ABSTRAK

Implementasi Sistem Pendeteksi Keberadaan Dosen Berbasis ESP32 dan *Beacon BLE* di Gedung Jurusan Teknik Komputer

(Muhammad Farras Fajri 2025 : 53 Halaman)

Kesulitan dalam memperoleh informasi keberadaan dosen di Jurusan Teknik Komputer menjadi hambatan dalam proses komunikasi dan koordinasi akademik. Metode manual yang masih digunakan saat ini, seperti pengecekan langsung ke ruang dosen atau melalui pesan pribadi, terbukti tidak efisien dan rawan ketidakakuratan. Penelitian ini bertujuan untuk merancang dan mengimplementasikan sistem pelacakan keberadaan dosen secara otomatis menggunakan teknologi *Bluetooth Low Energy* (BLE) dan mikrokontroler ESP32-C3. Sistem memanfaatkan sinyal iBeacon yang dibawa oleh dosen untuk dideteksi oleh ESP32-C3, lalu mengirimkan data ke server dan menampilkannya melalui website berbasis Laravel sebagai antarmuka pengguna.Metode pengembangan yang digunakan adalah *Rapid Application Development* (RAD), dengan pengujian yang meliputi fungsionalitas dan jangkauan sinyal BLE. Hasil pengujian menunjukkan bahwa sistem dapat diimplementasikan dengan baik dan berfungsi sesuai perancangan. Jangkauan deteksi *BLE* stabil mencapai 13 meter di luar ruangan dan 11 meter di dalam ruangan, sedangkan seluruh fitur website seperti login, manajemen data, dan penampilan status kehadiran dosen berjalan dengan lancar. Secara keseluruhan, sistem ini mampu mendeteksi dan menampilkan informasi kehadiran dosen secara akurat dan real-time, serta menjadi solusi efektif dalam mengatasi keterbatasan metode manual yang selama ini digunakan.

Kata Kunci: Pelacakan Keberadaan, ESP32, Beacon *BLE*, Laravel, Sistem Informasi.

ABSTRACT

Implementation of a Lecturer Presence Detection System Based on ESP32 and *BLE* Beacon in the Computer Engineering Department Building

(Muhammad Farras Fajri 2025 : 53 Pages)

The difficulty in obtaining real-time information about lecturer presence in the Computer Engineering Department has become an obstacle to effective academic communication and coordination. Manual methods still in use today—such as checking directly at the lecturer's office or sending personal messages—are inefficient and often inaccurate. This study aims to design and implement an automated lecturer presence tracking system using Bluetooth Low Energy (BLE) technology and the ESP32-C3 microcontroller. The system utilizes iBeacon signals carried by lecturers, which are detected by the ESP32-C3, transmitted to a server, and then displayed through a Laravel-based website interface. The development method used is Rapid Application Development (RAD), with testing covering both system functionality and BLE signal range. The test results show that the system was successfully implemented and performs as designed. The BLE detection range remains stable up to 13 meters outdoors and 11 meters indoors, while all website features—such as login, data management, and lecturer presence status display—function properly. Overall, this system is capable of accurately detecting and displaying lecturer presence information in real-time, providing an effective solution to overcome the limitations of traditional manual methods.

Keywords: *Presence Tracking, ESP32, BLE Beacon, Laravel, Information System.*