

## Overview

What is it?

A line-following robot that utilizes sensors to detect and follow a predetermined path. This project aims to demonstrate an affordable and efficient robotics solution for automation in tasks such as transportation and logistics.

Purpose:

To automate movement for specific applications, showcasing the potential of robotics in simplifying operational tasks.

Objective:

Highlight the development and implementation of a cost-effective line-following robot using Arduino technology.

## Components

List of Materials:

- Arduino Uno
- L298N Motor Driver
- 4 DC Motors and Wheels
- 2 IR Sensors
- Chassis
- 12V Battery Pack
- Jumper Wires

### Circuit Design

Diagram and Connections:

The Arduino is connected to the L298N motor driver, which controls the motors and interprets data from the sensors.

The L298N motor driver interfaces with the motors and sensors using specific pins:

- ENA/ENB: Motor enable pins
- IN1-IN4: Motor direction control pins
- Sensor Outputs: Signal inputs from the IR sensors.

### Working Mechanism

1. The IR sensors detect the black line on the surface.
2. The Arduino processes real-time data from the sensors.
3. The motor driver adjusts the motor speed and direction accordingly.
4. The car continuously aligns itself to stay on the line, even during curves or straight paths.

### Challenges & Solutions

Calibration:

Adjusting sensors for varying surface textures and lighting conditions.

Motor Balancing:

Synchronizing motor speeds to ensure smooth and stable movement.

Power Management:

## A Robotics Innovation Project

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Optimizing the 12V battery pack to support consistent power delivery for extended operation.

### Results

Successfully demonstrated the robot's ability to follow a line with precision.

Smooth and stable navigation through curves and straight paths.

### Team Members

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