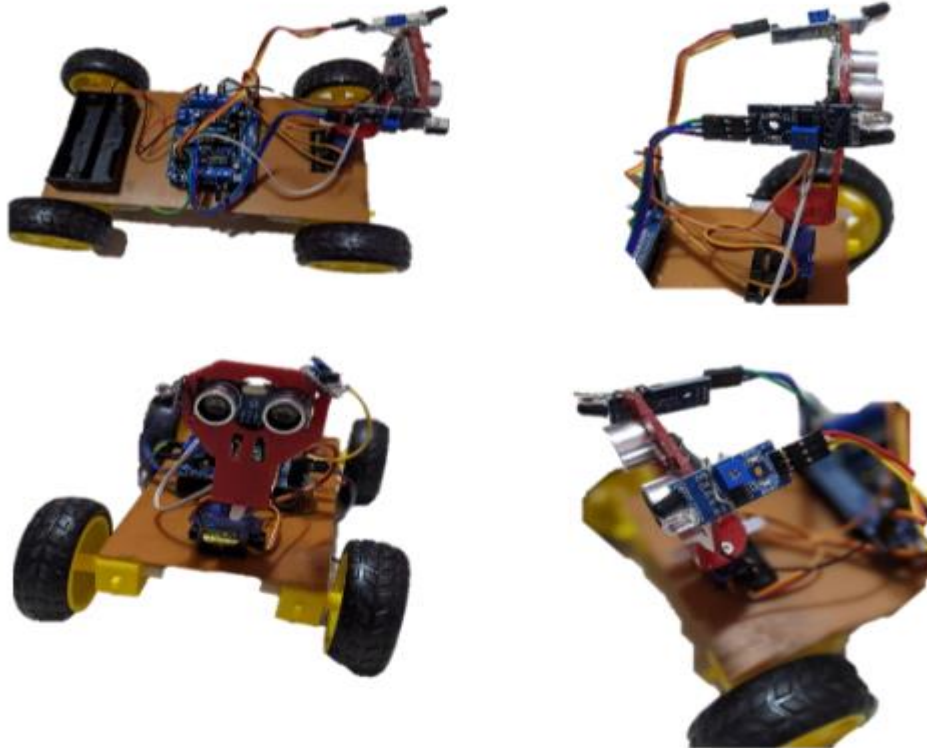
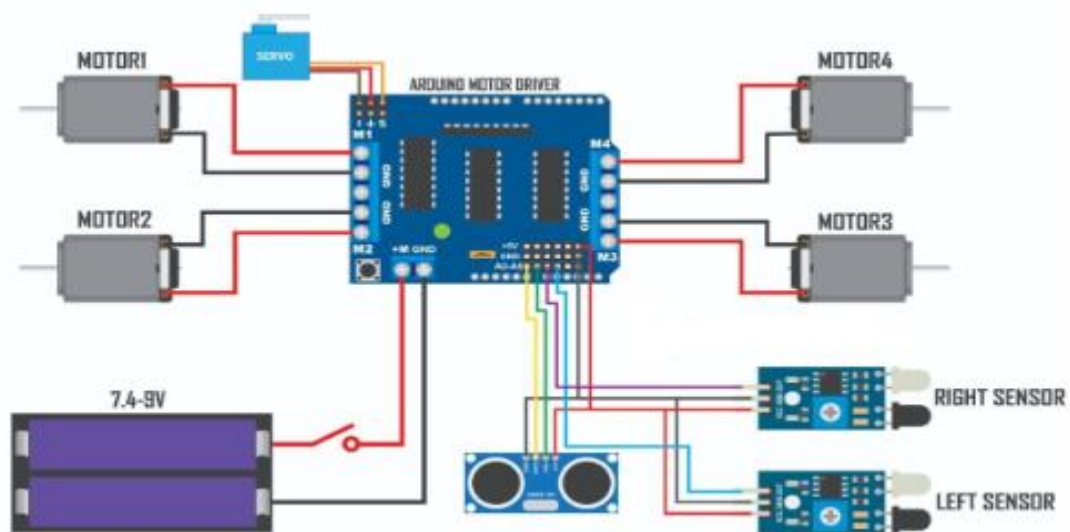


hand following robot

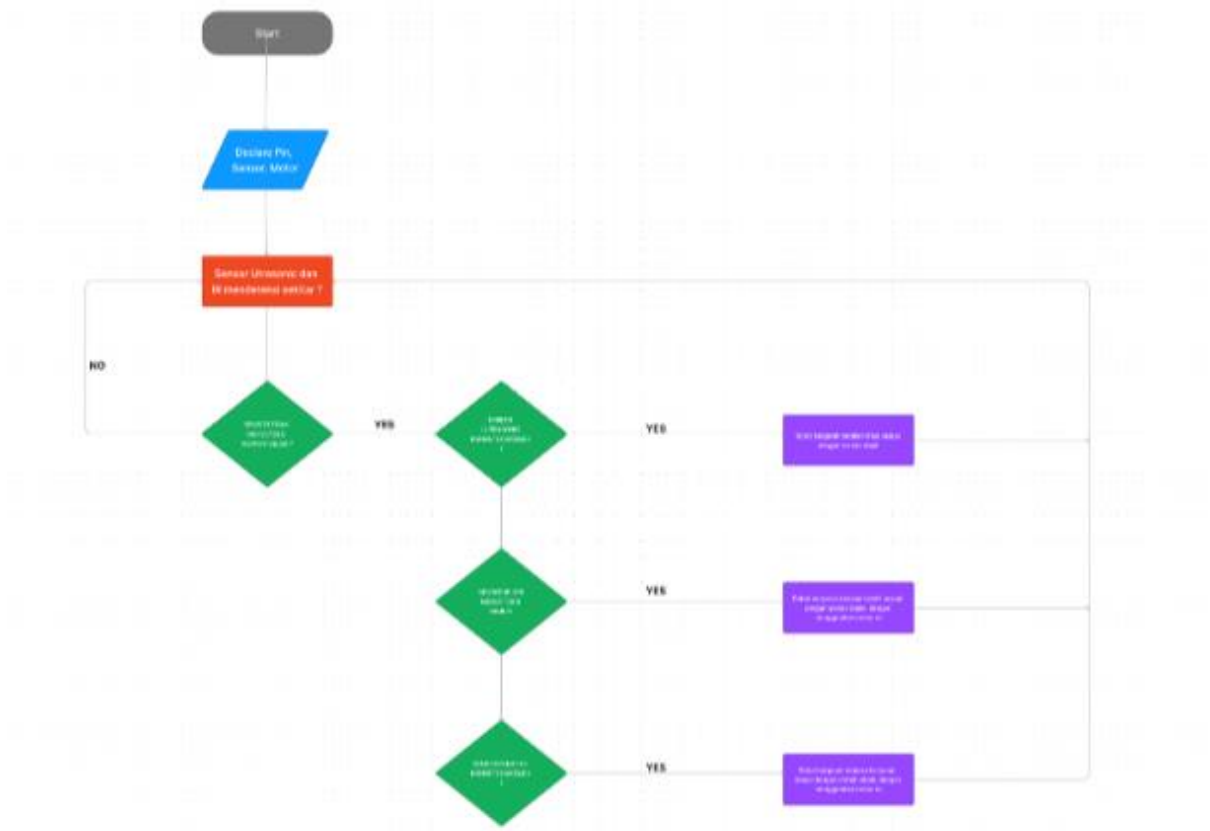
- Design Robot Hand following



- Schematic



- Flowchart Hand Following Robot



Detail check this,

<https://www.figma.com/file/u2iWA7Ts7eZNOSN0ztmMWU/Untitled?type=whiteboard&node-id=0-1>

- Arduino code Hand Following Robot

```

• //Arduino Human Following Robot
• // Created By DIY Builder
• // You have to install the AFMotor and NewPing library Before Uploading
  the sketch
• // You can find all the required libraris from arduino library manager.
• // Contact me on instagram for any query(Insta Id : diy.builder)
• // Modified 7 Mar 2022
• // Version 1.1
•
• //include the library code:
• #include<NewPing.h>
• #include<Servo.h>
• #include<AFMotor.h>
•

```

```

• #define RIGHT A2          // Right IR sensor connected to analog
  pin A2 of Arduino Uno:
• #define LEFT A3          // Left IR sensor connected to analog pin
  A3 of Arduino Uno:
• #define TRIGGER_PIN A1   // Trigger pin connected to analog pin A1
  of Arduino Uno:
• #define ECHO_PIN A0      // Echo pin connected to analog pin A0 of
  Arduino Uno:
• #define MAX_DISTANCE 500 // Maximum ping distance:
•
• unsigned int distance = 100; //Variable to store ultrasonic sensor
  distance:
• unsigned int Right_Value = 100; //Variable to store Right IR sensor
  value:
• unsigned int Left_Value = 100; //Variable to store Left IR sensor
  value:
•
•
• NewPing sonar(TRIGGER_PIN, ECHO_PIN, MAX_DISTANCE); //NewPing setup of
  pins and maximum distance:
•
• //create motor objects
• 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; //create servo object to control the servo:
• int pos=0;      //variable to store the servo position:
•
• void setup() { // the setup function runs only once when power on the
  board or reset the board:
•
•   Serial.begin(9600); //initailize serial communication at 9600 bits
  per second:
•   myservo.attach(10); // servo attached to pin 10 of Arduino UNO
•   {
•   for(pos = 90; pos <= 180; pos += 1){ // goes from 90 degrees to 180
  degrees:
•     myservo.write(pos); //tell servo to move according
  to the value of 'pos' variable:
•     delay(15); //wait 15ms for the servo to
  reach the position:
•   }
•   for(pos = 180; pos >= 0; pos-= 1) { // goes from 180 degrees to 0
  degrees:
•     myservo.write(pos); //tell servo to move according
  to the value of 'pos' variable:

```

```

•   delay(15);                                //wait 15ms for the servo to
reach the position:
•   }
•   for(pos = 0; pos<=90; pos += 1) {          //goes from 180 degrees to 0
degrees:
•       myservo.write(pos);                    //tell servo to move according
to the value of 'pos' variable:
•       delay(15);                             //wait 15ms for the servo to
reach the position:
•   }
•   }
•   pinMode(RIGHT, INPUT); //set analog pin RIGHT as an input:
•   pinMode(LEFT, INPUT);  //set analog pin RIGHT as an input:
•   }
•
•   // the lope function runs forever
•   void loop() {
•
•   delay(50);                                //wait 50ms between
pings:
•   distance = sonar.ping_cm();                //send ping, get
distance in cm and store it in 'distance' variable:
•   Serial.print("distance");
•   Serial.println(distance);                  // print the distance
in serial monitor:
•
•       Right_Value = digitalRead(RIGHT);      // read the value
from Right IR sensor:
•       Left_Value = digitalRead(LEFT);        // read the value
from Left IR sensor:
•
•   Serial.print("RIGHT");
•   Serial.println(Right_Value);               // print the right IR
sensor value in serial monitor:
•   Serial.print("LEFT");
•   Serial.println(Left_Value);                //print the left IR
sensor value in serial monitor:
•
•   if((distance > 1) && (distance < 15)){       //check wheather the
ultrasonic sensor's value stays between 1 to 15.
•
•                                           //If the condition is
'true' then the statement below will execute:
•       //Move Forward:
•       Motor1.setSpeed(130); //define motor1 speed:
•       Motor1.run(FORWARD);  //rotate motor1 clockwise:
•       Motor2.setSpeed(130); //define motor2 speed:
•       Motor2.run(FORWARD);  //rotate motor2 clockwise:
•       Motor3.setSpeed(130); //define motor3 speed:

```

```

• Motor3.run(FORWARD); //rotate motor3 clockwise:
• Motor4.setSpeed(130); //define motor4 speed:
• Motor4.run(FORWARD); //rotate motor4 clockwise:
•
• }else if((Right_Value==0) && (Left_Value==1)) { //If the condition is
  'true' then the statement below will execute:
•
• //Turn Left
• Motor1.setSpeed(150); //define motor1 speed:
• Motor1.run(FORWARD); //rotate motor1 clockwise:
• Motor2.setSpeed(150); //define motor2 speed:
• Motor2.run(FORWARD); //rotate motor2 clockwise:
• Motor3.setSpeed(150); //define motor3 speed:
• Motor3.run(BACKWARD); //rotate motor3 anticlockwise:
• Motor4.setSpeed(150); //define motor4 speed:
• Motor4.run(BACKWARD); //rotate motor4 anticlockwise:
• delay(150);
•
• }else if((Right_Value==1)&&(Left_Value==0)) { //If the condition is
  'true' then the statement below will execute:
•
• //Turn Right
• Motor1.setSpeed(150); //define motor1 speed:
• Motor1.run(BACKWARD); //rotate motor1 anticlockwise:
• Motor2.setSpeed(150); //define motor2 speed:
• Motor2.run(BACKWARD); //rotate motor2 anticlockwise:
• Motor3.setSpeed(150); //define motor3 speed:
• Motor3.run(FORWARD); //rotate motor3 clockwise:
• Motor4.setSpeed(150); //define motor4 speed:
• Motor4.run(FORWARD); //rotate motor4 clockwise:
• delay(150);
•
• }else if(distance > 15) { //If the condition
  is 'true' then the statement below will execute:
•
• //Stop
• Motor1.setSpeed(0); //define motor1 speed:
• Motor1.run(RELEASE); //stop motor1:
• Motor2.setSpeed(0); //define motor2 speed:
• Motor2.run(RELEASE); //stop motor2:
• Motor3.setSpeed(0); //define motor3 speed:
• Motor3.run(RELEASE); //stop motor3:
• Motor4.setSpeed(0); //define motor4 speed:
• Motor4.run(RELEASE); //stop motor4:
• }
• }
•

```

- Working principle of hand-following robot

1. Starting: The hand following the robot program or system is started.
2. Declaration of Pins, Sensors, and Motors: This stage involves the declaration and configuration of pins, ultrasonic sensors, infrared sensors, and DC motors that will be used in the system. Pins are used to connect these components with a controller or microcontroller.
3. Ultrasonic and Infrared sensors detect around The system checks whether ultrasonic sensors and infrared sensors detect objects around them.
4. No object detection by sensor: If no object is detected by sensor ultrasonic and infrared, the system will assume that there are no objects nearby.
5. The sensor does not detect the presence of an object: If the sensor does not detect the presence of an object, then the system will assume there are no objects around it.
6. Ultrasonic sensor detects an object: If the ultrasonic sensor detects an object, the system will proceed to the next step.
7. The robot moves forward according to the direction of the object: The system gives orders to the motor DC robot to move forward according to the direction of the object detected by the sensor ultrasonic. DC motor moves the robot forward.
8. Left Infrared sensor detects objects: If the infrared sensor on the left side of the robot detects an object, the system will proceed to the next step.
9. The robot moves to the left according to the direction of the object: The system gives orders to the motor DC robot to move left to avoid objects detected by sensors left infrared. DC motor moves the robot to the left.
10. Right infrared sensor detects objects: If the infrared sensor on the right side of the robot detects an object, the system will proceed to the next step.
11. The robot moves to the right according to the direction of the object: The system gives orders to robot DC motor to move to the right to avoid objects detected by right infrared sensor. DC motor moves the robot to the right.

- Documentation of the hand following robot

Click here,

<https://drive.google.com/drive/folders/1mpR0gA6eLy42m7BaUnt6F2dhHrllW7ya?usp=sharing>