

Crowd Activity Monitoring

N. Mandlik

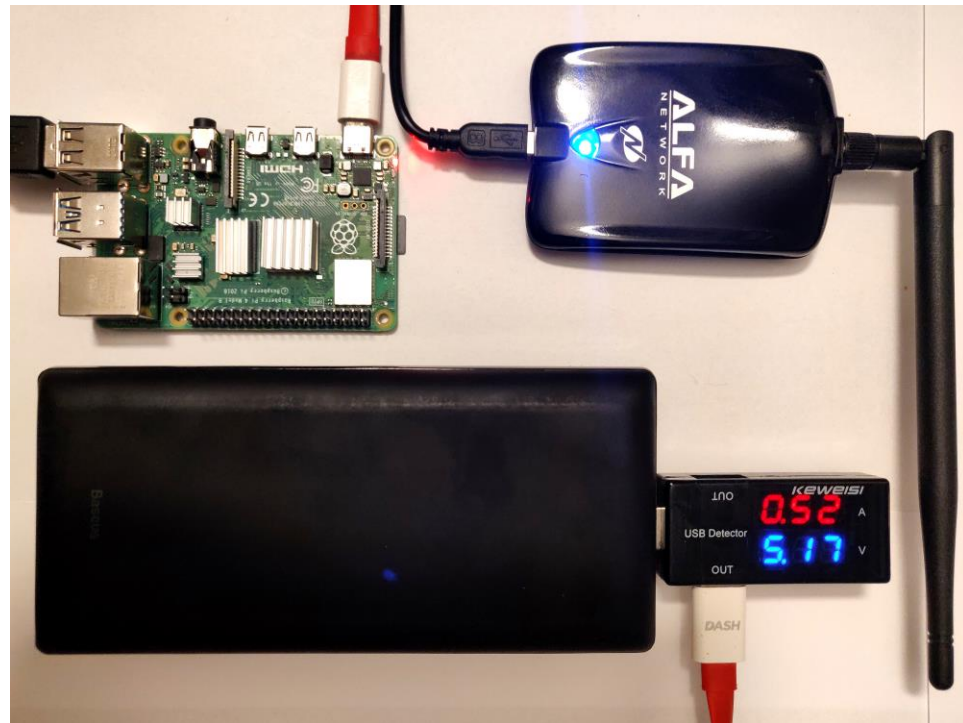
K.L. Cserna

Hypothesis

- Number of WiFi devices detected at a location is indicative of the crowd strength.
- Probe requests are not sufficient to detect all devices in the vicinity.

Method

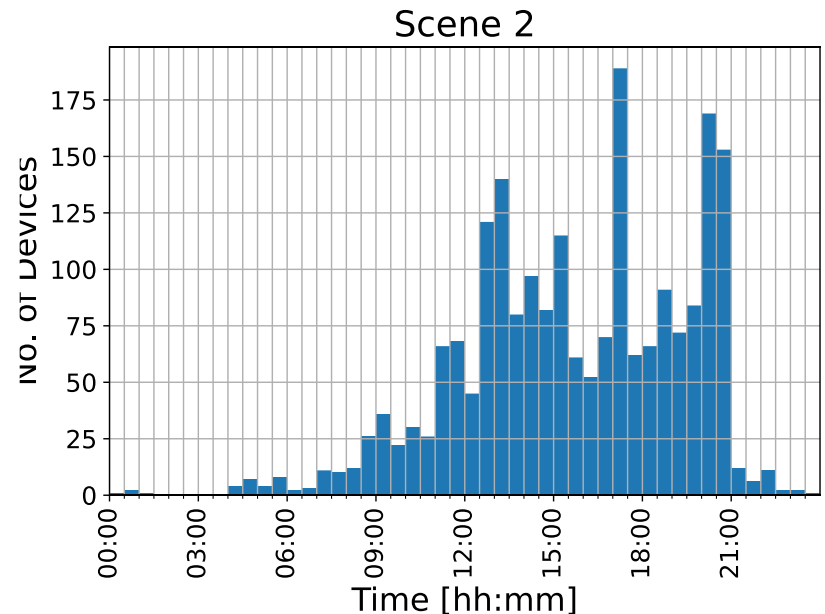
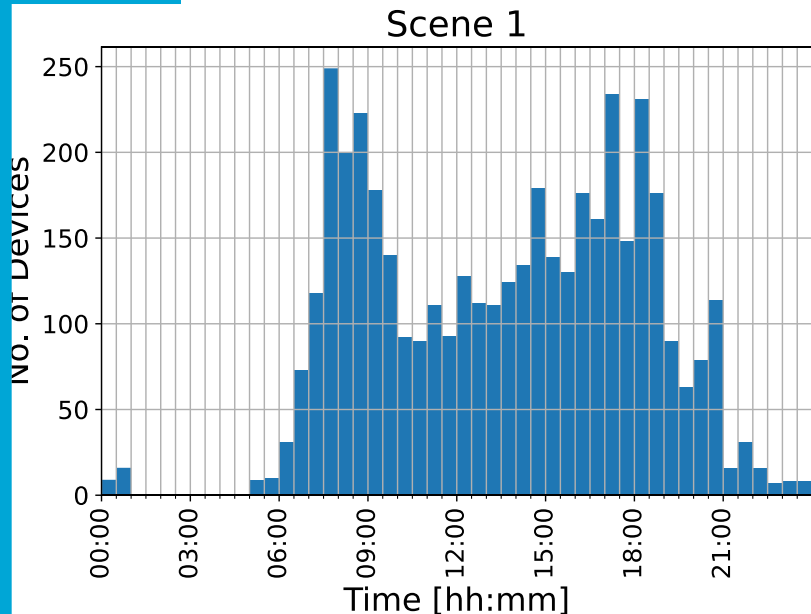
- Probe + Non-probe packets
- Threshold on RSSI
- Hardware
 - Pi 4
 - WiFi Adapter
- Software
 - Ubuntu 20.10
 - Dumpcap
 - Python
- 5 Scenes



Scenes

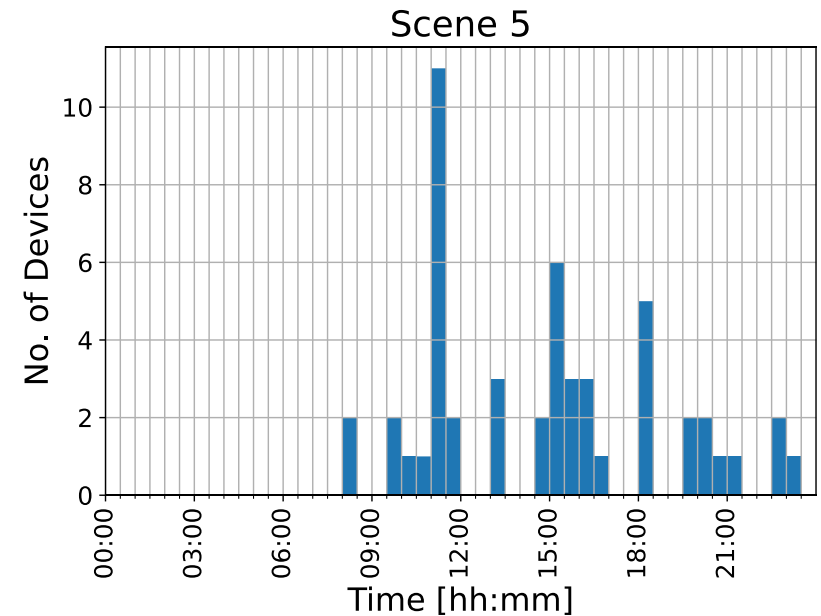
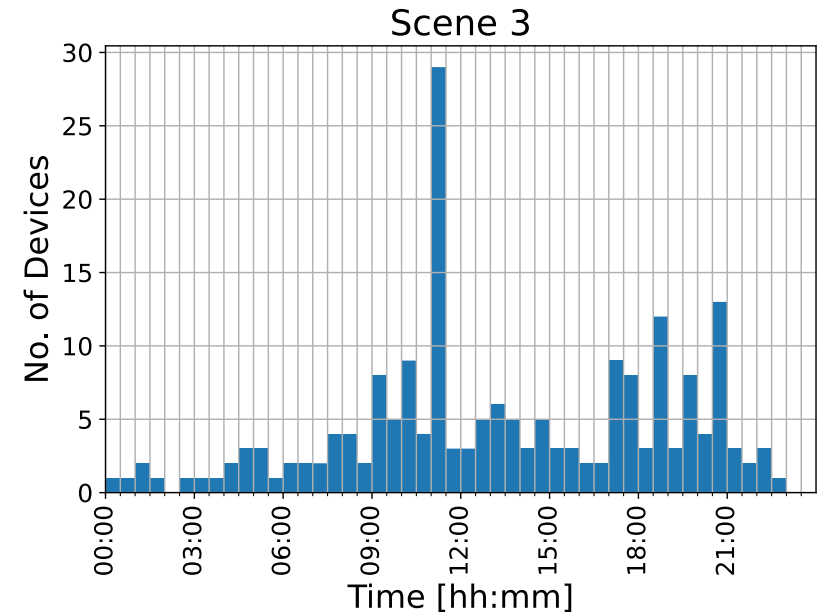
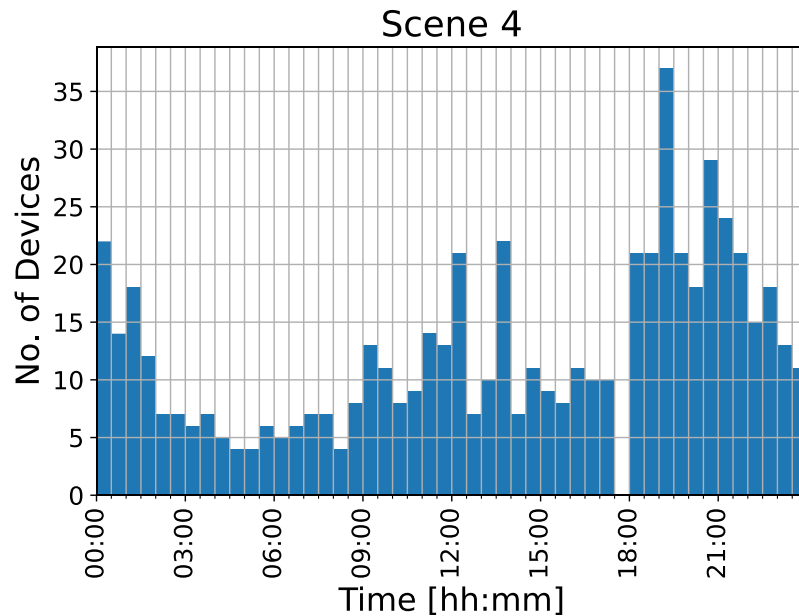
24h measurement at each scene

- Delft Station Bicycle Parking 1
 - Weekday
 - Weekend



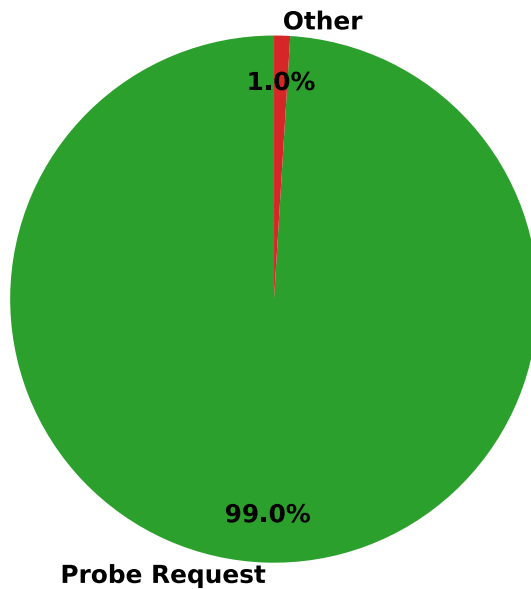
Scenes

- Residential Building
 - Bicycle Parking
 - Corridor
 - Mailbox Room



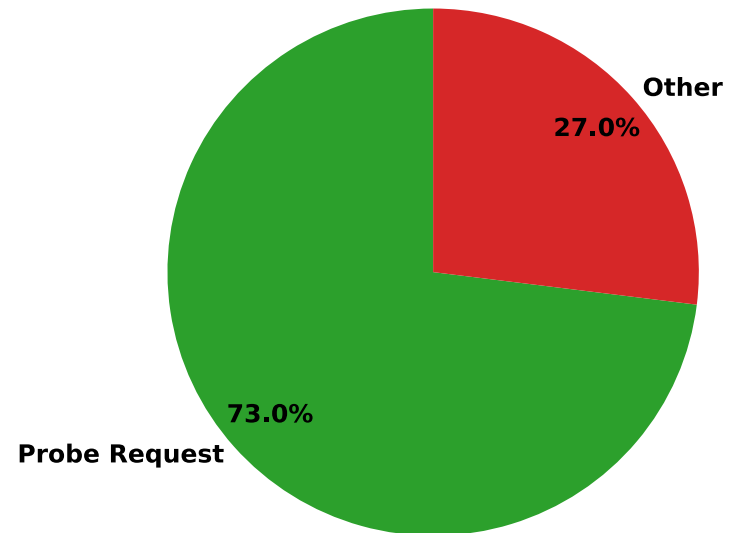
Means of detection

Scene 1



Delft Station Bicycle Parking 1

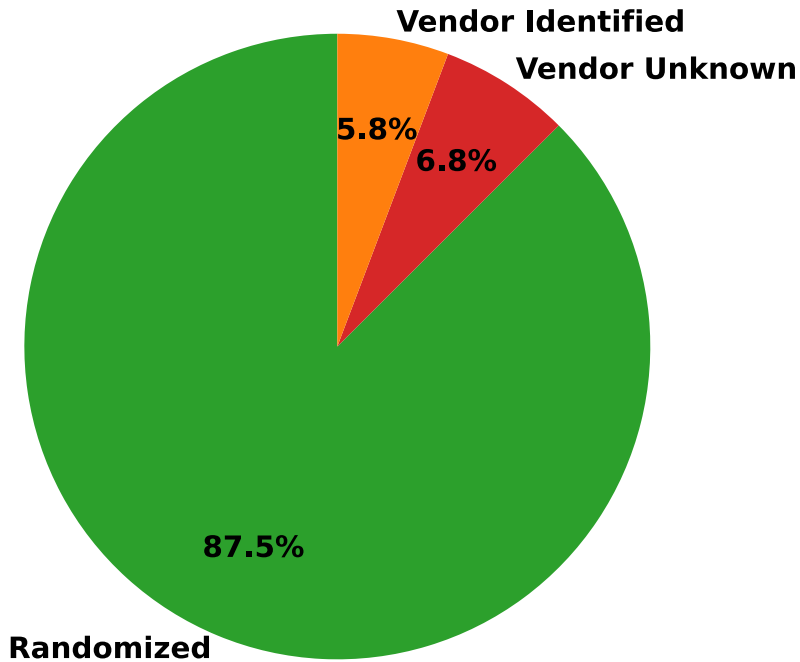
Scene 4



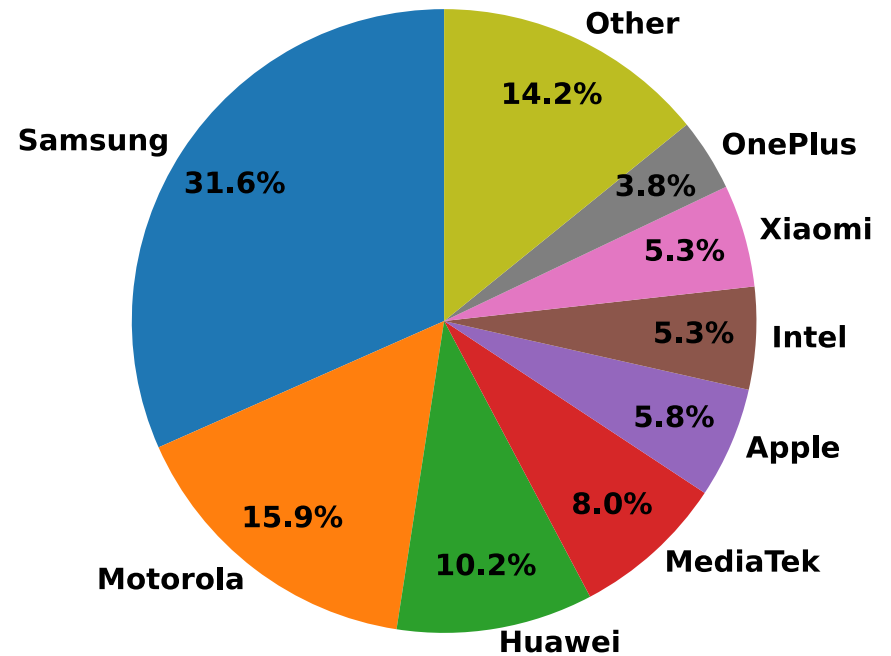
Residential Building Corridor

MAC address vendors

MAC Address Vendor Lookup



Identified MAC Address Vendors



Conclusion

- Analysis of WiFi packets can be used to monitor crowd patterns at a location.
- At public places not having any open WiFi networks, probe requests are sufficient to detect the WiFi stations in that area
- However, at locations where most stations are expected to be associated with an access point, other frame types need to be captured as well.

Questions



<https://gitlab.ewi.tudelft.nl/et4394/2020-2021/wn-group-08>