

SmartWayFix -An Intelligent Pothole Reporting and Maintenance System

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Abstract: Road maintenance is one of the key challenges faced by modern urban infrastructure systems. Potholes not only disrupt smooth traffic flow but also cause serious vehicle damage, accidents, and increased fuel consumption. The traditional road monitoring process is largely manual and reactive, depending on citizen complaints or routine inspections, which often leads to delayed responses and inefficient management. To address these issues, this paper introduces SmartWayFix – An Intelligent Pothole Reporting and Maintenance System, designed to automate the detection, reporting, and monitoring of road surface conditions. The system integrates the YOLO (You Only Look Once) deep learning model for real-time pothole detection and uses GPS technology for accurate location tracking. The web platform is developed using HTML, CSS, and React.js for an interactive frontend and Node.js, SQL, and Java for backend processing and data management. SmartWayFix operates through three core modules — User, Admin, and Mayor. Users can register, upload pothole reports with images, and track repair status. The admin module automates complaint handling, assigns tasks based on location and priority, and sends automated notifications to users and concerned authorities through an email automation system. The mayor module ensures transparency by enabling real-time monitoring of maintenance progress within respective areas. This system enhances accountability, reduces manual inspection time, and promotes Smart City initiatives by leveraging AI and IoT-based infrastructure monitoring for efficient, data-driven decision-making.

Keywords: SmartWayFix, Pothole Detection, YOLO, React.js, Node.js, Java, SQL, Smart City, Road Maintenance, Web Application, Real-Time Monitoring, Automation, Email Notification System, E-Governance

