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AN IOT-DRIVEN APPROACH TOWARDS AUTOMATED TRAFFIC VIOLATION MONITORING AND DETECTION

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ABSTRACT

An IoT-driven approach to automated traffic violation monitoring and detection harnesses interconnected smart devices to enhance road safety and streamline law enforcement processes. This system integrates IoT-enabled cameras, sensors, and advanced image processing algorithms to monitor traffic behavior in real-time. High-definition cameras equipped with computer vision capabilities capture violations such as speeding, red-light breaches, and illegal parking. The data is processed locally at the edge or transmitted to a centralized cloud system for analysis using machine learning algorithms. With real-time analytics, the system can identify and categorize violations, log vehicle details, and instantly alert authorities or issue automated fines. Additionally, IoT sensors embedded in roads can measure speed and traffic density, further enhancing the system's accuracy. The approach not only ensures efficient enforcement but also reduces the need for human intervention, minimizing errors and operational costs. Key challenges include data privacy concerns, network reliability, and infrastructure costs. However, advancements in 5G, edge computing, and block chain technology for secure data handling are mitigating these issues. Such systems are already transforming urban traffic management, promoting adherence to rules, reducing accidents, and fostering safer driving practices. This IoT-driven innovation signifies a step forward in creating smarter, more sustainable urban environments.