# Environment Exploration Rover: Autonomous Navigation and Obstacle Avoidance

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**Abstract**: *The advancement of autonomous robots has significantly contributed to environmental exploration, search and rescue missions, and space exploration. This paper presents the design and implementation of an environment exploration system with intelligent obstacle detection and avoidance. The rover was equipped with sensors to detect obstacles and navigate safely using a decision-making algorithm. The proposed system ensures autonomous navigation by integrating forward movement, obstacle detection, emergency stops, and dynamic path adjustments based on sensor input. It is designed to monitor environmental conditions and gather data It is equipped with temperature and humidity sensors, an ESP 32 CAM for high-resolution imaging, and ESP 32 Wi-Fi for remote communication Powered by an Arduino, which navigates rough terrains, collects environmental parameters, and supports scientific analysis Field tests confirm its effectiveness in providing accurate data and images. Thus, this is a cost-effective solution for environmental monitoring.*

**Keywords**: Exploration Rovers, ESP32 CAM, ESP32 Wi-Fi, L298N motor driver, Six wheels, batteries , Ultrasonic Sensors, IR Sensors, Motor Deriver, Temperature and Humidity Sensors