

***IoT Based Smart Parking System Integrated With Transformer Optical Character
Recognition And Real-time Notification On Android***

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ABSTRACT

This study aims to develop a smart parking system to minimize incidents of motor vehicle theft. The system is based on the Internet of Things (IoT) and integrates Transformer Optical Character Recognition (TrOCR) technology with real-time notifications via an Android app. It was developed in response to the rising number of motor vehicle thefts, particularly in school and campus areas with limited security systems. The developed parking device uses a Raspberry Pi 4, a webcam, and a servo motor to read vehicle license plates, recognize drivers, and automatically send warning notifications via Firebase Cloud Messaging (FCM). The TrOCR model is used to extract characters from license plate images with accuracy tested using real-world test data, while YOLOv11 is applied for object detection. Test results show that the system is capable of recognizing license plates with 95% accuracy and issuing real-time alerts if a vehicle exits without proper authorization. This research contributes to an efficient parking security system that can be implemented in educational environments at a more affordable cost.

Keywords: IoT, Smart Parking, TrOCR, Android, Firebase, YOLO, Vehicle Security