

Design and Implementation of a Smart Vehicle Start System Using Dual-Layer License Verification

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Abstract: *This paper presents a comprehensive design and implementation of a Smart Vehicle Start System employing dual-layer authentication through RFID-based license verification and facial recognition. The system ensures that only authorized and licensed drivers can operate vehicles, addressing critical security concerns in automotive access control. Implemented using Raspberry Pi Zero, MFRC522 RFID reader, and camera module v1.3, the system achieves authentication within 5 seconds with approximately 95% accuracy. Experimental results demonstrate reliable identity verification with minimal false acceptance rates, offering a cost-effective solution for both personal and commercial vehicle security. The system features real-time monitoring, web-based dashboard for management, and instant access control decisions.*

Keywords: Vehicle Security, RFID, Facial Recognition, Embedded Systems, Driver Authentication, LBPH Algorithm, IoT

