

ABSTRACT

Damage to the brake lining is one of the main causes of traffic accidents, it reduces the performance of the braking system and extends the braking distance. This study presents a prototype based on the Internet of Things (IoT) that can monitor brake lining thickness in real-time to increase driver alertness. The system establishes two thickness thresholds: 75% (6.75 mm) as an initial indicator and 50% (4.5 mm) as a warning indicator. Thickness detection is performed via an AWG 18 cable connected to an ESP32 microcontroller. The monitoring interface was built using a Laravel-based web platform. This approach enables drivers to promptly receive accurate notifications about decreases in brake lining thickness so they can perform preventive maintenance to minimize potential accidents. System testing was conducted by simulating friction at rotational speeds ranging from 600 to 6,000 RPM. Test results show the system can accurately measure brake lining thickness with a one-second response time. This solution is suitable for older model vehicles without an early warning system and is expected to improve driver awareness of brake lining condition, thereby reducing the risk of brake failure due to undetected wear.

Keywords: Internet of Things (IoT), Brake pads, Driving Safety, Real-time monitoring, Friction simulation.