

Advanced Anti-Theft System for Four-Wheelers Using Multi-Factor Authentication and IoT Technology

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Abstract: *This paper presents a comprehensive anti-theft system for four-wheel vehicles that implements dual-factor authentication using Radio Frequency Identification (RFID) and fingerprint biometric verification. The proposed system enhances vehicle security by integrating multiple layers of protection including physical access control, ignition immobilization, real-time GPS tracking, and remote IoT-based kill switch functionality. The system employs ATmega328P microcontroller and NodeMCU ESP8266 for processing and connectivity, RC522 RFID reader and AS608 fingerprint sensor for authentication, GPS module for location tracking, and relay-based ignition control. Experimental results demonstrate that the system effectively prevents unauthorized vehicle operation with 98.7% authentication accuracy and provides reliable remote monitoring capabilities through the Blynk IoT platform. The system represents a significant advancement in vehicle security technology by combining physical and digital security measures in a cost-effective solution.*

Keywords: Vehicle Security, RFID, Fingerprint Authentication, GPS Tracking, Internet of Things, Blynk Platform, Anti-Theft System, Multi-factor Authentication

