

Voice Controlled Robotic Car

**Prof. Pratyasha Pradhan¹, Mr. Vinod Kumar MS², Mr. Akshay Kumar³,
Mr. Suryanarayana Raju S⁴, Mr. Madhava Rao⁵**

¹Professor, CS&E Dept, Proudhadavaraya Institute of Technology, Hosapete, Karnataka, India

^{2,3,4,5}Students, CS&E Dept, Proudhadavaraya Institute of Technology, Hosapete, Karnataka, India

Abstract: *The proposed project presents the design and implementation of a voice-controlled robot that integrates intelligent sensing, communication, and actuation mechanisms to enhance human-machine interaction. The system is developed using an Arduino microcontroller as the central processing unit, interfaced with a Bluetooth module to receive real-time voice commands from a Voice Bot mobile application. Upon processing these commands, the Arduino controls the robot's motion via an H-Bridge motor driver circuit, enabling forward, backward, left, and right stop movements of the DC motors.*

To ensure environmental awareness and safety, the robot incorporates an ultrasonic sensor for obstacle detection, preventing collisions by halting or rerouting the robot's motion when an object is detected within a predefined distance. For visual indication and user feedback, the system integrates a 16x2 LCD display that shows status messages such as movement direction or obstacle detection.

An additional feature of the robot is its automatic lighting system for operation in low-light conditions. Using an LDR (Light Dependent Resistor), the system monitors ambient light levels; when darkness is detected, the Arduino activates a relay-driven LED headlight to illuminate the path. Furthermore, left and right indicator LEDs are triggered synchronously with corresponding motion commands, providing clear directional signaling similar to real-world vehicles.

This multifunctional design combines voice-based control, autonomous sensing, and user feedback mechanisms, making it an efficient and user-friendly robotic platform. Its applications range from assistive robotics for physically challenged individuals, smart home automation, and surveillance, to educational demonstrations in embedded systems and robotics. By integrating low-cost sensors and widely available components, the system ensures affordability, scalability, and adaptability for future enhancements, including IoT-based remote monitoring and machine learning-driven decision-making..

Keywords: *Light Dependent Resistor.*

