

Exploring Bluetooth Low Energy: Features and Security

Student



Severin Grimm

Introduction: This project explores the evolving landscape of Bluetooth Low Energy (BLE) technology, focusing on BLE version 5.0 and its security aspects and features. It examines advancements in BLE's architecture and functionalities, highlighting the transition to becoming a more sophisticated and secure protocol. The study also explores the integration of BLE with emerging technologies like WebBluetooth and WebAssembly, showcasing their potential in enhancing IoT device user interactions and security.

Approach: The project's methodology involved hands-on experiments with well-known hardware, including the ESP32 and STM32 boards, to establish and analyze BLE connections using the manufacturers software development kits. An attempt was made to establish an encrypted and authenticated BLE connection between an Android device and an STM32 board via NFC without additional apps. Additionally, the project explored the utilization of WebAssemblies in conjunction with WebBluetooth to broaden the scope of BLE applications.

Result: Key contributions include the development of a comprehensive BLE Security Guide to assist developers in navigating BLE implementations, and an interactive WebBluetooth example application. These resources serve as practical guides to understanding and leveraging BLE technology in IoT applications.

Advisor

Dr. Alexandru Caracas

Subject Area

Computer Science