detection robot demonstrates the detection algorithm's accuracy in properly recognising human presence. The data comprises the number of true positives (humans correctly recognised), false positives (humans wrongly identified), true negatives (non-humans accurately identified), and false negatives (missed human detections). Precision, recall, and F1 score are accuracy measures used to evaluate the detection algorithm's performance.To quantify advancements or highlight areas of concern, the analytical data may be compared to established benchmarks or earlier iterations of the human detecting robot. This enables the robot's capabilities to be refined and improved iteratively.The data analysis focuses on the performance of the robot in various environmental situations. It covers evaluations of the detection algorithm's resilience in different lighting situations, the presence of barriers or crowded settings, and the effect of background noise or interference on human detection accuracy. The research identifies any places where environmental adaptation might be improved.The analysis data for a human detecting robot reveals information about its performance, strengths, limitations, and opportunities for improvement. It is used to make educated judgements and to enhance the detection algorithms, tracking systems, environmental adaptability, response speed, and general dependability of the robot.

# CHAPTER 5
# CONCLUSION

## 5.1 INTRODUCTION

In order to reach a conclusion on the project, this chapter discusses the project's existing architecture as well as its limitations and future improvement plans. The purpose of the project constraint is to make the project's capability clear. The suggestions for upgrading plans are intended to maintain the significance and advantages of our project for the intended users.

## 5.2 PROJECT LIMITATION

A human detecting robot's effectiveness can be impacted by external variables such as illumination, weather, the presence of barriers, or congested settings. The accuracy of human detection can be impacted by poor illumination or occlusions, resulting in false positives or false negatives.Human detection might be limited by the quality and capability of the sensors utilised in the robot. The accuracy and reliability of recognising humans in various settings can be affected by sensor range, resolution, sensitivity, and noise levels. Sensor limitations might result in missing detections or inaccurate identification.The placement and capability of the robot's sensors may place restrictions on its field of vision. As a result, just a portion of the surroundings may be covered, perhaps omitting human existence beyond the vision. Delays in detection and reaction may occur because the robot must move or spin because of the small field of vision.When designing and implementing a human detecting robot, it's crucial to take these constraints into account. The effectiveness and dependability of human detecting robots may be improved by addressing these issues through continuous research, algorithm upgrades, sensor breakthroughs, and system optimisation.

## 5.3 CONCLUSION

In conclusion, there are a number of constraints that need to be taken into account while developing and using human detecting robots. Environmental considerations, sensor limits, human appearance variations, real-time processing restrictions, false alarms, a small field of vision, resilience to position and orientation, and integration with navigation and interactivity are some of these restrictions. Understanding these constraints is essential for creating technologies and tactics that can address these issues and boost the efficiency and dependability of human detecting robots. We may work towards developing more effective and efficient human detection systems for a variety of applications, including search and rescue, surveillance, and human-robot interaction, by addressing these constraints via continuing research and development.

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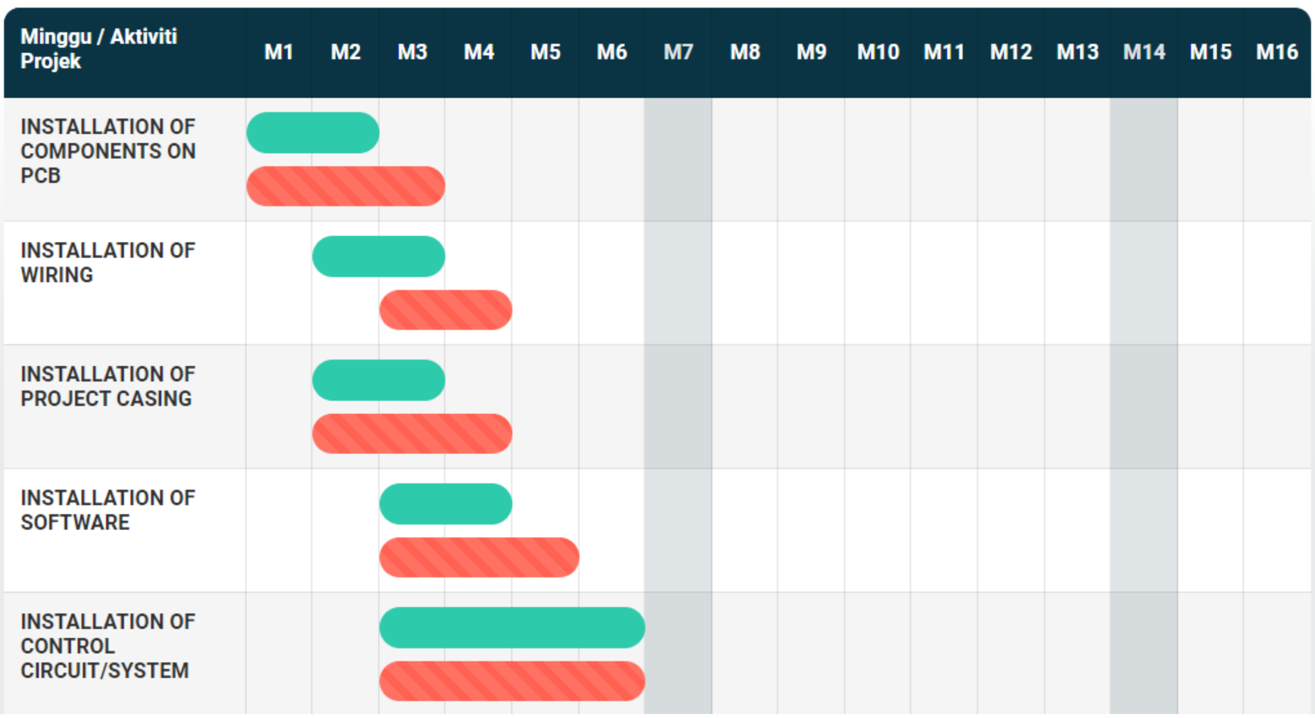
# APPENDIX A – GANTT CHART

**CARTA GANTT : PERANCANGAN DAN PELAKSANAAN PROJEK PELAJAR**

**SESI : 2 : 2022/2023**
**JABATAN: JKE**
**KODKURSUS: DEE50102**
**TAJUK PROJEK : HUMAN DETECTION ROBOT**



TEST THE ELECTRONIC PART
TEST THE MECHANICAL PART
TEST THE OVERALL PROCESS/PROJECT
PREPARATION OF SLIDE PRESENTATION
PREPARATION OF LOGBOOK
PREPARATION OF PROJECT 2 FINAL REPORT
PREPARATION OF INSTRUCTION MANUAL
Perancangan
Pelaksanaan
Cetak Carta Gantt