

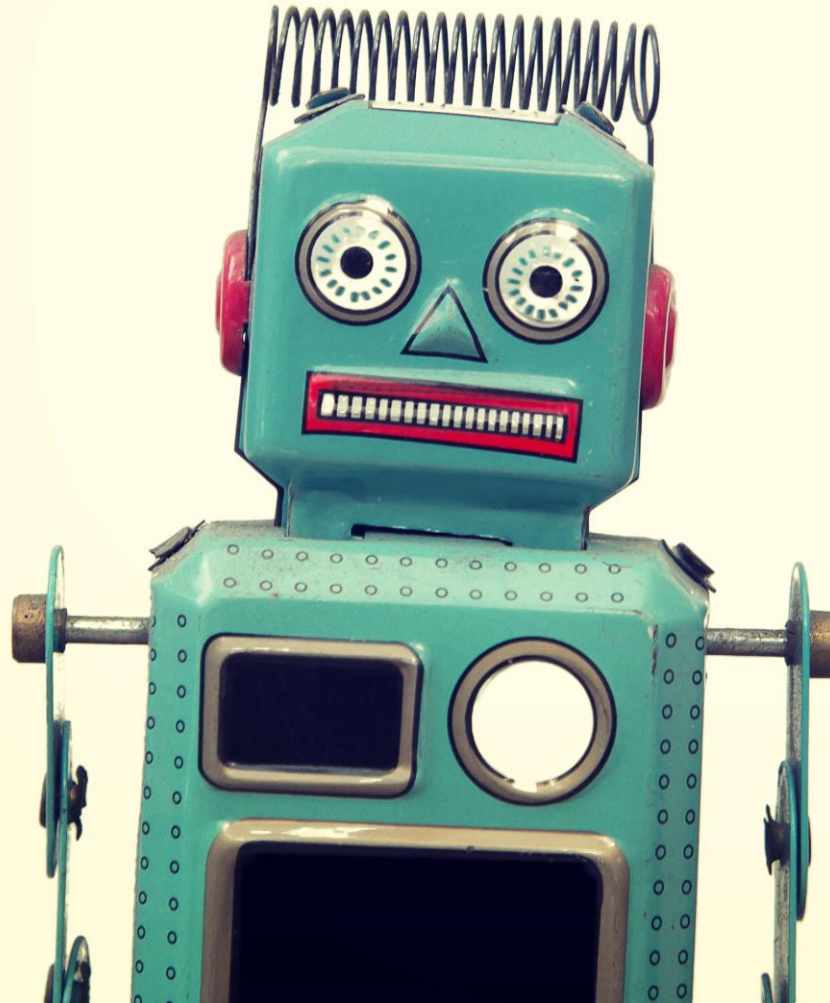


Sumo Robot

Technical REPORT

RADIANTS TEAM

The Project Description

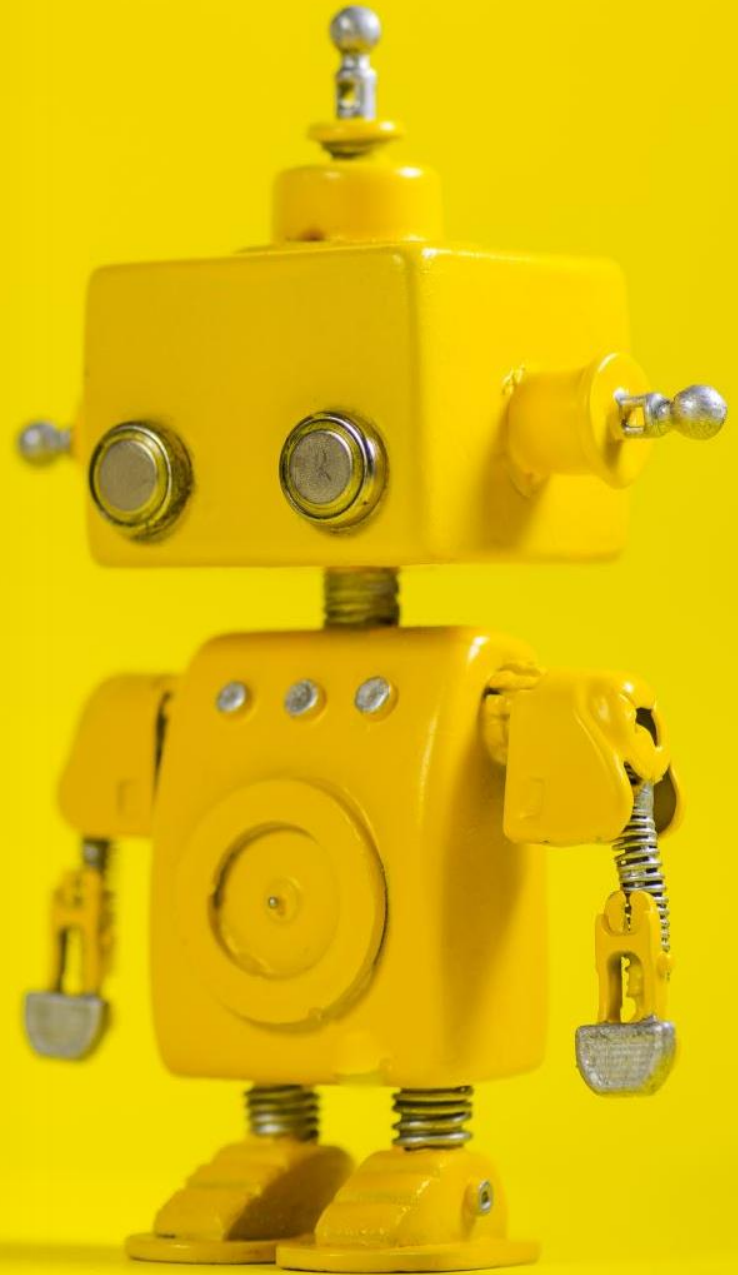


The Project Description

An autonomous vehicle (Robot) that compete with other robots of the same type in a sumo wrestling match. This requires a robotic vehicle capable of sensing impact on every side, distinguishing between frontal impact and impact to the side or rear, and detecting the sumo ring's boundary line, reacting to these stimuli in an intelligent manner.

The robot has to display intelligent behavior by attempting to the competitor Robot out of the ring while being careful not to leave the ring itself. Balancing these goals is the key to the game. The robot must rely on limited sensory and must react as quickly as possible to changes in the environment

SUMO Robot Competition Description

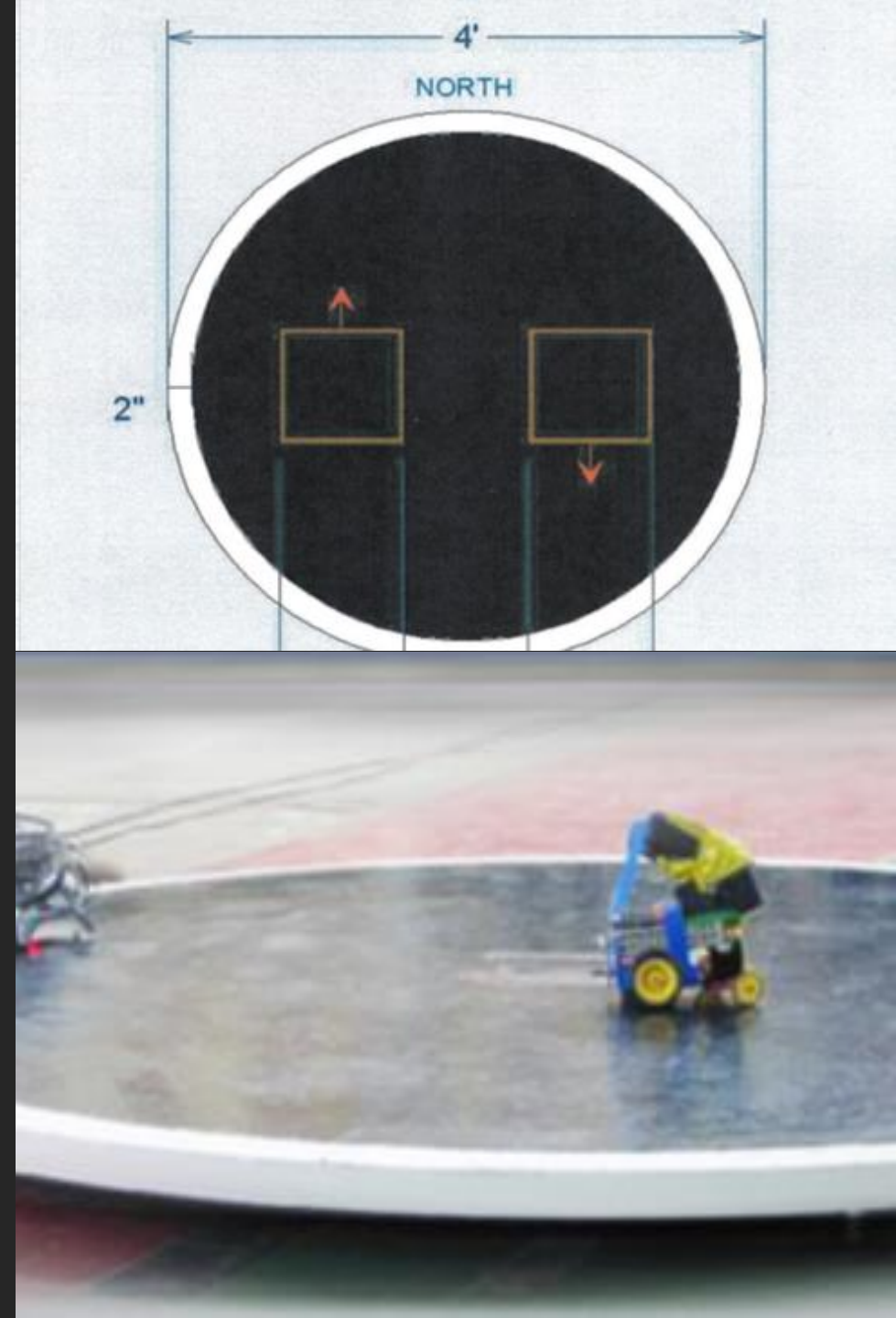


Description

Robotic sumo is a competition where two robots, known as sumo-bots, attempt to push each other out of an arena using sensors, clever programming, and innovative design. The arena for the contest is a 154 cm diameter circle, the match consist of 3 rounds of total time 3 minutes .

Your goal is to create a Sumo-bot that can push its opponent out of the arena before being pushed out of the arena by the competing sumo-bot.

For more details see the [Link](#)





Components & Implementation of the project

(HARDWARE – SOFTWARE
– MECHANICAL)



Hardware Components :

- 2 Motor Drive Circuits – 1 Control Circuit

Component of circuits & sensors :

540 MOSFET

Capacitor

Diode 1N5819

Diode 1N4446

Resistor 6.8

Resistor 840

Resistor 1k

Resistor 330

فیوز

T-block روزیتة

LED

Pin Header 4 pin

Pin Header 3 pin

3 Toggle switch

Arduino Nano +Cable

PC817

2N2222

ریلای G5LE

4 Ultra-sonic & 4 IR sensors



mechanical Components :

Components :

2 Motors (Car Wipers motors)

Ecoskeleton of Wood



Software Code :

Implementation :

Reading the Data from the 4 IR sensors

Reading the Data from the 4 Ultra-sonic sensors

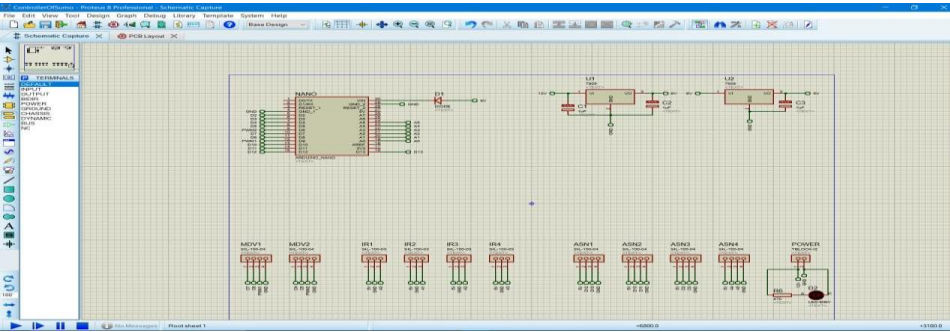
Controlling the movement of the motors

Implementing a strategy to move the Robot properly

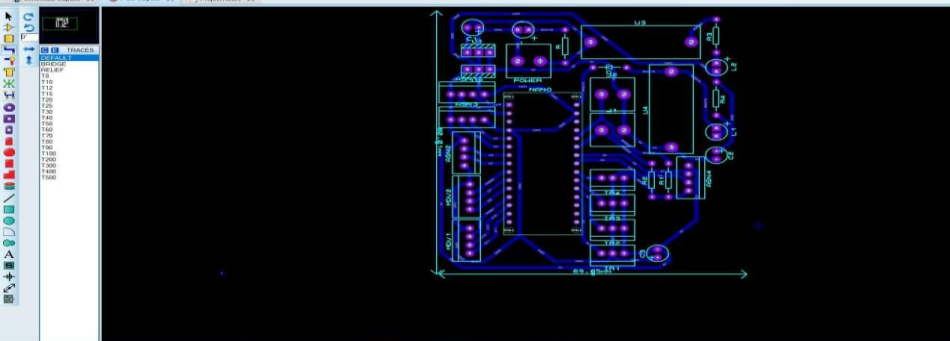


Hardware Circuits (Design& Implementation)

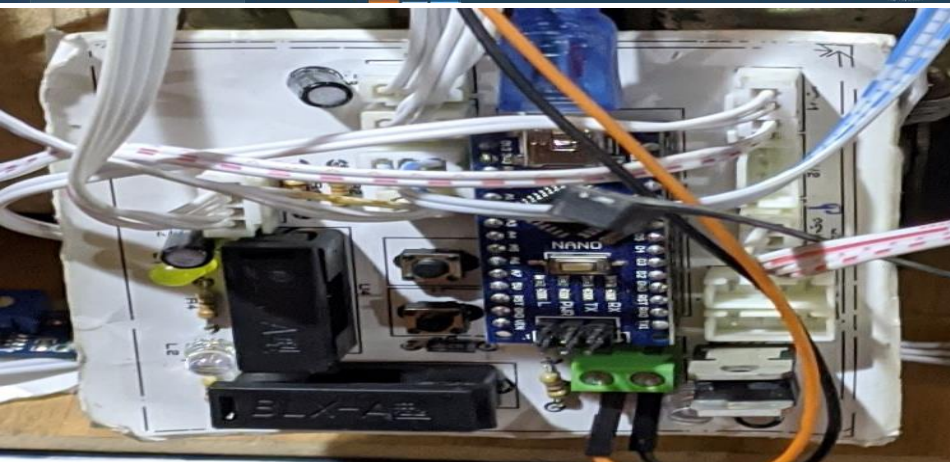
Control Circuit :



(Design)

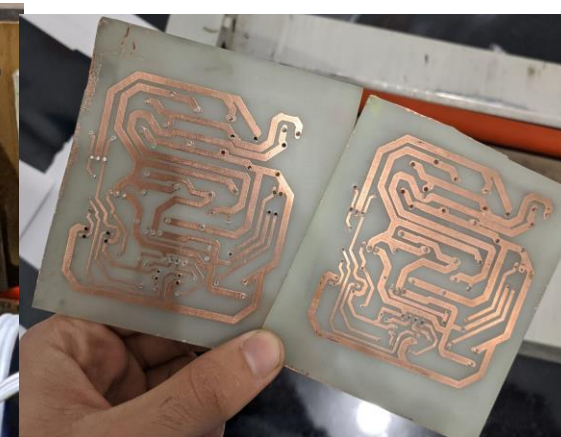
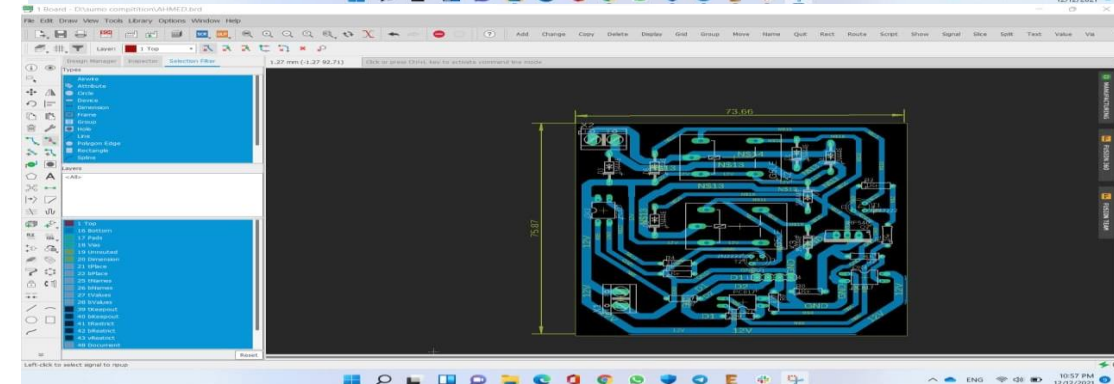
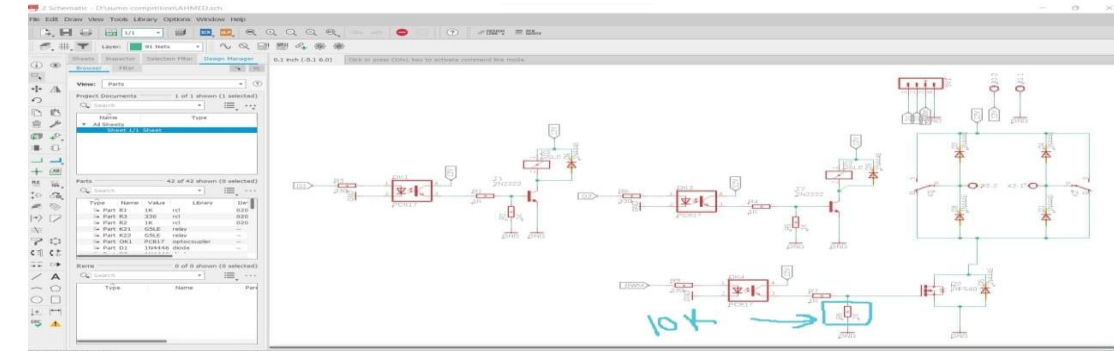


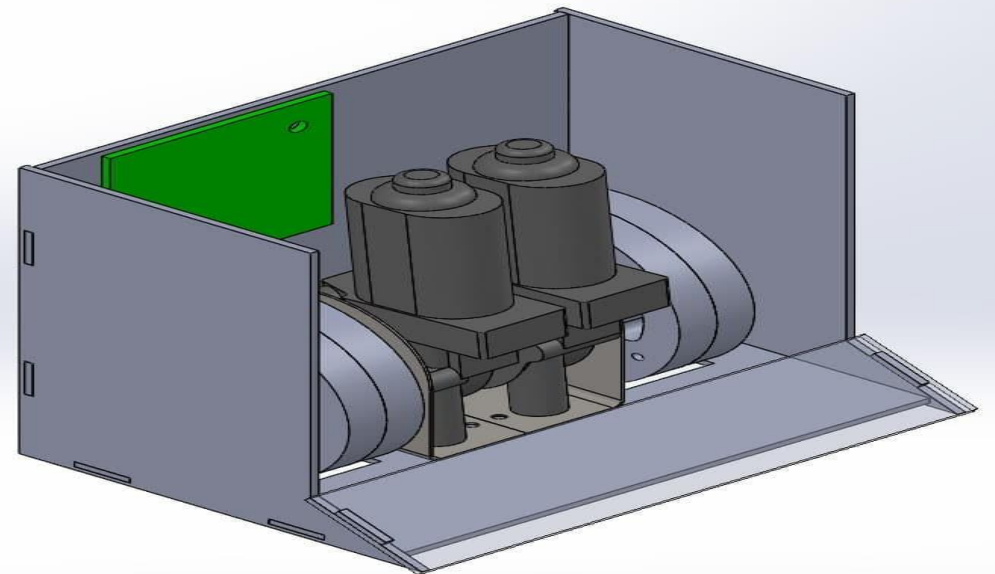
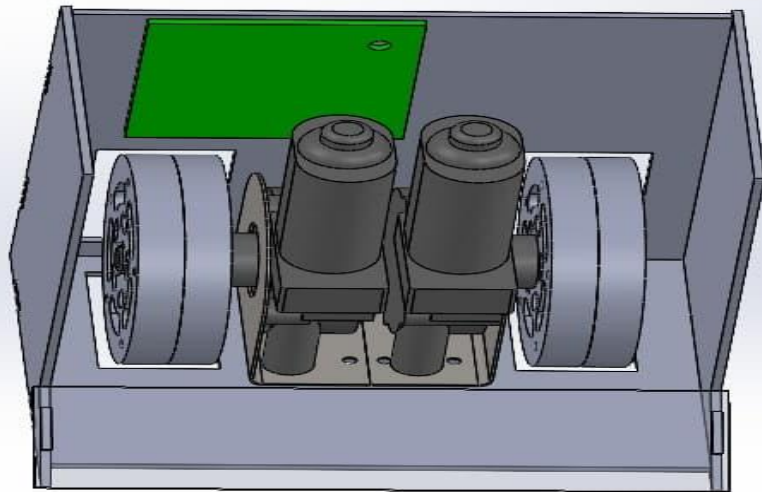
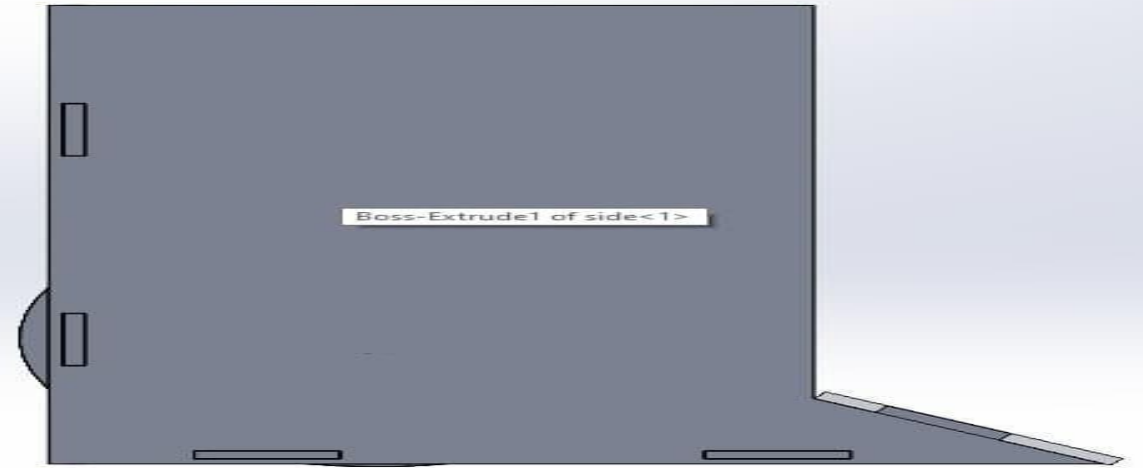
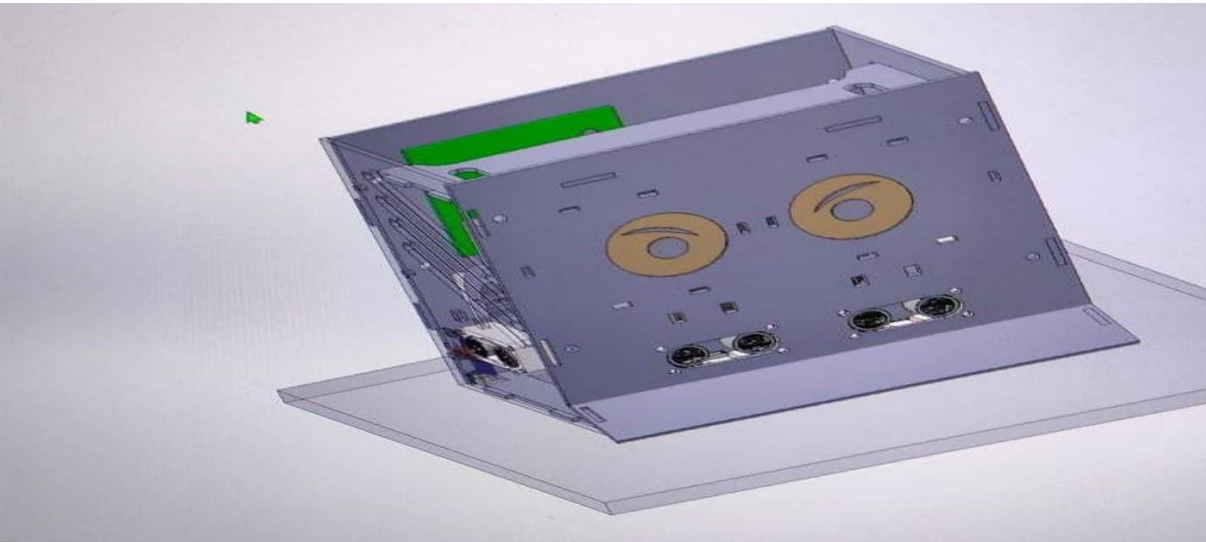
(PCB)



(Implementation)

Motor Drive Circuits :



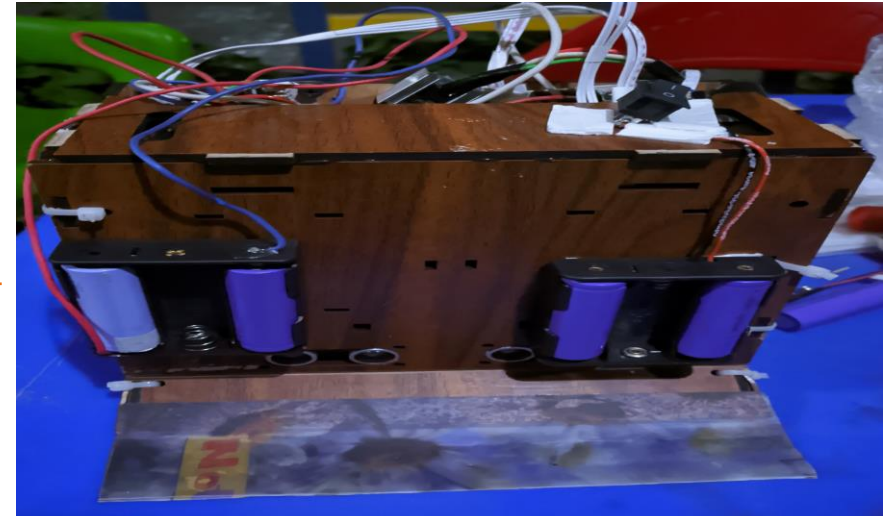
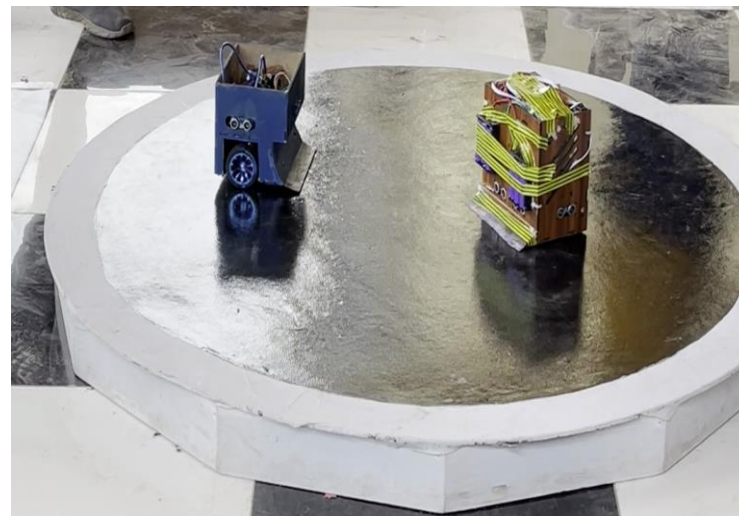
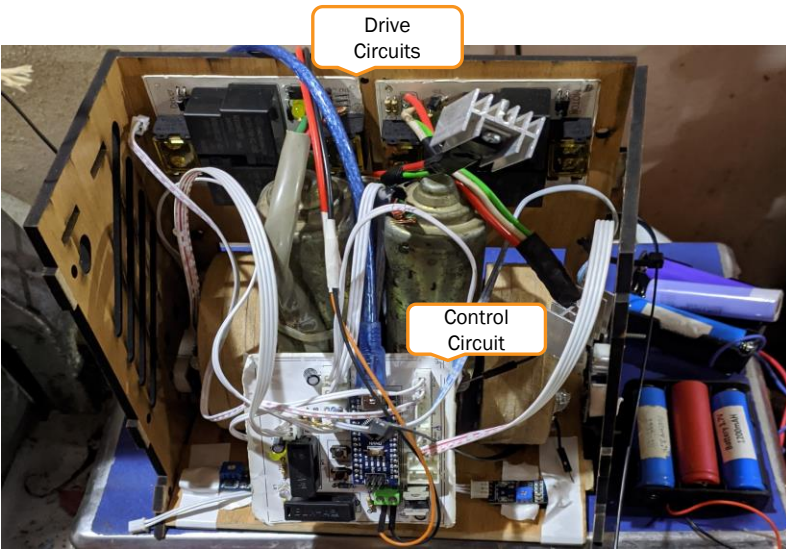




```
1 #include "sumo.h"
2 int flag=0;
3 void setup() {
4     // put your setup code here, to run once:
5     init_motor();
6     init_ir();
7     init_altra();
8     Stop();
9     delay(5000);
10    //Serial.begin(9600);
11 }
12
13 void loop() {
14     // put your main code here, to run repeatedly:
15     read_ir();
16     if((ir_fr==white)&&(ir_fl==black)&&(ir_bl==black)&&(ir_br==black))
17     {
18         back(fast);
19         delay(500);
20         left(slow);
21         // Serial.println("1111111111111111");
22     }else if((ir_fr==black)&&(ir_fl==white)&&(ir_bl==black)&&(ir_br==black))
23     {
24         back(fast);
25         delay(500);
26         right(slow);
27         // Serial.println("2222222222222222222222");
28     }else if((ir_fr==white)&&(ir_fl==white)&&(ir_bl==black)&&(ir_br==black))
29
30 void init_motor(void)
31 {
32     pinMode(motor_right_1,OUTPUT);
33     pinMode(motor_right_2,OUTPUT);
34     pinMode(motor_left_1,OUTPUT);
35     pinMode(motor_left_2,OUTPUT);
36     pinMode(motor_left_enable,OUTPUT);
37     pinMode(motor_right_enable,OUTPUT);
38 }
39 void forward(int speed)
40 {
41     analogWrite(motor_left_enable,speed);
42     analogWrite(motor_right_enable,speed);
43     digitalWrite(motor_right_1,0);
44     digitalWrite(motor_right_2,1);
45     digitalWrite(motor_left_1,0);
46     digitalWrite(motor_left_2,1);
47 }
48 void back(int speed)
49 {
50     analogWrite(motor_left_enable,speed);
51     analogWrite(motor_right_enable,speed);
52     digitalWrite(motor_right_1,1);
53     digitalWrite(motor_right_2,0);
54     digitalWrite(motor_left_1,1);
55     digitalWrite(motor_left_2,0);
```

The Complete Code in the
[Link](#)

The Complete Project





Photos Of The Team



Team Members

Hardware members

- 1- أحمد شاكر عطية إبراهيم
- 2- أسامة محمود صبحي الزقرد
- 3- أسامة صلاح الألفي محمد
- 4- بسمة محمد وصفى على
- 5- أميرة سامي احمد سيد

Software members

- 6- أسامة محمد السيد زيدان
- 7- حسن محمود احمد حسن
- 8- إيمان السيد السيد الغباشي
- 9- محمد نصر السيد راضى

Mechanical member

- 10- المعتصم بالله عصام الكناني

Thanks

