



# Autonomous Line Follower Robot Creation

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## Introduction:

The "Autonomous Line Follower Robot Creation" project was undertaken as a personal endeavor with the aim of designing, constructing, and programming an autonomous robot capable of following a designated path. This report provides an overview of the project's objectives, methodologies, achievements, and outcomes.

## Project Objectives:

The main objective of this project was to design a detailed 3D model of a line follower robot and successfully construct an autonomous robot capable of accurately tracking a line using a PID control algorithm.

## Design and Modeling:

1. Utilized SOLIDWORKS and AutoCAD to create a comprehensive and intricate 3D model of the line follower robot.
2. Emphasized precision in design to ensure seamless integration of components and optimal performance.

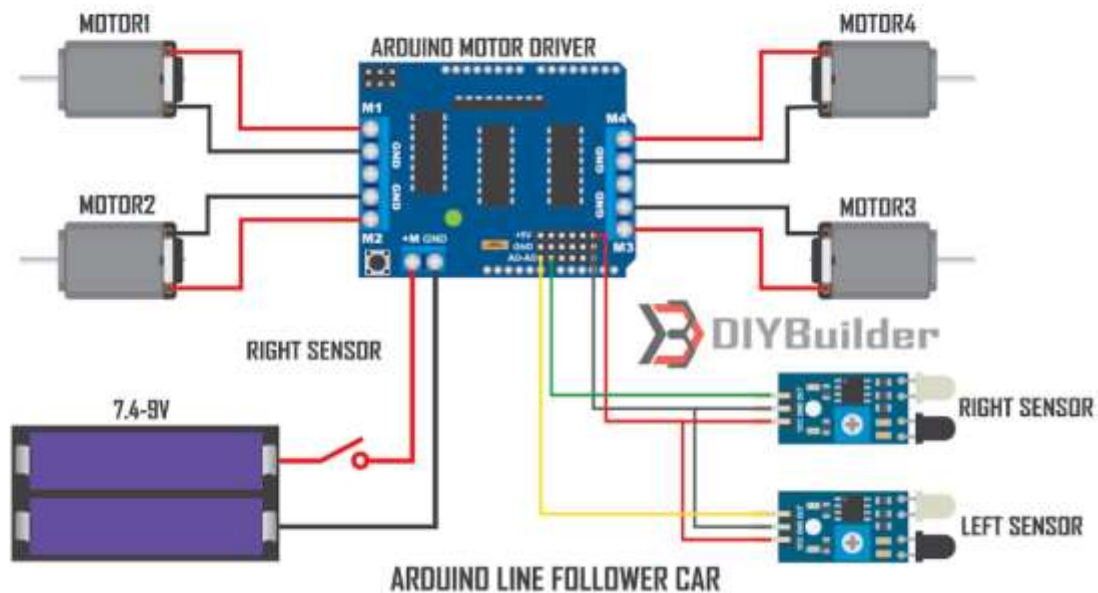
## Components list:

- Arduino Uno
- 2 IR Sensors
- L298N motor driver
- Battery DC 7-12V
- Jumper wires

## Robot Construction and Programming:

1. Constructed the line follower robot using Arduino Uno as the microcontroller, IR sensors for line tracking, and a PID control algorithm for precise control.
2. Programmed the robot to autonomously follow a designated line by processing sensor data and making real-time adjustments.

## Circuit Diagram



## Code

```
//including the libraries
#include <AFMotor.h>

//defining pins and variables
#define left A0
#define right A1

//defining motors
AF_DCMotor motor1(1, MOTOR12_1KHZ);
AF_DCMotor motor2(2, MOTOR12_1KHZ);
AF_DCMotor motor3(3, MOTOR34_1KHZ);
AF_DCMotor motor4(4, MOTOR34_1KHZ);

void setup() {
  //declaring pin types
  pinMode(left,INPUT);
  pinMode(right,INPUT);
  //begin serial communication
  Serial.begin(9600);
}
```

```

}

void loop(){
  //printing values of the sensors to the serial monitor
  Serial.println(digitalRead(left));

  Serial.println(digitalRead(right));

  //line detected by both
  if(digitalRead(left)==0 && digitalRead(right)==0){
    //Forward
    motor1.run(FORWARD);
    motor1.setSpeed(150);
    motor2.run(FORWARD);
    motor2.setSpeed(150);
    motor3.run(FORWARD);
    motor3.setSpeed(150);
    motor4.run(FORWARD);
    motor4.setSpeed(150);
  }
  //line detected by left sensor
  else if(digitalRead(left)==0 && !analogRead(right)==0){
    //turn left
    motor1.run(FORWARD);
    motor1.setSpeed(200);
    motor2.run(FORWARD);
    motor2.setSpeed(200);
    motor3.run(BACKWARD);
    motor3.setSpeed(200);
    motor4.run(BACKWARD);
    motor4.setSpeed(200);

  }
  //line detected by right sensor
  else if(!digitalRead(left)==0 && digitalRead(right)==0){
    //turn right
    motor1.run(BACKWARD);
    motor1.setSpeed(200);
    motor2.run(BACKWARD);
    motor2.setSpeed(200);
    motor3.run(FORWARD);
    motor3.setSpeed(200);
    motor4.run(FORWARD);
    motor4.setSpeed(200);
  }
}

```

```

}
//line detected by none
else if(!digitalRead(left)==0 && !digitalRead(right)==0){
  //stop
  motor1.run(RELEASE);
  motor1.setSpeed(0);
  motor2.run(RELEASE);
  motor2.setSpeed(0);
  motor3.run(RELEASE);
  motor3.setSpeed(0);
  motor4.run(RELEASE);
  motor4.setSpeed(0);

}

}

```

## Problem-Solving and Iterative Testing:

1. Demonstrated strong problem-solving skills by iteratively testing the robot's line tracking abilities.
2. Refined the PID control algorithm to overcome challenges and ensure accurate line following.

## Results and Achievements:

1. Successfully designed a detailed 3D model of the line follower robot, ensuring precise component integration.
2. Constructed an autonomous robot capable of accurately tracking a designated path using IR sensors and a PID algorithm.
3. Exhibited algorithmic expertise through iterative testing, problem-solving, and algorithm refinement.

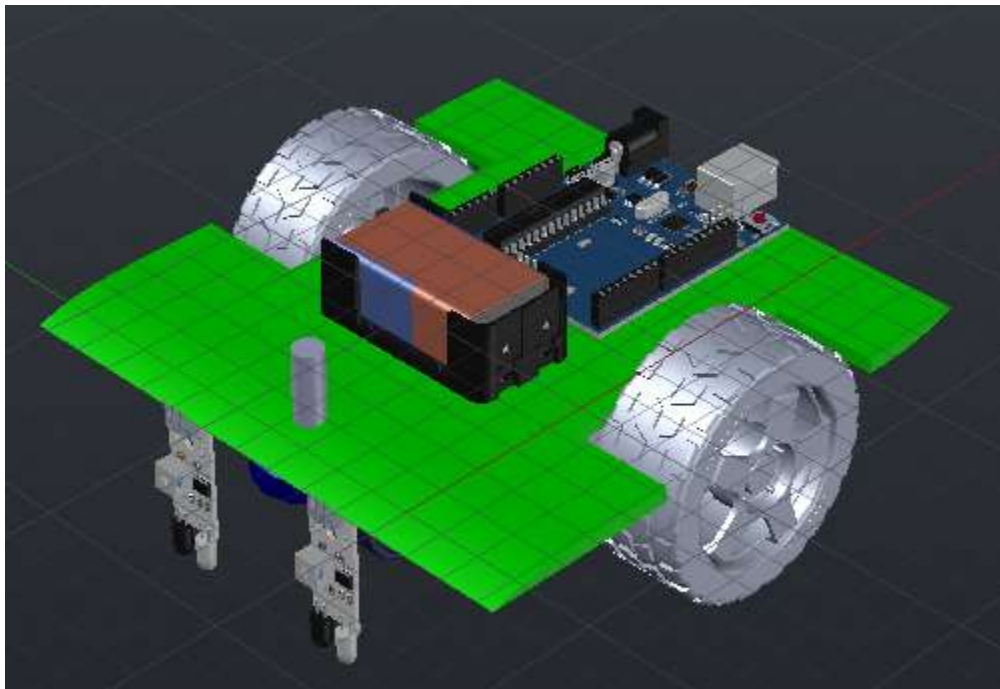
## Conclusion:

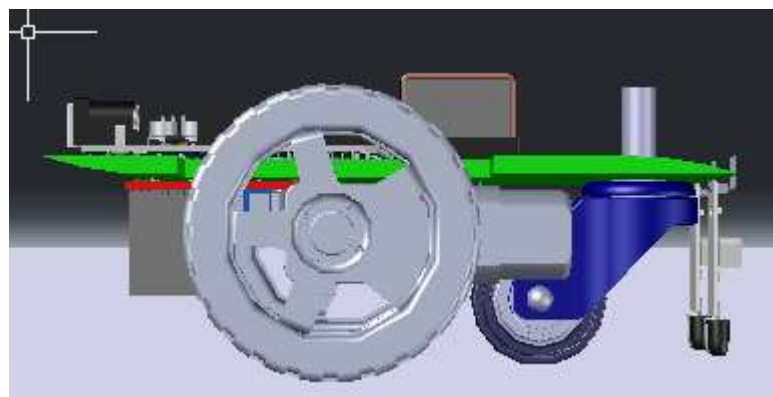
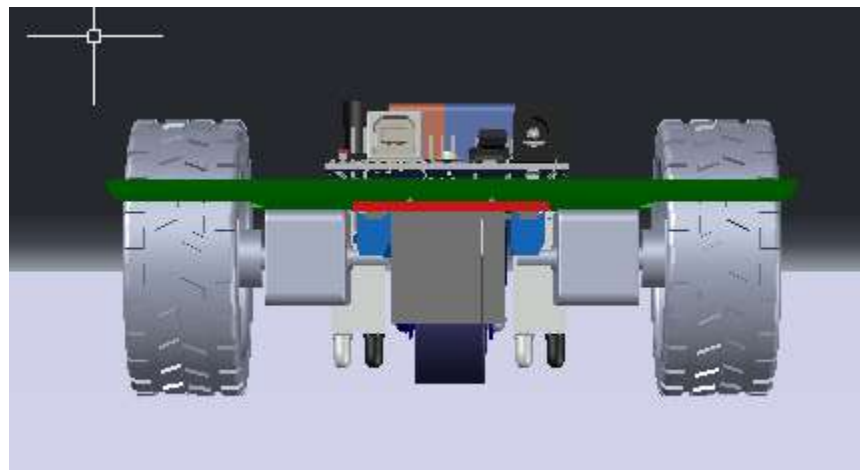
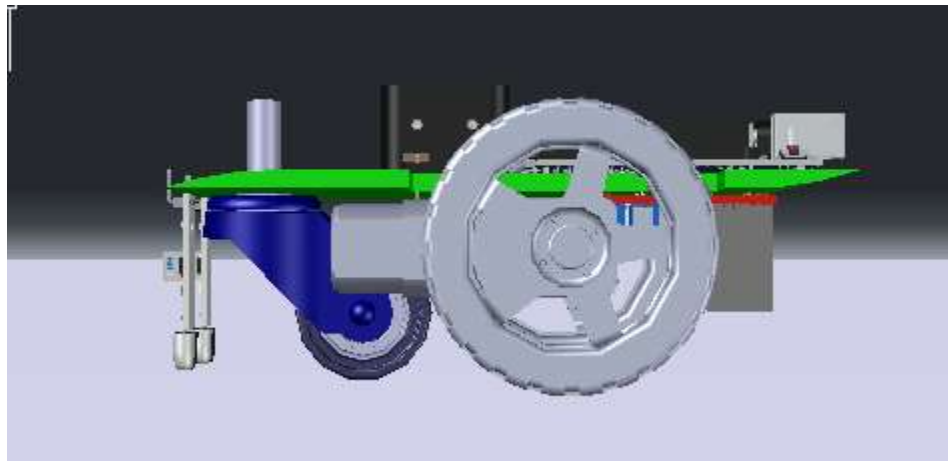
The "Autonomous Line Follower Robot Creation" project showcased the successful integration of design, construction, and programming to develop an autonomous robot

capable of accurately tracking a designated line. Through meticulous design, construction, and iterative testing, the project achieved its objectives and demonstrated strong problem-solving abilities. The incorporation of a PID control algorithm highlighted algorithmic expertise and unwavering commitment to achieving optimal performance. This project not only expanded practical skills but also deepened understanding in robotics, algorithm optimization, and autonomous system development.

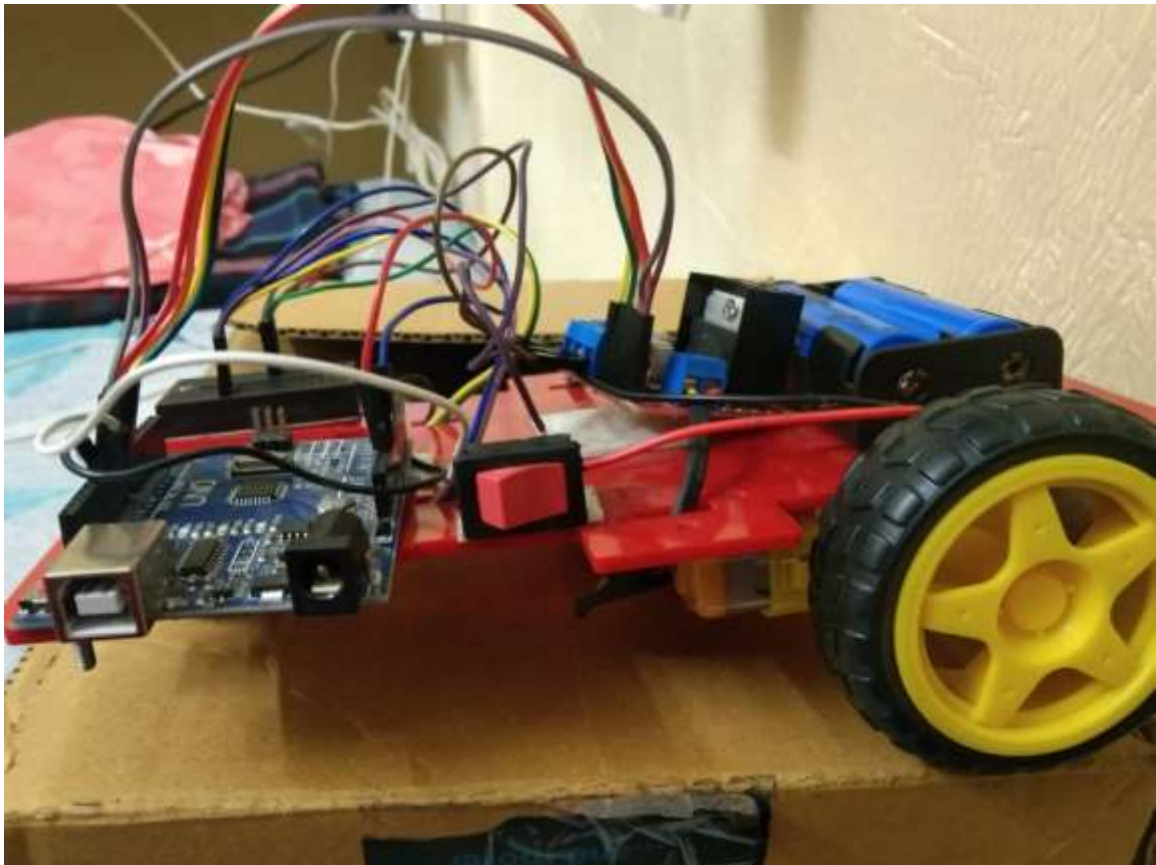
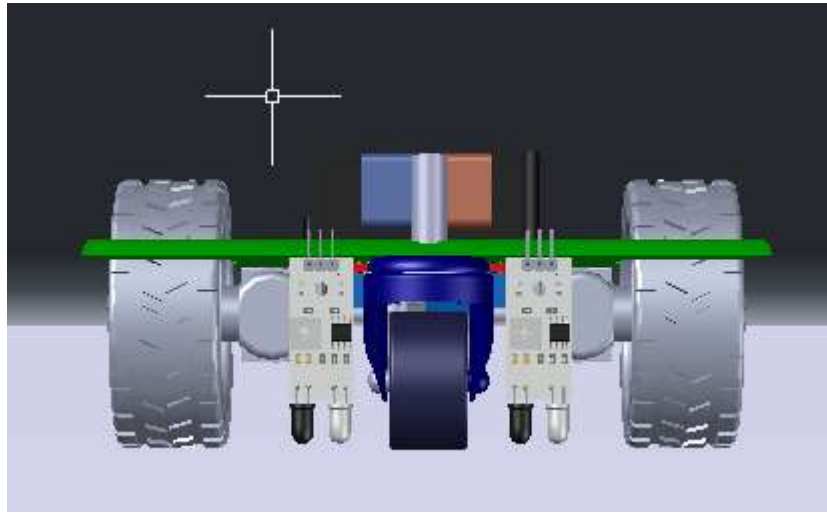
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## Picture of BOT









Drive link For Videos Of the bot

<https://drive.google.com/drive/folders/1nkTi-CqWD-j6MSNuLmetVPjZAchW1Z-8?usp=sharing>