ME396

AUTOMATIC FIRE TRUCK

OBJECTIVE:

1) A fire engine that autonomously spots fire within its range, approaches it then extinguishes it.
2) Our vehicle may be driven using our app if the fire is not within the radius.

BREIF ON EQUIPMENT:

1) Flame sensor
2) Water pump
3) Arduino UNO
4) Bluetooth module (HC-05)
5) LC driver
6) Motors
7) Chassis
8) Wheels
9) Water tank
10) Bread board
11) Jumper wire
12) Servo motor
13) Relay module

BREIF INTRODUCTION:

This study examines the operation of a firefighting system in great detail.

a vehicle that can be remotely driven

We utilize the open-source hardware Arduino for this, and our automobile receives instructions in the form of source code. This project functions as a fire extinguisher across a huge region in real-world settings. Whenever it notices a fire, it moves in that direction and squirts water on it.

There are three primary phases in this project:

1. Transmitting instructions for moving forward, backward, right, and left using a Bluetooth module that is connected to our automobile. The automobile therefore responds to the signals and moves as necessary.

2. Our automobile recognizes the direction of the fire and moves in that direction.

The use of flame sensors can aid with this.

3. The third and last procedure is to use a motor pump to spray water over the fire when it has been detected.

WHAT HAVE WE ACCOMPLISHED THIS SEMESTER?

1) We used MIT app developer to create a novel idea: "Voice-controlled Fire detection Truck".
2) We got close to perfection of our truck code using the "Arduino IDE" language.
3) We purchased all of the parts from online sources.

SOFTWARE USED:

1) **Arduino IDE** to program the car.
2) **MIT app developer** to make the app to control the car.

MACHINE STATUS:

1) In India automatic firefighting cars or autonomous fire suppression systems, were still in the research and development stages and had not yet become widely adopted in firefighting operations.

2) Here are some companies that are performing trails on automatic firetrucks to improve efficiency. Those are:
   Ezitracker (Australia)
   BionicHIVE (Singapore)
   Robotise (Belgium)

DESIGN CALCULATION:

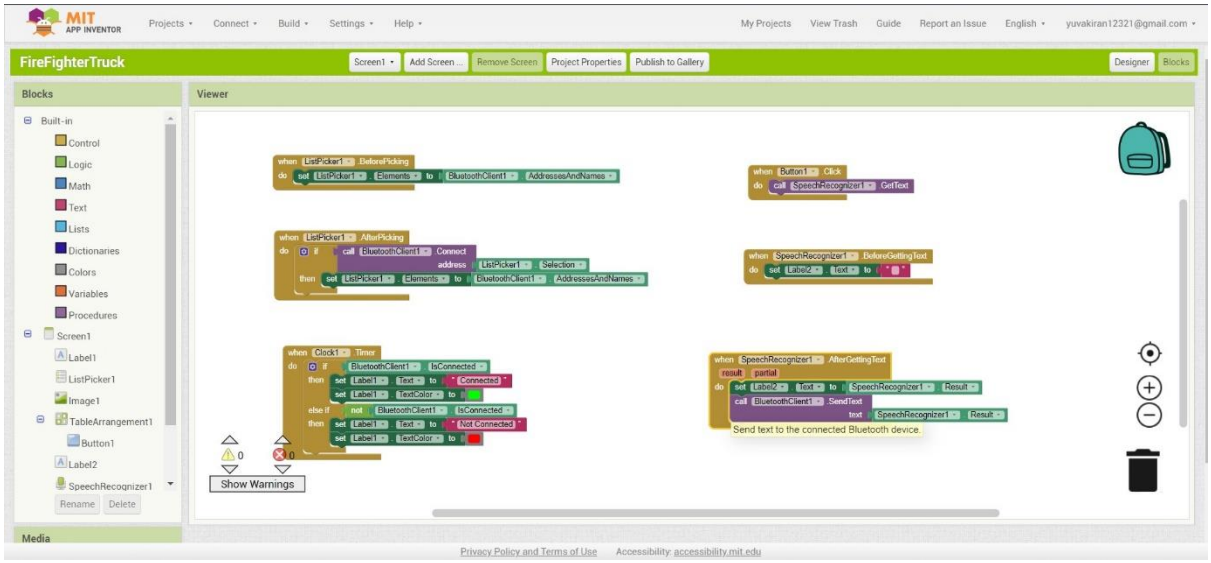
1) Wheel diameter = 5.9 cm
2) Chassis length = 28.6 cm
3) Wheel thickness = 2.6 cm
4) Track width = 16 cm
5) Wheel base = 11.4 cm
6) Chassis width = 15 cm

EXPERIMENTAL SETUP:

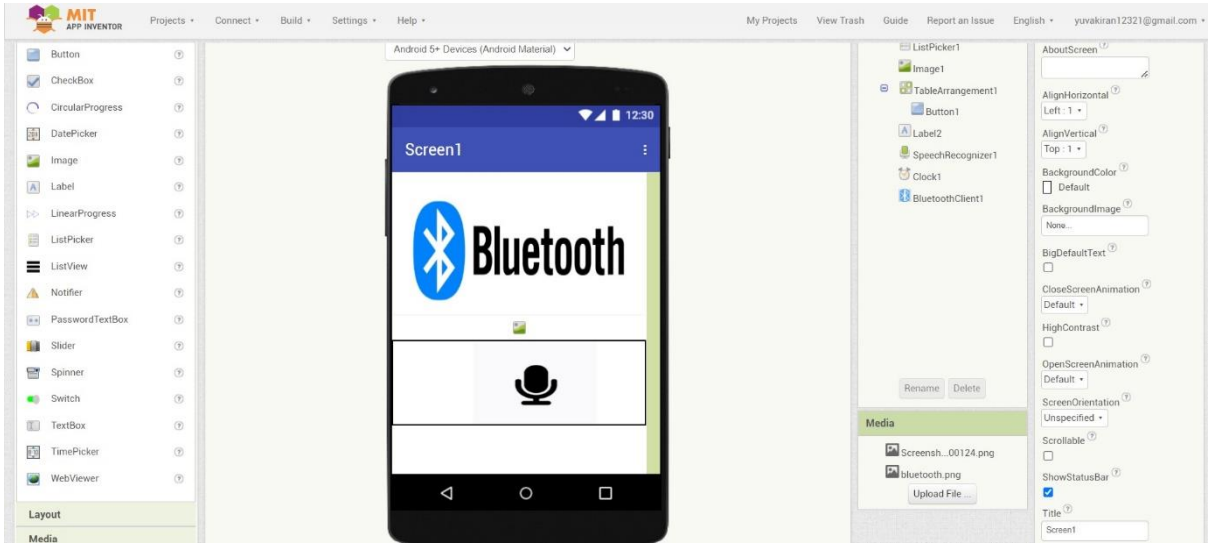
As a result, in this project, we are setting it up to put out the fire in a burning spot. However, in order for that to happen, the sensors must be able to detect the fire because their range is limited. Therefore, we are adding a remote control to it.

BUILDING OUR APP

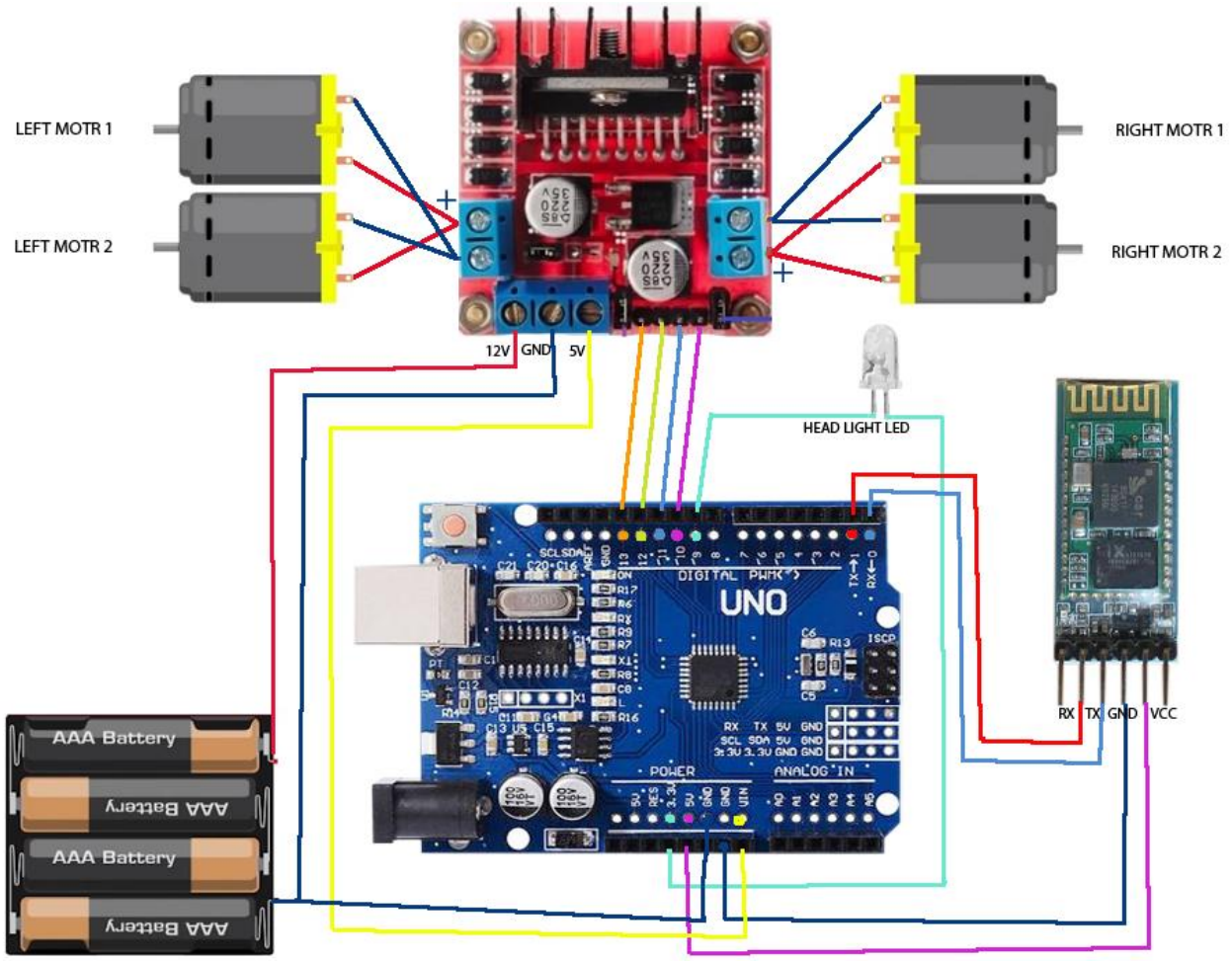
Our application's body



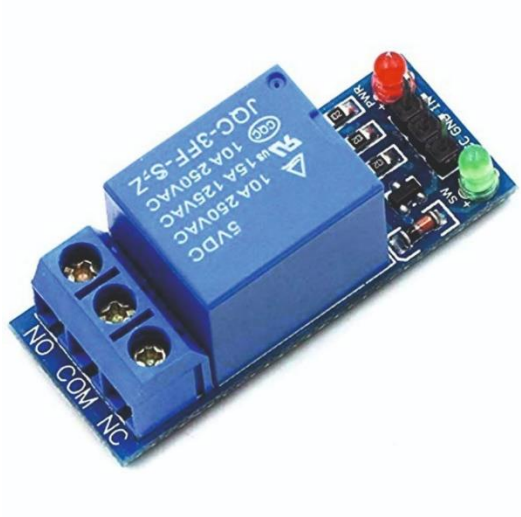
Our Application’s Design



Remote control circuit diagram



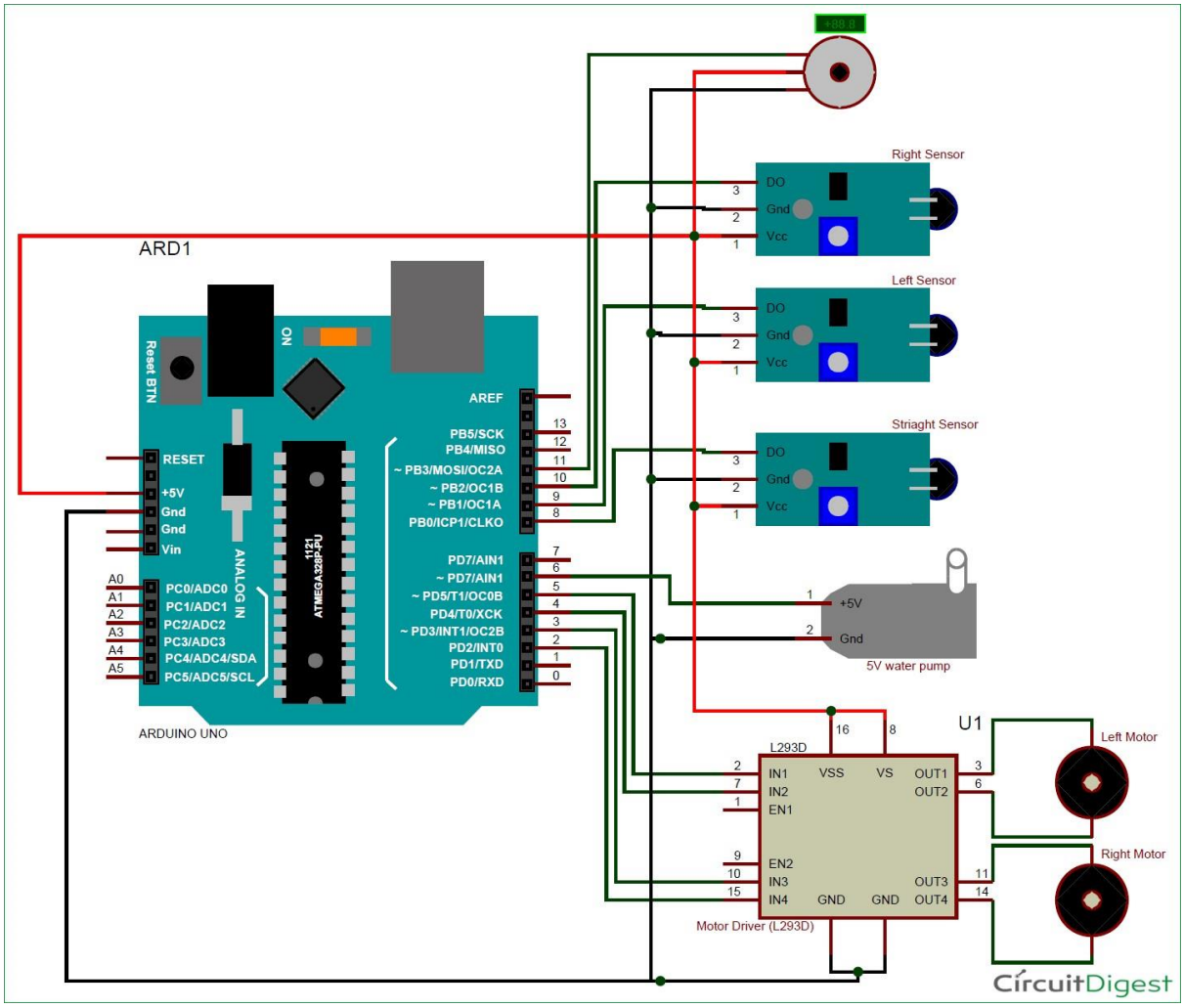
The New Parts added for this semester



Relay Module

Bluetooth Module

Automated firefighting truck circuit diagram



Logic Behind Firefighting Truck

```
void put_off_fire()
{
   delay (300);
digitalWrite(motor_input1, LOW);
digitalWrite(motor_input2, LOW);
digitalWrite(motor_input3, LOW);
digitalWrite(motor_input4, LOW);
digitalWrite(pump, LOW);
delay(400);
digitalWrite(pump,HIGH);
fire=false;
}

void loop()
{
 while(Serial.available()>0)
{
 delay(10);
char c=Serial.read();
   Serial.println(c);
   if(c=='#')
  {
     break;
   }
```

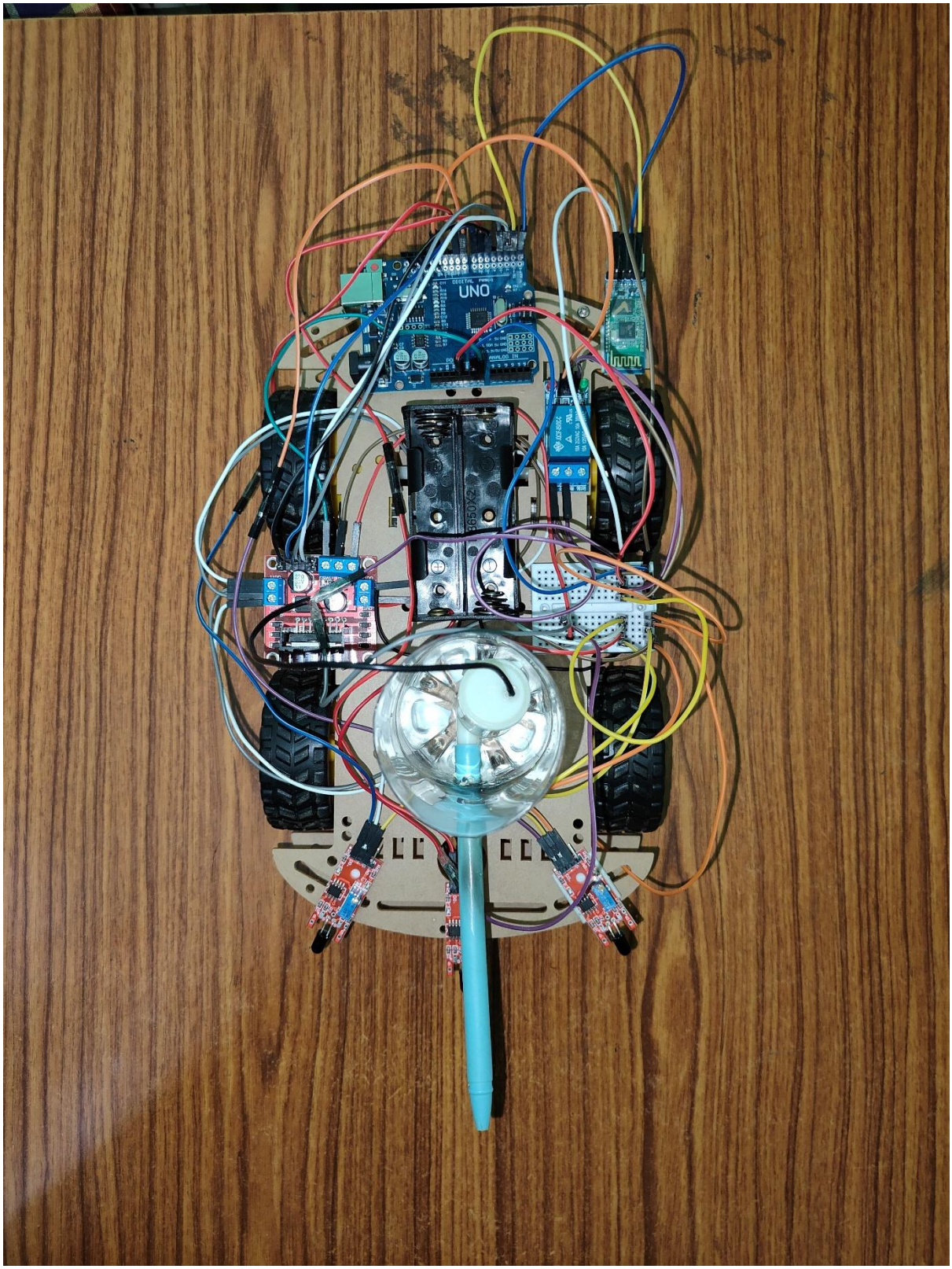
```
  voice+=c;
  }
   if(voice=="back"){
  digitalWrite(motor_input1, HIGH);
  digitalWrite(motor_input2, HIGH);
  digitalWrite(motor_input3, LOW);
  digitalWrite(motor_input4, LOW);
   delay(1500);
  }
else if(voice=="right"){
  digitalWrite(motor_input1, LOW);
  digitalWrite(motor_input2, LOW);
  digitalWrite(motor_input3, LOW);
  digitalWrite(motor_input4, HIGH);
  delay(400);}
else if(voice=="forward"){
  digitalWrite(motor_input1, LOW);
  digitalWrite(motor_input2, LOW);
  digitalWrite(motor_input3, HIGH);
  digitalWrite(motor_input4, HIGH);
  delay(1500);
  }
else if(voice=="left"){

  digitalWrite(motor_input1, LOW);
```

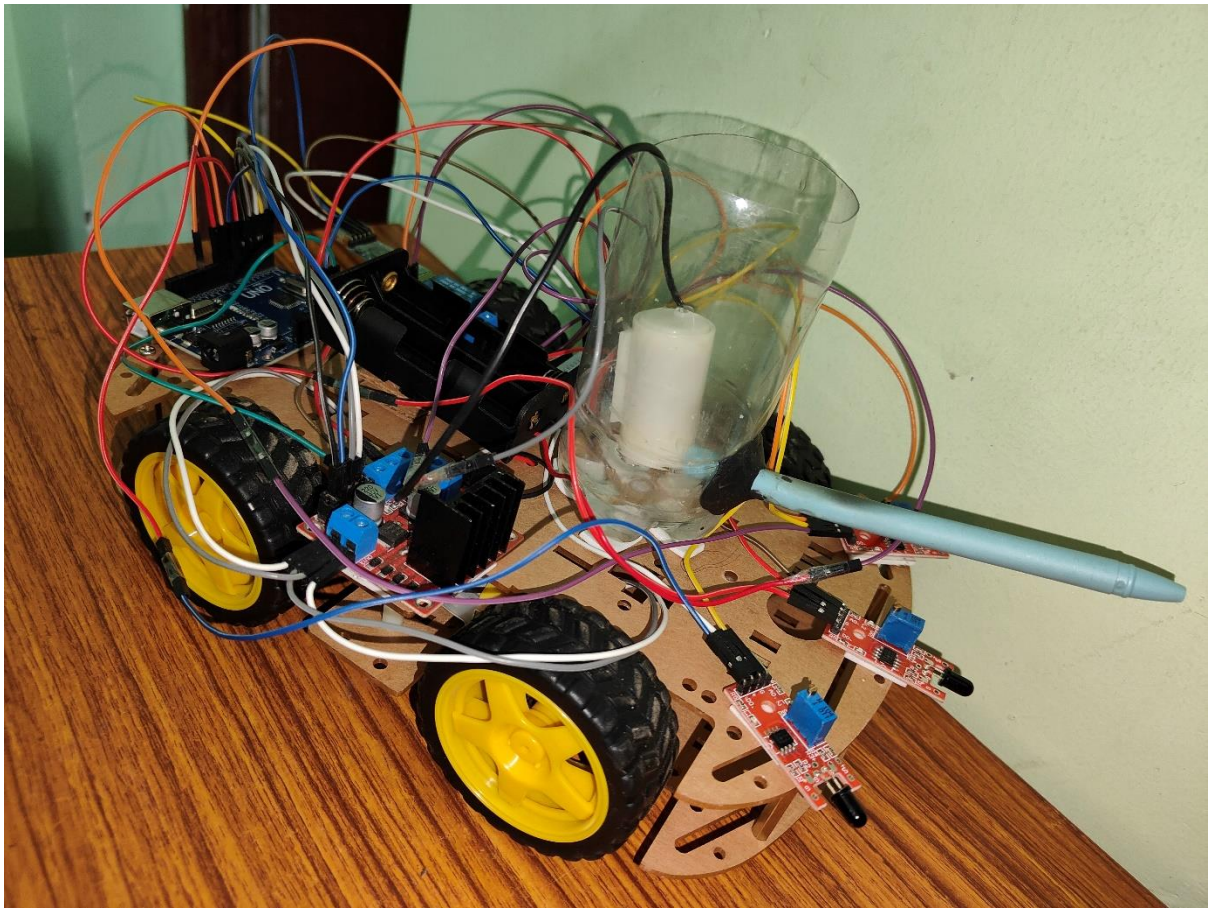
```
    digitalWrite(motor_input2, LOW);
    digitalWrite(motor_input3, HIGH);
    digitalWrite(motor_input4, LOW);
    delay(400);
    }
    else if(voice=="stop"){
    digitalWrite(motor_input1, LOW);
    digitalWrite(motor_input2, LOW);
    digitalWrite(motor_input3, LOW);
    digitalWrite(motor_input4, LOW);
    delay(400);
    }
   else
    {
    digitalWrite(motor_input1, LOW);
    digitalWrite(motor_input2, LOW);
    digitalWrite(motor_input3, LOW);
    digitalWrite(motor_input4, LOW);
    }
voice="";

flame_detected_L = digitalRead(flame_sensor_L);
flame_detected_F = digitalRead(flame_sensor_F);
flame_detected_R = digitalRead(flame_sensor_R);
if (flame_detected_L == 1)
```

```
{
Serial.println("Flame detected in left...! take action immediately.");
//Move the robot left
digitalWrite(motor_input1, LOW);
digitalWrite(motor_input2, LOW);
digitalWrite(motor_input3, HIGH);
digitalWrite(motor_input4, LOW);
delay(600);
digitalWrite(motor_input1, LOW);
digitalWrite(motor_input2, LOW);
digitalWrite(motor_input3, LOW);
digitalWrite(motor_input4, LOW);
   }
else if (flame_detected_F == 1)
{
Serial.println("Flame detected in front...! take action immediately.");
//Move the robot left
digitalWrite(motor_input1, LOW);
digitalWrite(motor_input2, LOW);
digitalWrite(motor_input3, HIGH);
digitalWrite(motor_input4, HIGH);
fire = true;
}
else if (flame_detected_R == 1)
{
```

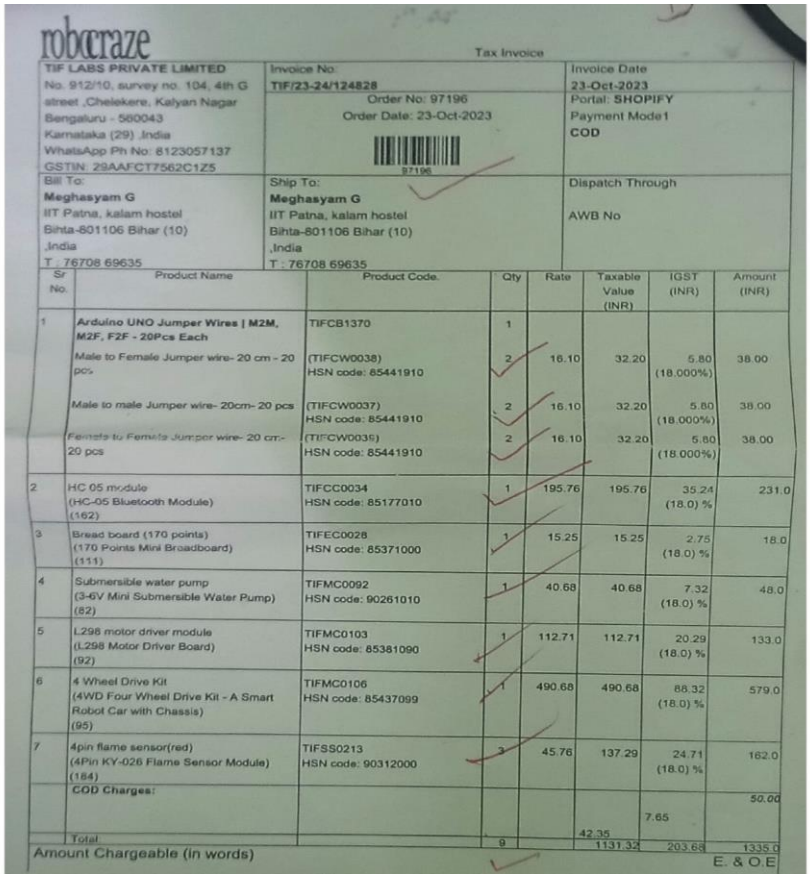
```
Serial.println("Flame detected in right...! take action immediately.");
//Move the robot left
digitalWrite(motor_input1, LOW);
 digitalWrite(motor_input2, LOW);
 digitalWrite(motor_input3, LOW);
 digitalWrite(motor_input4, HIGH);
delay(600);
digitalWrite(motor_input1, LOW);
digitalWrite(motor_input2, LOW);
digitalWrite(motor_input3, LOW);
digitalWrite(motor_input4, LOW);}
else{
digitalWrite(motor_input1, LOW);
digitalWrite(motor_input2, LOW);
digitalWrite(motor_input3, LOW);
digitalWrite(motor_input4, LOW);}
delay(100);
if(flag==0){
      delay(200);
      flag=1;  }
    delay(200); //Slow down the speed of robot
     while (fire==true)
     {
      put_off_fire();   }
}
```

IMAGES:





ECONOMICS OF OUR PROJECT



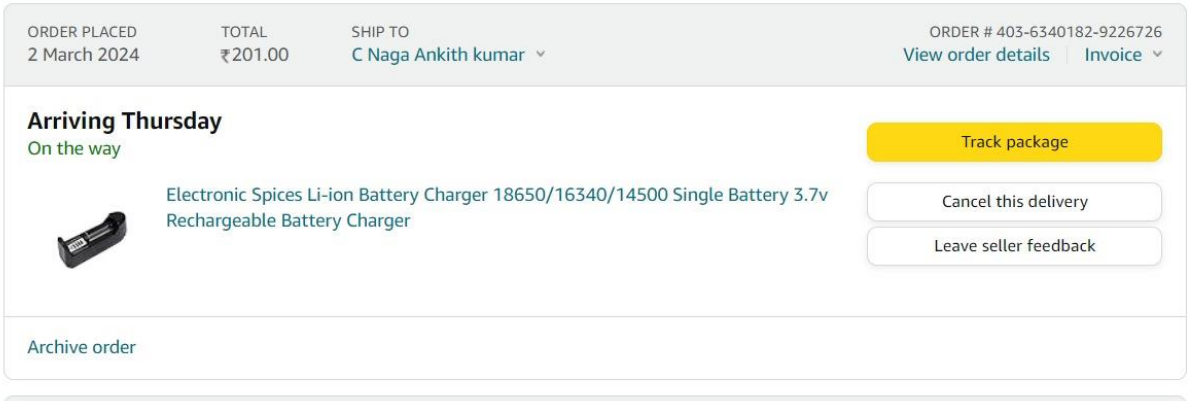
robocraze

Tax Invoice

TIF LABS PRIVATE LIMITED No. 912/10, survey no. 104, 4th G street ,Chelekere, Kalyan Nagar Bengaluru - 560043 Karnataka (29) ,India WhatsApp Ph No: 8123057137 GSTIN: 29AAFCT7562C1Z5	Invoice No: TIF/23-24/124828 Order No: 97196 Order Date: 23-Oct-2023	Invoice Date 23-Oct-2023 Portal: SHOPIFY Payment Mode1 COD
Bill To: Meghasyam G IIT Patna, kalam hostel Bihta-801106 Bihar (10) ,India T : 76708 69635	Ship To: Meghasyam G IIT Patna, kalam hostel Bihta-801106 Bihar (10) ,India T : 76708 69635	Dispatch Through AWB No

Sr No.	Product Name	Product Code.	Qty	Rate	Taxable Value (INR)	IGST (INR)	Amount (INR)
1	Arduino UNO Jumper Wires | M2M, M2F, F2F - 20Pcs Each	TIFCB1370	1				
	Male to Female Jumper wire- 20 cm - 20 pcs	(TIFCW0038) HSN code: 85441910	2	16.10	32.20	5.80 (18.000%)	38.00
	Male to male Jumper wire- 20cm- 20 pcs	(TIFCW0037) HSN code: 85441910	2	16.10	32.20	5.80 (18.000%)	38.00
	Female to Female Jumper wire- 20 cm- 20 pcs	(TIFCW0036) HSN code: 85441910	2	16.10	32.20	5.80 (18.000%)	38.00
2	HC 05 module (HC-05 Bluetooth Module) (162)	TIFCC0034 HSN code: 85177010	1	195.76	195.76	35.24 (18.0) %	231.0
3	Bread board (170 points) (170 Points Mini Broadboard) (111)	TIFEC0028 HSN code: 85371000	1	15.25	15.25	2.75 (18.0) %	18.0
4	Submersible water pump (3-6V Mini Submersible Water Pump) (82)	TIFMC0092 HSN code: 90261010	1	40.68	40.68	7.32 (18.0) %	48.0
5	L298 motor driver module (L298 Motor Driver Board) (92)	TIFMC0103 HSN code: 85381090	1	112.71	112.71	20.29 (18.0) %	133.0
6	4 Wheel Drive Kit (4WD Four Wheel Drive Kit - A Smart Robot Car with Chassis) (95)	TIFMC0106 HSN code: 85437099	1	490.68	490.68	88.32 (18.0) %	579.0
7	4pin flame sensor(red) (4Pin KY-026 Flame Sensor Module) (184)	TIFSS0213 HSN code: 90312000	3	45.76	137.29	24.71 (18.0) %	162.0
	COD Charges!					7.65	50.00
	Total:		9		42.35 1131.32	203.68	1335.0

Amount Chargeable (in words) E. & O.E



ORDER PLACED 2 March 2024 | TOTAL ₹201.00 | SHIP TO C Naga Ankith kumar | ORDER # 403-6340182-9226726 | View order details | Invoice

Arriving Thursday

On the way

Track package

Electronic Spices Li-ion Battery Charger 18650/16340/14500 Single Battery 3.7v Rechargeable Battery Charger

Cancel this delivery

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ORDER PLACED 2 March 2024 | TOTAL ₹558.00 | SHIP TO C Naga Ankith kumar | ORDER # 403-2656930-0871567 | View order details | Invoice

Arriving 11 March - 14 March

Track package

Micro USB Compatible with VIPOW VIP 3000 MaH Battery (Pack of 2)...

View or edit order

Write a product review

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REFERENCE:

1) Bluetooth Controlled Car | Arduino Project Hub
2) DIY Arduino Based Fire Fighting Robot Project with Code and Circuit Diagram (circuitdigest.com)
3) India's Favourite Robotics and DIY Store – Robocraze

MENTOR: DR. SOMNATH SARANGI

REPORT DONE BY :

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