ABSTRACT

Road traffic offenses have become a major worry in recent years, especially for two-wheeler riders who routinely use their phones while operating a motor vehicle. This dangerous conduct results in fatalities and major accidents. Traffic surveillance systems and law enforcement agencies are in place, but the manual labor required to discover and punish such infractions makes them ineffective. In order to solve this problem, the suggested project offers a real-time, automated system that uses the YOLO (You Only Look Once) object detection algorithm in conjunction with a Raspberry Pi, optical character recognition (OCR), and automated email notification systems to identify when two-wheeler riders are using their phones.

The objective is to create an affordable, scalable, and effective system that can function autonomously, detect traffic infractions instantly, and issue electronic challans without the need for human assistance. The setup uses a Raspberry Pi to record live video feeds from roads using a USB webcam. A specially trained YOLOv8 model that can identify two-wheelers and the rider's use of a mobile phone analyzes the footage frame-by-frame. When a violation is found, the system takes a picture and extracts the license plate using Tesseract-OCR. Based on the database connection, the extracted number is subsequently included in an automated email that functions as a digital challan and is delivered either directly to the offender or to the relevant authorities.

The strengths of the suggested system are its complete automation, real-time processing, affordability, and small size. The method does away with the necessity for high-end computing infrastructure or continuous internet access by utilizing Raspberry Pi to install this on the edge. The system's ability to precisely identify license plates, detect infractions, and send out timely email notifications has been proven through extensive testing on real-world datasets and scenarios.

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