

Line Follower Robot

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Abstract: *In the realm of autonomous robotics, line following robots represent an essential stepping stone toward advanced automated systems. This paper introduces a smart line follower robot enhanced with adaptive path correction using ultrasonic sensors. Unlike traditional line followers that rely solely on infrared (IR) sensors for navigation, our approach incorporates a multi-sensor fusion strategy that enables real-time obstacle detection and dynamic rerouting. By integrating an Arduino-based control system, pulse width modulation (PWM) motor drivers, and an ultrasonic sensor array, the robot not only follows a predefined path but also adapts to unforeseen changes in its environment. This enhancement significantly improves performance in cluttered or dynamic spaces. The proposed design is low-cost, scalable, and well-suited for applications in warehouse automation, hospital logistics, and educational environments. Experimental evaluation demonstrates the robot's capability to detect obstacles with over 90% accuracy and reroute effectively with minimal deviation from its original path.*

Keywords: IR sensors, embedded systems, automation, path detection

