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(57) Abstract :
Abstract Road infrastructure plays a crucial role in ensuring safe and efficient transportation, yet potholes remain a persistent issue, causing vehicle damage, traffic disruptions, and accidents. This project presents a real-time pothole detection system that leverages a combination of sensors, including an accelerometer, tilt sensors, a GPS module, and a camera, integrated with Raspberry Pi and Arduino UNO. The system continuously collects data on vehicle acceleration, tilt variations, and real-time location, enabling the identification of road irregularities. When a pothole is detected based on predefmed threshold values, the system records its GPS coordinates and captures an image for verification. The recorded data is then processed and visualized through a user-friendly interface, allowing authorities to monitor road conditions effectively and prioritize maintenance efforts. By automating pothole detection, the system eliminates the need for manual inspections, offering a cost-effective and scalable solution for smart city infrastructure. The integration of machine learning algorithms further enhances accuracy by refining detection thresholds over time. With its ability to provide real-time monitoring, automated data reporting, and precise mapping, this pothole detection system has the potential to significantly improve road safety, reduce vehicle maintenance costs, and support urban development initiatives.

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