Everything You Need to Know About RSSI

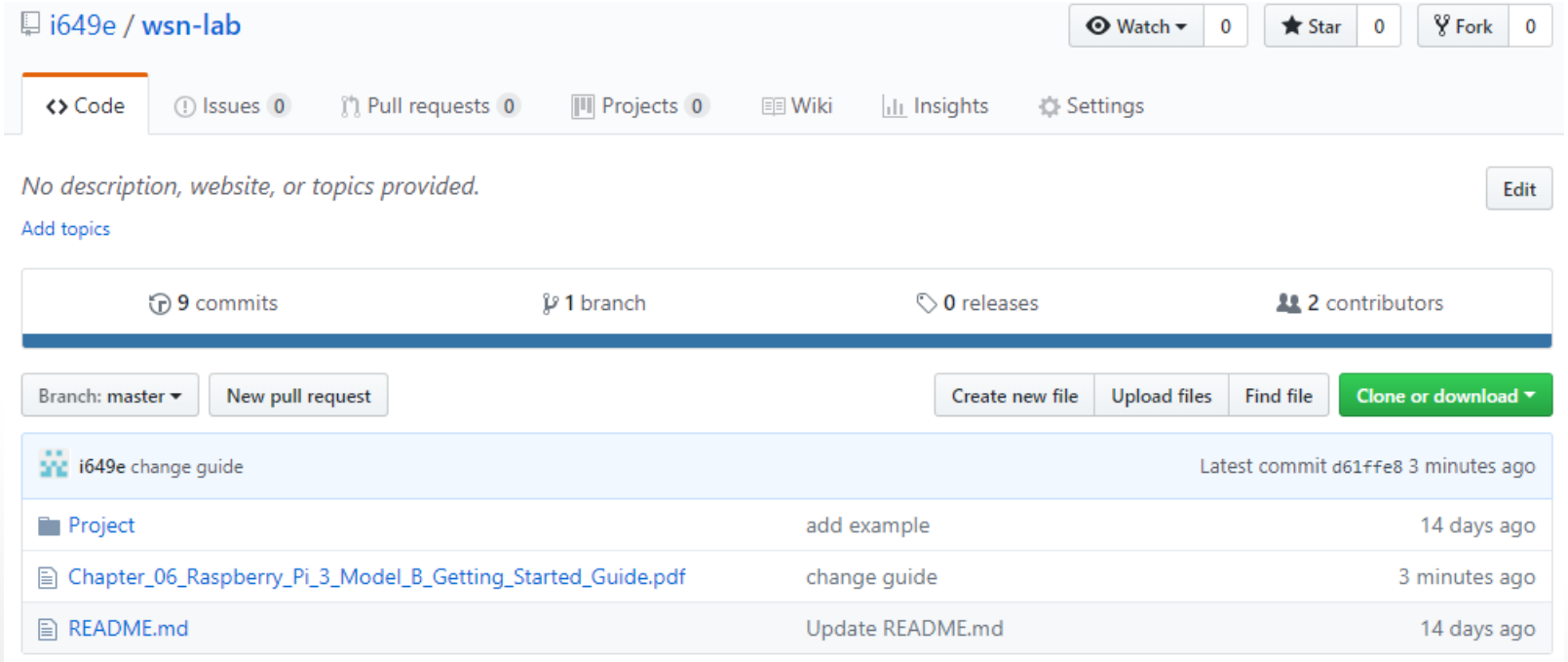
Nantawat Pinkam

I649E Wireless Sensor Networks

July 11, 2018

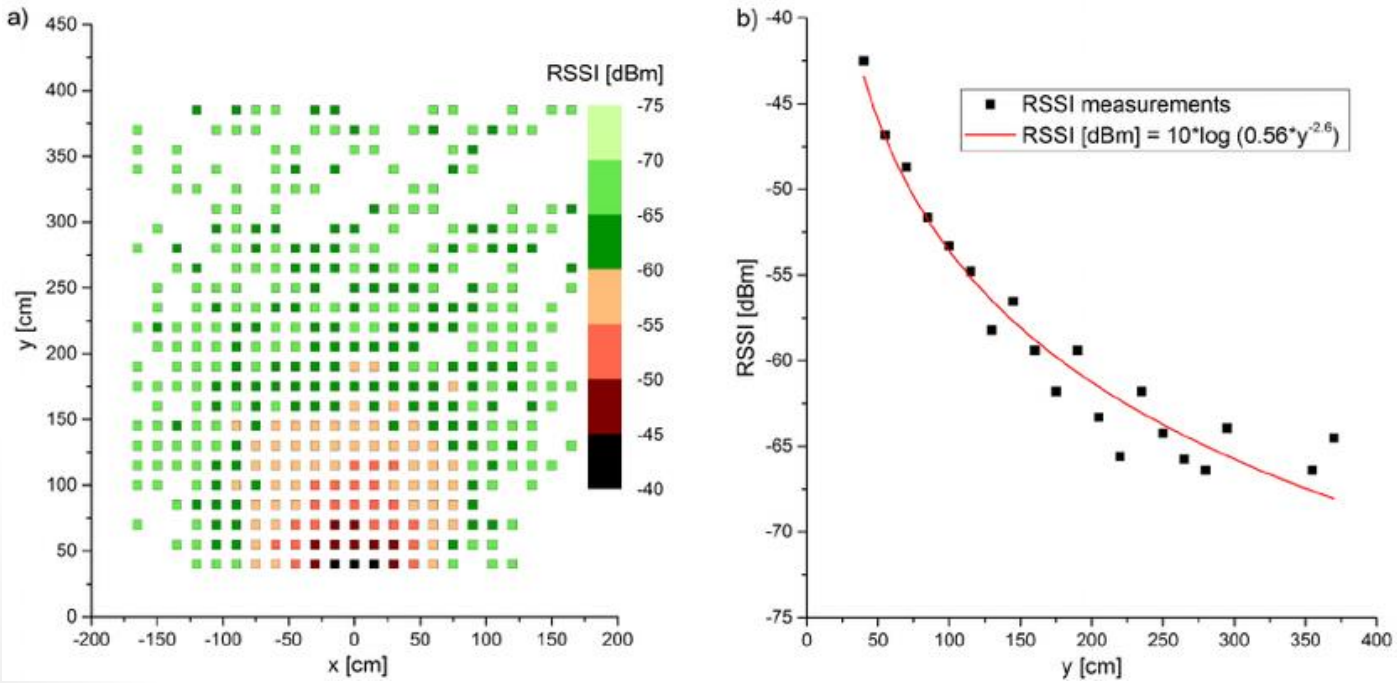
I649E's Github

https://github.com/i649e/wsn-lab



Received Signal Strength Indication (RSSI)

RSSI indicates the power present in a received radio signal.



https://www.researchgate.net/publication/276927462_Development_function_and_test_of_a_static_test_bench_for_UHF-RFID_ear_tags

Log Distance Path Loss Model

$$PL_{d_0 \to d} = PL(d_0) + 10nlog_{10}\left(\frac{d}{d_0}\right) + \chi$$

$PL_{d_0 \to d}$ = path loss at an arbitrary distance d

$PL(d_0)$= path loss at distance d_0

d_0= initial distance. **Usually set it very small ≈ 10cm**

d = arbitrary distance

n = path loss exponent

d = current distance of the node

χ = gaussian noise with $N(0, \sigma^2)$

Find n (Path Loss Exponent) of the Environment

1. Place two raspberry pi according to d_0 value
2. Read RSSI from the device and record it
3. Place two raspberry pi further away from each other (d = 1-2 m)
4. Read RSSI from the device and record it
5. Use log distance path loss model to find the path loss exponent n

Note: the path loss exponent n depends a lot on environment, node positions and different nodes may have different values. Try to find the indoor open area with a clear line of sight to get a good value.

https://www.gaussianwaves.com/2013/09/log-distance-path-loss-or-log-normal-shadowing-model/

Raspberry Pi RSSI

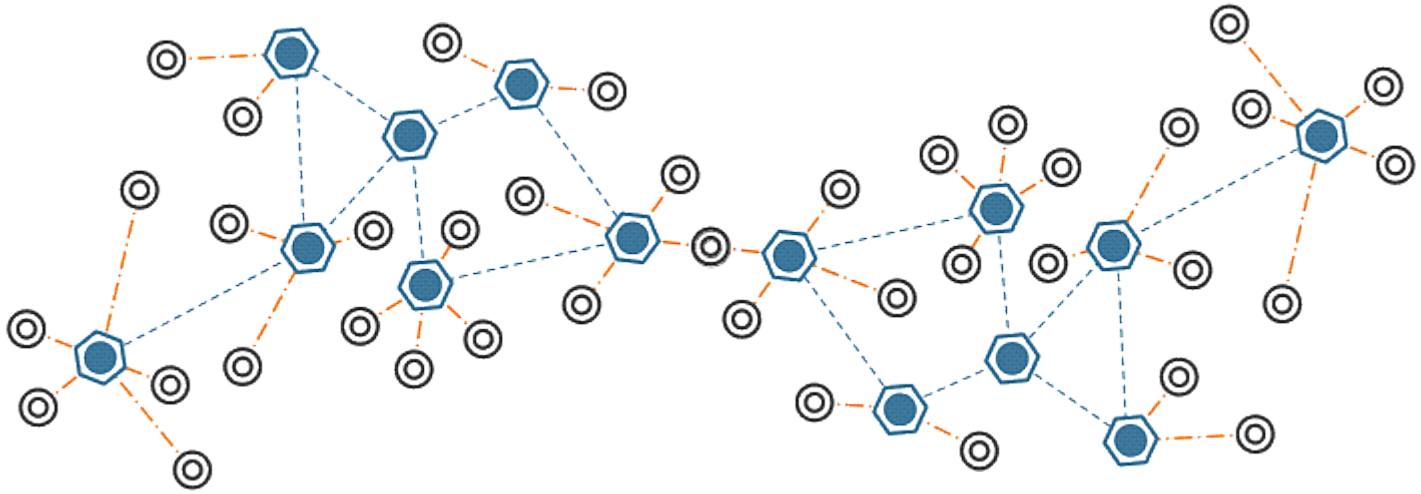
When two nodes are in the same network, they can get RSSI of each other using:

```
iw dev wlan0 station get <destination_mac_address>
```

The result should be like this:

```
Station xx:xx:xx:xx:xx:xx
rx packets: 400605
tx packets: 225023
tx failed: 3
rx drop misc: 2641
signal: -48 dBm << This is your RSSI reading!
tx bitrate: 72.0 MBit/s
```

Question and Answer



THANK YOU.