

LINE FOLLOWER ROBOT *NAVIGATING LINES: A SMART ROBOT'S JOURNEY*

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Abstract: Line Following is one of the most essential aspects in the field of Robotics. Line Following robot is an automated robot that detects and follows a black line on a white surface. The Infrared line sensor is used to detect the black line and gives output to the robot's microcontroller, which controls the robot's motion using the motor driver. This article presents methodologies used for automated line follower robot with modified code and accuracy within low cost estimation. The main contribution of this work lies in comparative study of codes for getting better accuracy level.

Index Terms—

- I. INTRODUCTION II. METHODOLOGY
- III. FUTUR<mark>E SCO</mark>PE
- IV. REFERENCES V. CONCLUSION

INTRODUCTION:

In recent years, robotics and machine learning has boomed its momentum in interdisciplinary field that combines the principles of mechanical, electrical, and computer engineering to develop auto-based systems that can perform complex tasks with accuracy. One such application of robotics is the making of line follower robots that are capable of following a prearranged path or line. These robots are used in a variety of applications, including industrial automation, surveillance, and navigation.

This presentation focuses on the development of a line follower robot using Smartelex RLS-6 line sensors and DRV8833 motor drivers. The project aims to design and build a low-cost, efficient, and accurate line follower robot that can navigate a predefined path with ease. The robot is based on the Arduino Nano board and uses a micro-gear motor and a caster wheel for propulsion. The RLS-6 line sensors are used for line detection and the DRV8833 motor driver is used for controlling the speed and direction of the motor.

METHODOLOGY:

The proposed methodology for this project includes the following steps:

- 1. Research and selection of the components: The SmartElex RLS 6 line sensor and DRV8833 motor driver will be selected based on their compatibility and cost efficiency for the project requirements.
- 2. Designing and construction of the robot's chassis.
- 3. Integration of the components: The SmartElex RLS 6 line sensor and DRV8833 motor driver are integrated into the robot's chassis, along with the microcontroller and other necessary components.
- 4. Development of the control software: The control software is developed based on suitable programming language including the algorithm and flowchart for line detection and motor control.
- 5. Testing and optimization: The performance of the robot will be tested in various environments and improvised for accuracy and efficiency.
- 6. Demonstration: The final demonstration of the robot will be done by following the black line on white surface with high accuracy and efficiency.



LITERATURE REVIEW:

Line follower robots are a popular type of autonomous robot that can follow a line on a surface without human intervention. These robots are widely used in various fields, including manufacturing, warehousing, and transportation, as they can perform repetitive tasks with high accuracy and efficiency. In addition to their industrial applications, line follower robots have also been used in educational settings to teach students about robotics and programming. These robots can help students develop skills in robotics, programming, and problem-solving. Overall, line follower robots are an important technology with various applications in different fields. The design of these robots involves several key components, and different types of sensors, motor drivers, and control systems can be used to create an effective and efficient robot.

FUTURE SCOPE:

The line follower project has a lot of potential for future development and expansion. By adding more sensors, control systems, and wireless communication modules can extend and optimize the robot's capabilities. The robot can be made more adaptable, intelligent, and versatile, making it useful in various applications. The future scope for the project include multiple line tracking, obstacle detection, wireless control, autonomous navigation, and object detection and recognition. The line follower robot can be further developed to meet the needs of different applications, such as warehouse management, agricultural monitoring, and more.

REFERENCES:

- Arduino Project Hub useful insights and tutorials.
- Several technical papers and research articles were consulted to gain insights about line following algorithms, motor control techniques, and sensor integration.

CONCLUSION:

The line follower robot is an automobile device that holds the ability to detect path line and move toward the line in the best way. The line follower project showcases how an autonomous robot can accurately follow a line. The line follower robot is designed to follow a black line on a white surface with a line thickness of approximately 1 cm and a width of approximately 2 cm. The robot's movements are controlled by an Arduino Nano board, which makes it possible to program the robot to follow the line automatically. The motor drivers and the line sensor and Arduino board is powered by a 9v battery. This project has challenged the group to communicate, implement on various ideas in modification of the robot's efficiency to detect the path.

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