Project Report: CBR3A – UB Site

Activity 1

Testing the Scanning Characteristics of Android Devices

Design

This activity aimed to evaluate the maximum distance at which an Android-based BLE scanner could reliably detect a BLE beacon. The test included two scenarios: one with the beacon enclosed in a metal box (to simulate being inside a bus) and another with the beacon in an open environment. Additionally, the experiment assessed the potential interference caused by using a mobile hotspot for the scanner's internet connection.

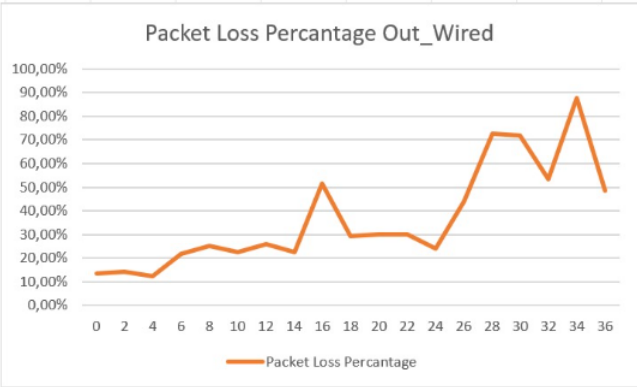
Method

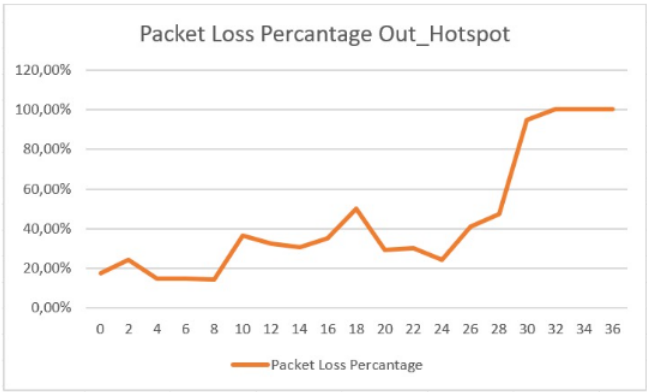
The BLE beacon was tested under controlled conditions to observe its scanning performance at varying distances. For each scenario, the packet loss percentage was measured and recorded. The first scenario used a metal box to simulate shielding, while the second scenario allowed the beacon to operate in an open environment. During both scenarios, the scanner maintained internet connectivity using a mobile hotspot, and its impact on scanning reliability was also observed.

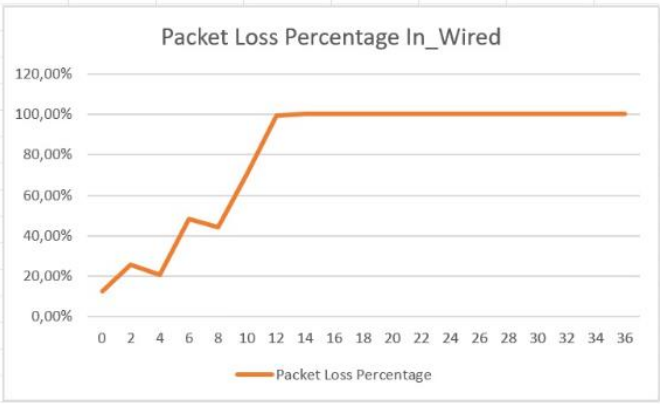
Implementation

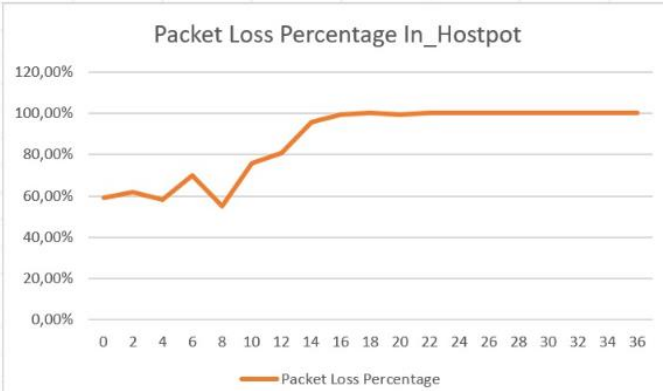
The experiment began by placing the BLE beacon inside a metal box. The Android scanner was used to detect the beacon's signal strength and packet loss percentage at incremental distances. The same process was repeated with the beacon in an open environment. Throughout the test, a mobile hotspot was used to maintain the scanner's internet connection, ensuring consistency across both scenarios.

Experiment









The results of the experiment showed that when the beacon was enclosed in the box, the packet loss percentage increased significantly, particularly at shorter distances. This indicated that the enclosure greatly affected the signal's strength and reliability. In the open environment, the packet loss was significantly lower, allowing for better scanning performance at greater distances. The use of the mobile hotspot did not introduce notable interference in either scenario, confirming that it can reliably support the scanner's connectivity needs.