Project Proposal
Title: Object Avoiding Vehicle

Robotics Group Info

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1. Abstract

This project aims to develop a simple object-avoiding vehicle using basic electronic components. The vehicle will autonomously detect and avoid obstacles using ultrasonic sensors, with a microcontroller managing sensor input and motor control. The goal is to build a functional prototype that demonstrates key concepts in robotics and automation using affordable materials, showing how such systems can be applied in tasks like warehouse navigation and automated transport.

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2. Problem Statement / Scope

Autonomous obstacle-avoiding systems are essential in areas like industrial automation and transport. Designing such systems can be complex, but this project simplifies the process using basic components (DC motors, ultrasonic sensors, and a microcontroller). It provides a practical solution for dynamic navigation and lays the foundation for future improvements like vision-based control.

Scope:

- Limited to low-cost components.
- Demonstrates real-time path correction.
- Designed for indoor use with static and dynamic obstacles.

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3. Objectives

- Build a small autonomous vehicle with obstacle avoidance capability.
- Use ultrasonic sensors for object detection within a set range.
- Implement real-time motor control logic for path adjustment.
- Test performance with varying indoor obstacles.
- Document the development process and results.

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4. Proposed Method

1. **Hardware Setup**:
    - Assemble a chassis with DC motors and ultrasonic sensors.
    - Use an Arduino microcontroller for motor and sensor control.
2. **Software Implementation**:
    - Write code to process sensor data and control motor responses using Arduino IDE.
3. **Testing and Calibration**:
    - Test the vehicle in different obstacle setups and fine-tune sensor thresholds.
4. **Performance Evaluation**:
    - Measure obstacle detection success and identify areas for future improvements.