

Allen Nguyen

Port of Japanese Friendship Garden Android app
Haiku Hunt into iOS

Update for July 9nd
Week 2

Prime internship in Osaka, Japan

In collaboration with BPOC, PRIME, NICT, ISID, & Japanese Friendship Garden

Project Overview

- Deployment of iBeacons on iOS platform
 - Two main objectives
 - 1.) Port Android Haiku Hunt application written by Jesus Rios of PRIME 2013 onto iOS
 - 2.) Map user location using iBeacons
 - Possible future uses:
 - Delivering data to users when they reach a certain location
 - Monitoring user location

Progress for This Week

- Followed up on a few of Dr. Haga's suggestions
 - Making a graph of predicted distance values (based off of RSSI, which is the signal strength of the iBeacons) to have a sense of how much they fluctuate
 - Measured RSSI values over time at .5 second intervals for a duration of 50 seconds for each trial.
 - Subsequent trials increased the distance by .5 meters. 0.0 meters was the 1st trial, 5.0 meters the last.
 - Tried mapping location by trilateration (using distances from known points to calculate location). Used a grid of iBeacons at known coordinates in the X-Y plane

Problems Encountered

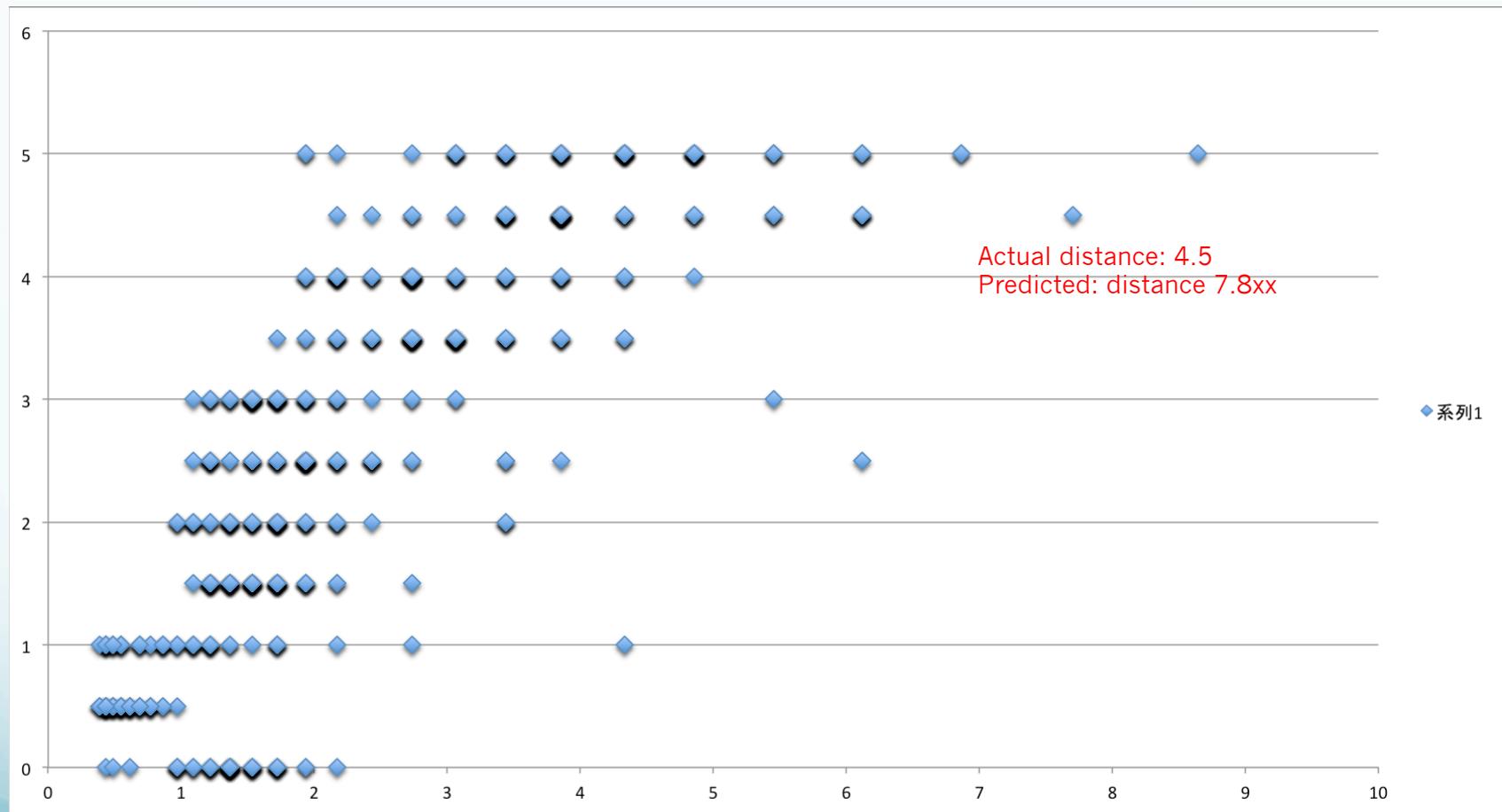
- Using a grid a good starting point; however, the grid has no effect on curbing fluctuations in iBeacon signal strength (which translates to distance measured)
- Single iBeacons much too inconsistent to be reliable, as shown by RSSI/distance samples. Need to explore other approaches further to try and restrict RSSI/distance to a less dynamic range
 - Too many external factors resulted in extreme spikes/dips in signal strength like orientation of device, direction user is facing, Bluetooth waves easily absorbed by human body or reflected by walls/obstructions, etc. => adverse effect on predicted distance

Plans for Next Week

- Explore possible workarounds to increase iBeacon consistency in signal strength
 - Cluster multiple iBeacons
 - Sample RSSI over time before using an averaged RSSI in distance calculations
 - Other approaches?

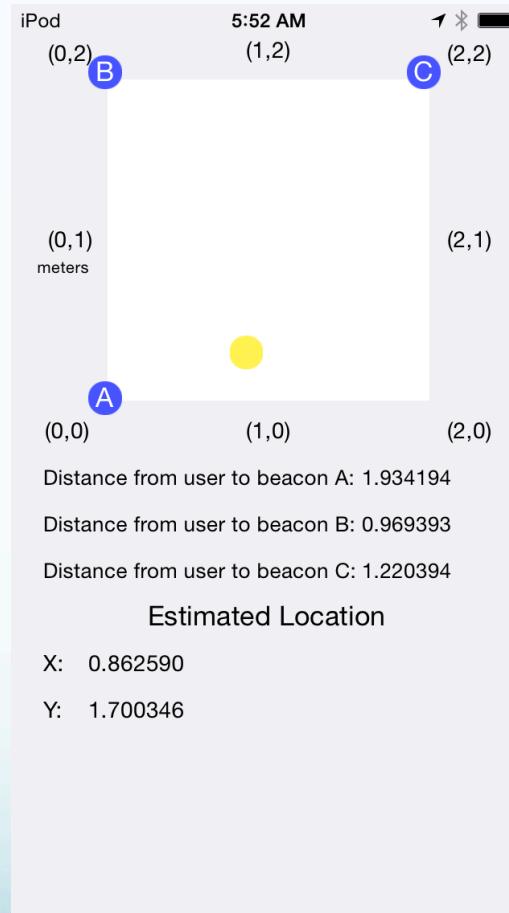
Sample of RSSI/Predicted Distance at Various Actual Distances

Y axis is actual distance from iBeacon in meters

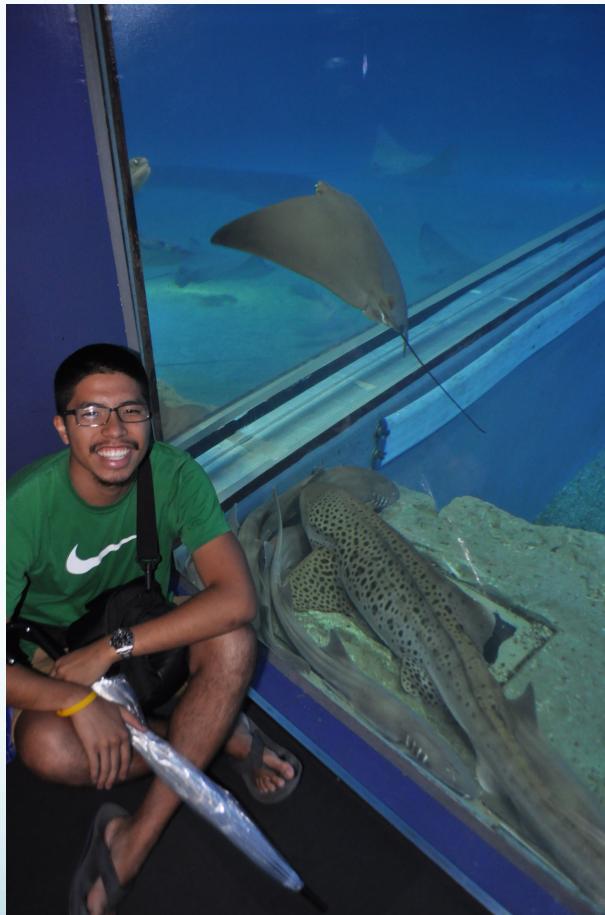


X axis is distance predicted from RSSI values in meters

Grid Location Mapping



Cultural Appreciation



Osaka Aquarium

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