

The Artificial Neural Network-Based Smart Number Plate for Vehicles with Real-Time Traffic Signs Recognition and Notification

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Abstract

The world is advancing technologically in all sectors, including intelligent transportation, whereby various vehicles' movements are monitored and controlled remotely. These technologies simplify the tasks in traffic control and increase road safety. The previous related works implemented and designed provided different technologies that can identify, locate, and detect the vehicle's speed. However, even though these technologies have been implemented, there is still a lack of assistance to drivers for earlier knowing the road situation and real-time accident notification to dedicated authorities such as traffic police stations. In this paper, an Artificial Neural Network-based Smart Number Plate with real-time traffic sign recognition and notification was developed. The developed number plate comprises two units, the processing unit and the display unit, which both communicate through wireless communication. The processing unit contains a speed sensor and vibration shock sensors, Global System for Mobile Communication (GSM), Global Position System (GPS), and Raspberry Pi 3 B+ that act as the system controller. The display unit contains the Expressif board, Liquid crystal Display (LCD), and Buzzer. With the TensorFlow model for machine learning, the smart number plate classifies and recognizes traffic signs with real-time notification. Moreover, this number plate had been tested on different drivers and assisted them in obeying the traffic signs earlier, and the traffic station had been alerted for emergency support.