

Brainy Line Following Robot with Obstacle Detection

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Abstract: *Autonomous mobile robots play a vital role in modern automation systems. This paper presents the design and implementation of an autonomous line-following robot integrated with obstacle detection. The robot uses infrared (IR) sensors for line tracking and an ultrasonic sensor for obstacle detection. When an obstacle is detected, the robot halts and re-routes if possible. The system is built using Arduino microcontroller technology and is aimed at applications in industries, logistics, and smart transportation. The integration of both line following and obstacle avoidance enhances the robot's real-time decision-making capabilities in dynamic environments. This project presents the design and implementation of a Greenline-following robot integrated with an obstacle detection system. The robot is programmed to autonomously navigate by following a green-colored path using color sensors, ensuring accurate tracking even along curved or complex routes. To enhance safety and adaptability, the system incorporates ultrasonic sensors that detect and respond to obstacles in the robot's path. When an obstruction is detected, the robot either pauses or reroutes to avoid collisions, depending on the programmed logic. This combination of line-following and real-time obstacle detection makes the robot suitable for various applications, including smart logistics, automated delivery, and educational robotics. The project emphasizes efficiency, reliability, and real-world applicability through a cost-effective and scalable design.*

Keywords: Autonomous Robot, Line Following, Obstacle Detection, IR Sensor, Ultrasonic Sensor, Arduino, Mobile Robotics

