

Spoofed MAC Address Detection with ESP 32

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Abstract:

The purpose of this project is to develop a hybrid device capable of WiFi client tracking and detecting spoofed MAC addresses using an ESP32 microcontroller in promiscuous mode. The goal is for the ESP32 to passively listen to the nearby wireless traffic, and log detected MAC addresses from the corresponding probe requests and beacon frames. By passively listening to incoming connections, the device can build up a whitelist of valid MAC addresses and their typical signal strength to spot when a MAC address has been spoofed.

Materials:

- Arduino Nano ESP32
- Breadboard
- LEDs

Work Breakdown:

Date	Milestone	Details
04.21	Initial Setup	Set up the Arduino environment, ESP32, and verify that the board works in promiscuous mode.
04.25	MAC Address Logging and Whitelisting	Within the IDE set up a way for the ESP32 to log and whitelist incoming connections from known sources (i.e. the phones and laptops of my roommates)
04.30	Spoofing Detection and Testing	After confirming that the ESP32 is successfully and accurately logging the incoming information from the incoming connections, begin building the capability to detect when a MAC address is being spoofed, test by modifying my own MAC address and look for changes in data
05.03	Alert and Output Formatting	Once the core functionality is working, design a way for the ESP32 to display that there was an attempt to make a connection with a spoofed MAC address and light up an LED while outputting a log event to the terminal
05.07	Report Writing	After finalizing the device, record the demonstration video and document the methodology and work for the final submission on the 7 th