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OBSTACLE AVOIDING AND
LINE FORWARD MOTOR

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ABSTRACT

This report presents an Arduino-based project that utilizes various components to build a functional system. The project incorporates a Motor Driver, Servo, Arduino board, IR obstacle avoidance sensor, and Arduino Ultrasonic sensor. The following sections describe each component and its role in the project.

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INTRODUCTION

1.1 Introduction

The aim of this project is to create an interactive system using Arduino that can sense obstacles and maneuver accordingly. The Motor Driver, Servo, IR obstacle avoidance sensor, and Arduino Ultrasonic sensor are integrated to achieve this goal.

1.2 Motivations

We searched a lot of circuits to make, and this one was very fantastic, easy, extremely low cost, and quite simple and easy to make, that is the thing that motivated us to work on this circuit also It was the solution of a problem we thought about.

1.3 Project objective

The ability to detect and avoid obstacles allows the robot to operate safely in environments where there may be people or objects in its path. For example, a robot in a factory may need to navigate around machinery or other workers. Similarly, a robot in a home may need to avoid furniture or other obstacles.

The ability to follow a line allows the robot to navigate along a predefined path, which can be useful in a variety of applications. For example, a robot could be programmed to follow a line on the ground to deliver items in a warehouse or to clean a room in a house.

1.4 Project Layout
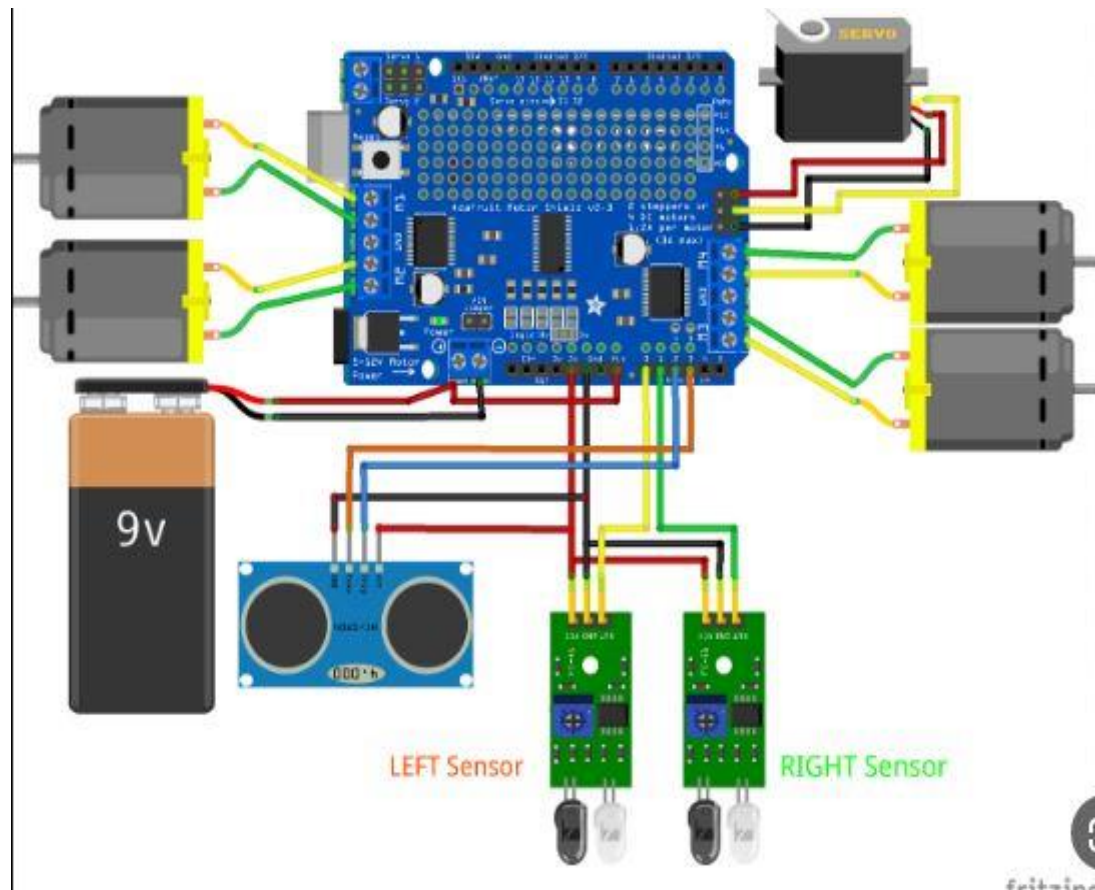
1.5 Report outline

1.5.1 Project Hardware

What tools are used and what are their benefits in the circuit?

1.5.2 The method of work

The way the circuit works and the best way to use it to get the best performance.

1.5.3 Advantages

Features of the circuit.

1.5.4 Circuit idea

The idea of the work of the circuit in terms of use and method of work.

PROJECT HARDWARE

2.1 Motor Driver:

The Motor Driver is an electronic device that controls the speed and direction of a motor. It is often used in robotics and automation projects. In this project, the Motor Driver is employed to drive the motion of a motor, enabling the system to move or perform specific tasks based on input from other sensors.

2.2 Servo:

A Servo is a small device that consists of a motor, a gear train, and a control circuit. It is used to precisely control the angular position of an object. In this project, the Servo is utilized to provide controlled movement to a specific part of the system, such as a robotic arm or a camera.

2.3 Arduino Board:

The Arduino board is a microcontroller-based platform that acts as the brain of the system. It allows for easy programming and interfacing with various components. In this project, the Arduino board serves as the central controller, receiving inputs from sensors and controlling the actions of the Motor Driver and Servo.

2.4 IR Obstacle Avoidance Sensor:

The IR (Infrared) Obstacle Avoidance Sensor is a proximity sensor that detects the presence of obstacles by emitting and receiving infrared light. It can effectively detect objects within a certain range. In this project, the IR obstacle avoidance sensor is employed to identify obstacles in the system's path and trigger the necessary actions to avoid them.

2 , 5 Arduino Ultrasonic Sensor:

The Arduino Ultrasonic Sensor utilizes ultrasonic waves to measure the distance between the sensor and objects in its vicinity. It calculates the time taken for the ultrasonic waves to bounce back, enabling distance measurements. In this project, the Ultrasonic Sensor is used to detect objects at a distance and assist in obstacle avoidance.

SYSTEM DESIGN AND OPERATION:

The Motor Driver and Servo are connected to the Arduino board, which serves as the main control unit. The IR obstacle avoidance sensor and Arduino Ultrasonic sensor are also connected to the Arduino board, providing input data about obstacles and distances. The system operates as follows:

1. The IR obstacle avoidance sensor continuously detects obstacles in the system's path.
2. When an obstacle is detected, the Arduino board processes the input and determines the appropriate action.
3. The Motor Driver is activated to control the movement of the system, either by changing its direction or speed to avoid the obstacle.
4. The Servo may be used to adjust the position of a specific component, such as a camera, to aid in obstacle avoidance or provide a desired functionality.
5. The Arduino Ultrasonic sensor assists in providing accurate distance measurements for effective obstacle detection and avoidance.

ADVANTAGES

There are several advantages to building a robot that can avoid obstacles and follow a line using motors:

1. Increased safety: By avoiding obstacles, the robot can operate safely in environments where there may be people or other objects in its path. This can help prevent accidents and injuries.

2. Increased efficiency: By following a line, the robot can navigate along a predefined path, which can help it complete tasks more efficiently. For example, a robot in a warehouse can follow a line to deliver items to different locations without the need for human intervention.

3. Adaptability: A robot that can avoid obstacles and follow a line can be programmed to perform a variety of tasks in different environments. This makes it a versatile tool that can be used in a variety of settings.

4. Reduced costs: By automating tasks that would otherwise require human labor, a robot that can avoid obstacles and follow a line can help reduce labor costs and increase efficiency.

5. Learning opportunities: Building a robot that can avoid obstacles and follow a line can be a great learning experience, providing opportunities to learn about programming, electronics, and robotics.

Overall, the advantages of building a robot that can avoid obstacles and follow a line using motors include increased safety, efficiency, adaptability, reduced costs, and learning opportunities.

CONCLUSION

This project successfully demonstrates the integration of various components, including the Motor Driver, Servo, Arduino board, IR obstacle avoidance sensor, and Arduino Ultrasonic