Consumer Interaction in Store

Part 3. Knowing the order of item pickup

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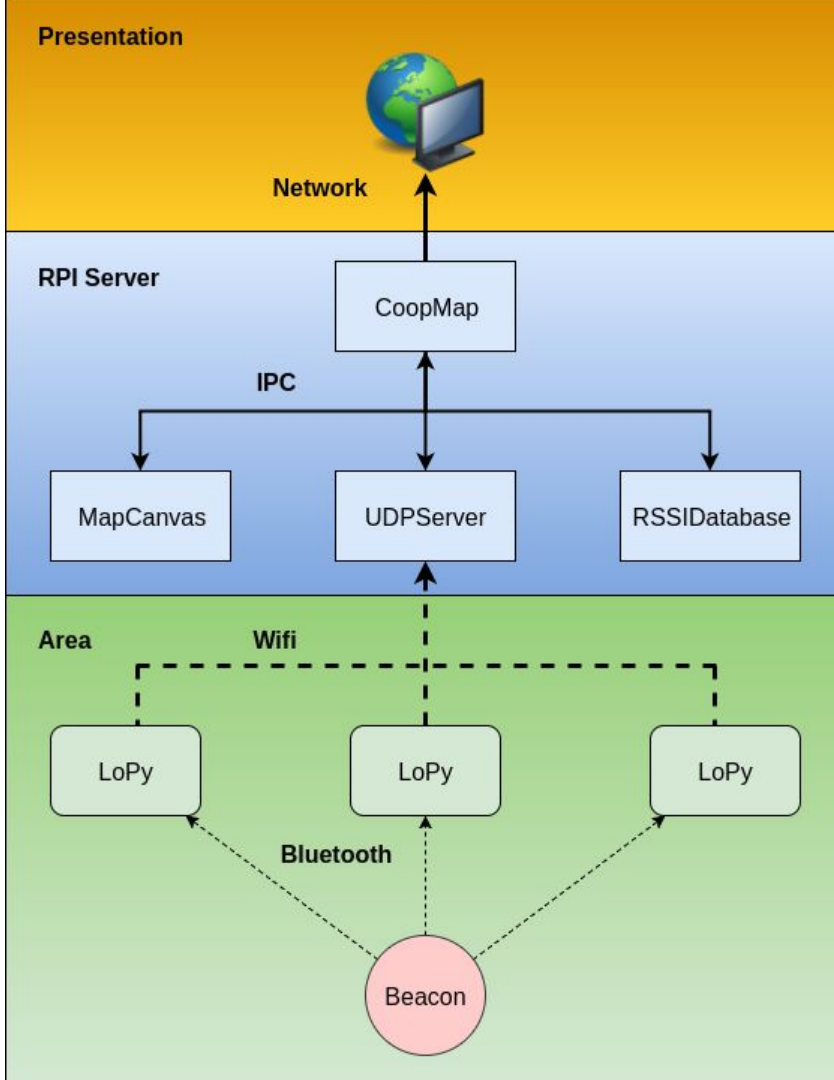
Disposition

- Quick recap
- RSSI Data Collection
- Hardware specific differences
- Experiment
- Live demo
- The future of the project

Quick Recap

- Raspberry Pi
- Lopy setup
- Beacons



Beacons

Estimote BLE beacon in baskets

Makes the basket trackable

Cheap and long lasting technology

+

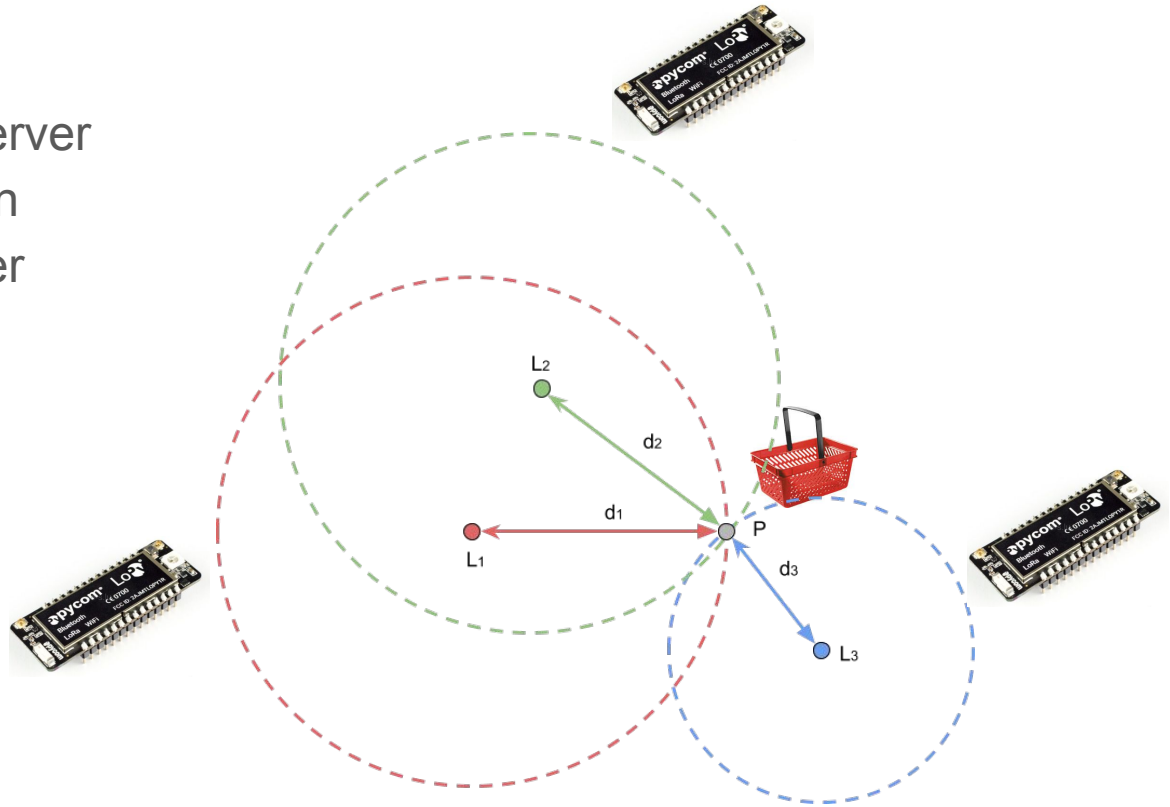
Settings:

Interval of advertisement (100ms)

Transmit power (4 dBm)

Lopy setup

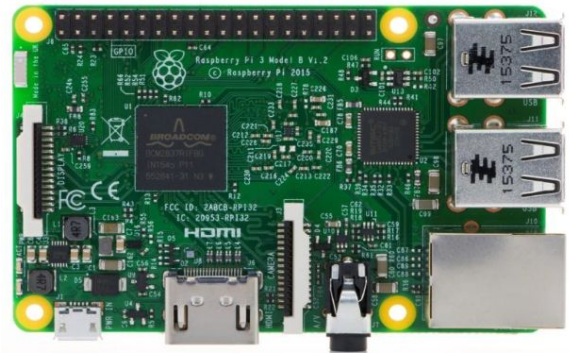
- Connecting to server
- Beacon detection
- Sending to server
- Min. 3 receivers

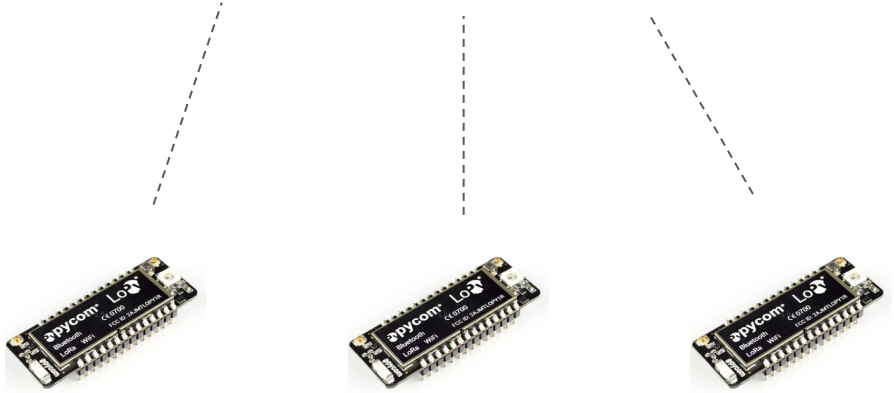


Raspberry Pi

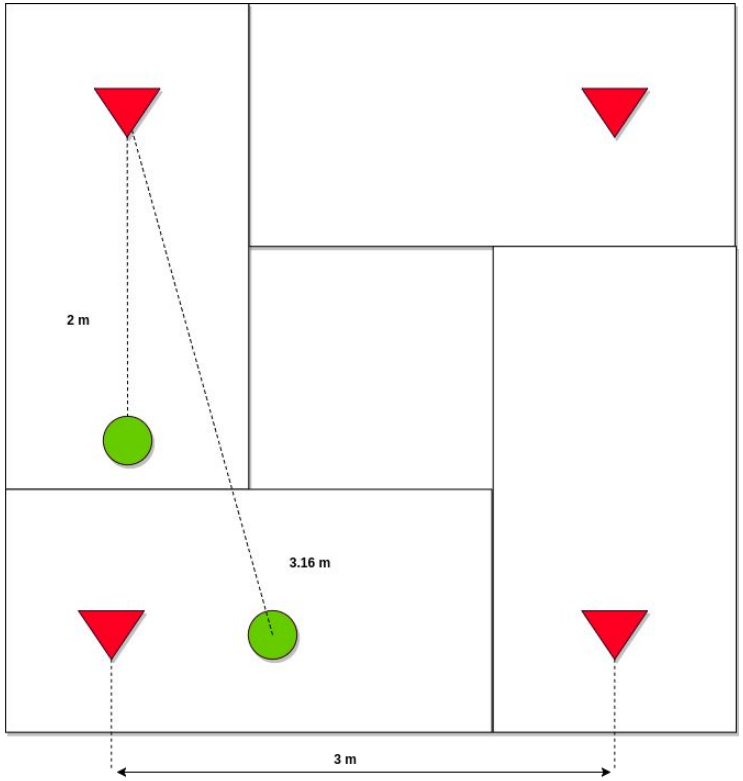
Job of the Pi

- Is a Wifi Access Point
- Is the a server for the system.
- Has a database for data
- Calculates coordinates in relation to receivers
- Drawing coordinates on a map
- Save data to log files





RSSI data collection



4 dBm, 100 ms

Hardware specific differences

- Hardware behavior.
- Individual calibration.
  - One equation.
  - Individual constants for calculating distance in relation to RSSI. for each pair of receivers and beacons

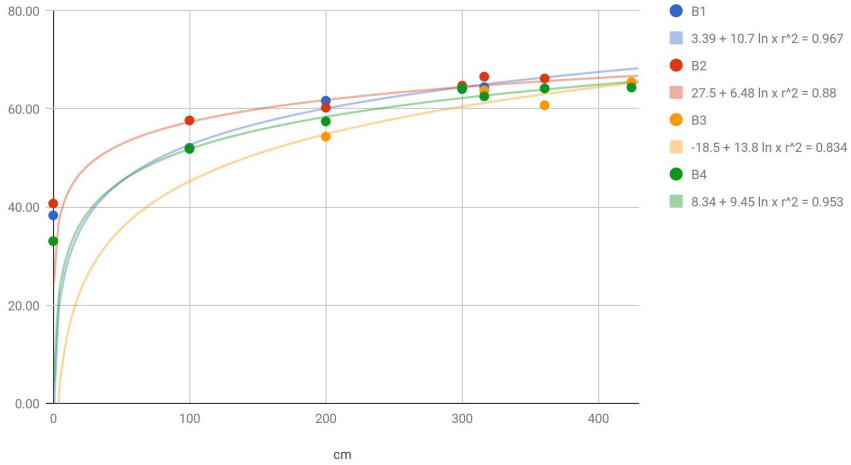
x: distance

y: rssi

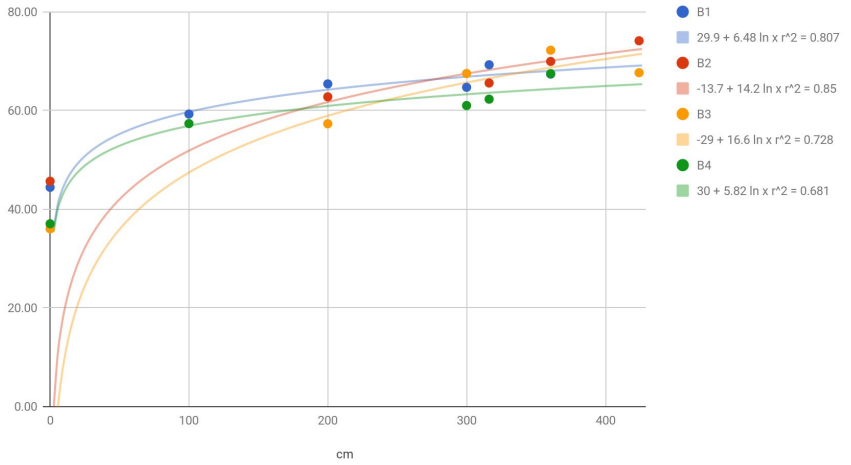
a, b: individual constants

$$x = e^{\frac{(y-a)}{b}}$$

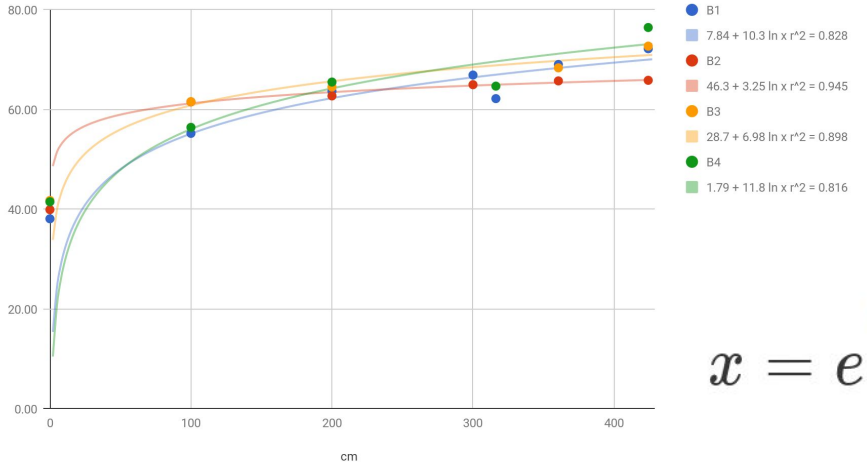
R1



R2

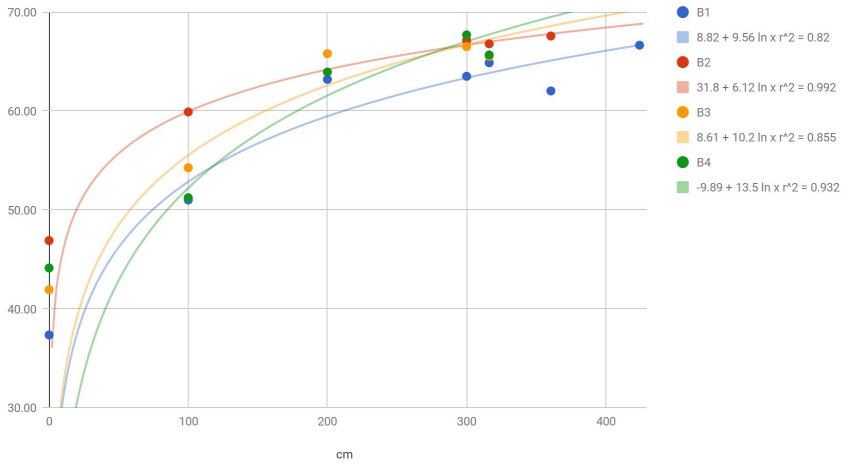


R4



$$x = e^{\frac{(y-a)}{b}}$$

R3

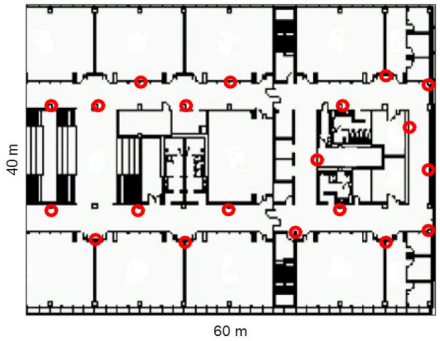


Experiment

1. Measured the actual position of each beacon
2. Ran the program and logged the coordinates into a file
3. Calculated the difference between the coordinates and the physical position

Zhuang et al.

Accuracy of < 2.56 m at 90%
1 beacon per 9 meter
Combination of methods: Fingerprinting, Trilateration and others.



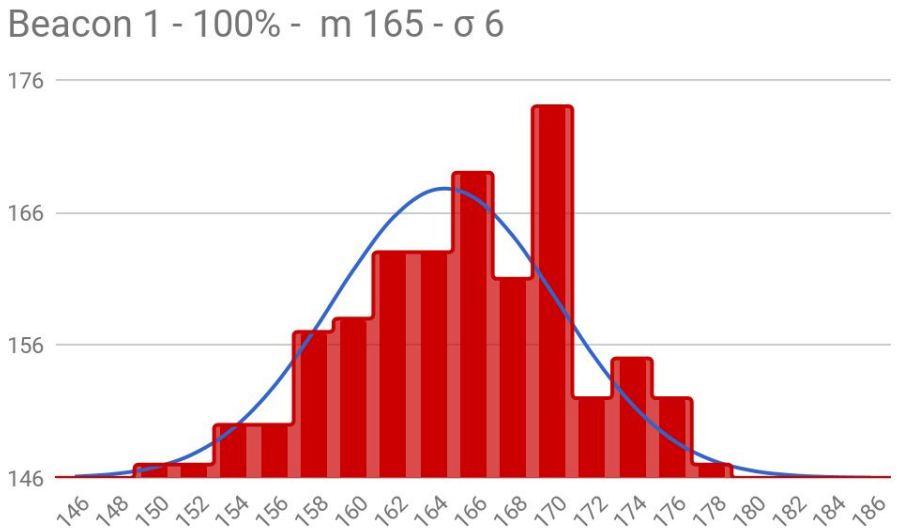
Results (Accuracy at 90%)

Beacon 1: 1.71 m

Beacon 2: 118.6 m

Beacon 3: 7.79 m

Beacon 4: Not enough data



Live demo

Future approach if this was to continue

- Examine beacons in order to understand why they behave different.
- Correlate basket content with paths in order to highlight associations rules between items.