

PERANCANGAN SISTEM SMARTKEY BERBASIS ESP8266 MENGGUNAKAN LOCAL WEB SERVER UNTUK KENDALI SEPEDA MOTOR DAN MONITORING BAHAN BAKAR

Nama Mahasiswa: Putra Pangihutan Nababan

NIM: 3103221308

Dosen Pembimbing: Marzuarman, S. S.i., M.T.

ABSTRAK

Sistem pengamanan kendaraan konvensional yang masih menggunakan kunci mekanis memiliki kelemahan, terutama terkait risiko pencurian dan keterbatasan monitoring kondisi kendaraan, sehingga seiring perkembangan teknologi Internet of Things (IoT) muncul kebutuhan menghadirkan sistem pengamanan yang lebih modern, praktis, dan terintegrasi. Penelitian ini bertujuan merancang dan membangun sistem SmartKey berbasis ESP8266 dengan fitur login web, kendali relay motor, indikator buzzer, serta monitoring kapasitas bahan bakar secara realtime melalui perancangan perangkat keras dan perangkat lunak. Perangkat keras terdiri dari ESP8266 sebagai mikrokontroler utama, relay sebagai aktuator pengendali motor, buzzer sebagai indikator suara, sensor fuelpump untuk membaca kapasitas bahan bakar, *stepdown* DC-DC sebagai pengatur tegangan, serta aki sebagai sumber daya, sedangkan perangkat lunak menggunakan webserver bawaan ESP8266 yang menampilkan halaman login, dashboard, serta kontrol ON/OFF motor. Hasil pengujian menunjukkan sistem SmartKey berfungsi sesuai rancangan, proses login berhasil memverifikasi pengguna, relay mampu mengendalikan motor ON/OFF, buzzer memberikan notifikasi suara sesuai kondisi, dan sensor fuelpump menampilkan kapasitas bahan bakar dalam bentuk fuel bar berwarna. Integrasi perangkat keras dan perangkat lunak berjalan dengan baik sehingga sistem mampu memberikan keamanan tambahan sekaligus kenyamanan bagi pengguna, menjadikan SmartKey berbasis ESP8266 sebagai alternatif solusi pengamanan kendaraan yang lebih aman, praktis, dan mendukung penerapan IoT dalam kehidupan sehari-hari serta diharapkan dapat berkontribusi dalam pengembangan sistem keamanan kendaraan berbasis teknologi modern dan menjadi referensi bagi penelitian selanjutnya di bidang otomotif.

ESP8266, Relay, Buzzer, Penurun Tegangan, Monitoring Bahan Bakar, Kunci Pintar, Internet untuk semua perangkat.

DESIGN OF A SMARTKEY SYSTEM BASED ON ESP8266 USING A LOCAL WEB SERVER FOR MOTORCYCLE CONTROL AND FUEL MONITORING

Student Name: Putra Pangihutan Nababan

Student ID Number: 3103221308

Supervisor: Marzuarman, S. S.i., M.T.

ABSTRACT

Conventional vehicle security systems that still use mechanical keys have weaknesses, especially related to the risk of theft and limited monitoring of vehicle conditions, so that along with the development of Internet of Things (IoT) technology, the need to present a more modern, practical, and integrated security system arises. This study aims to design and build an ESP8266-based SmartKey system with web login features, motor relay control, buzzer indicators, and realtime fuel capacity monitoring through hardware and software design. The hardware consists of an ESP8266 as the main microcontroller, a relay as a motor control actuator, a buzzer as a sound indicator, a fuel pump sensor to read fuel capacity, a DC-DC stepdown as a voltage regulator, and a battery as a power source, while the software uses the ESP8266's built-in webserver that displays the login page, dashboard, and motor ON/OFF control. The test results show that the SmartKey system functions as designed, the login process successfully verifies the user, the relay is able to control the motor ON/OFF, the buzzer provides sound notifications according to conditions, and the fuel pump sensor displays fuel capacity in the form of a colored fuel bar. The integration of hardware and software runs well so that the system is able to provide additional security as well as convenience for users, making the ESP8266-based SmartKey an alternative vehicle security solution that is safer, more practical, and supports the application of IoT in everyday life and is expected to contribute to the development of vehicle security systems based on modern technology and become a reference for further research in the automotive field.

SP8266, Relay, Buzzer, Stepdown, Fuel Monitoring, Smartkey, Internet of Things.