

The Smart Pothole Detection and Reporting System

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Abstract: Potholes significantly compromise road safety, leading to vehicular damage, traffic disruptions, and accidents. Traditional detection methods, reliant on manual inspections, are often inefficient and delayed. This paper introduces a Smart Pothole Detection and Reporting System leveraging the Raspberry Pi 3B+ as its core processor. The system integrates an HC-SR04 ultrasonic sensor to measure road surface variations, a Raspberry Pi Camera Module to capture images of detected anomalies, a 16×2 LCD display for real-time alerts, and an L293D motor driver to simulate vehicular responses. Upon detecting a pothole, the system captures its image, logs the GPS coordinates, and transmits this data to a centralized server for prompt maintenance actions. The implementation demonstrates a detection accuracy of approximately 94.5%, showcasing its potential as a cost-effective solution for urban infrastructure management. By facilitating real-time monitoring and reporting, this system aims to enhance road safety, reduce maintenance costs, and support the development of smarter cities.

Keywords: Raspberry, LCD, GPS, ultrasonic sensor, HC-SR04

