Homework 3 (Due the May 12th)

To develop a system deployed on large industrial campuses, in shopping malls, etc., to help people to navigate a complex, unfamiliar interior space without getting lost. GPS works fairly reliably outdoors, but it generally doesn't work well in indoor spaces. Instead, "WiFi fingerprinting" uses Machine learning approaches to determine a mobile device user's location in indoor environments. Specifically, Wifi fingerprinting uses the signals from multiple wifi hotspots within the building to determine location.

1. Read the paper Torres-Sospedra, Montoliu, Martínez-Usó, Avariento, Arnau, Benedito-Bordonau, and Huerta (2014)

2. Download the large database of wifi fingerprints for a multi-building industrial campus with a location (building, floor, and location ID) associated with each fingerprint: https://archive.ics.uci.edu/ml/datasets/ujiindoorloc

3. Read Potortì, Barsocchi, Girolami, Torres-Sospedra, and Montoliu (2015) and develop a machine learning model to produce a localization solution for observations in the validation dataset (i.e. 1,111 observations). Provide accuracy measure of your solution. Tip: for simplicity, you want to use RSSI (i.e. signal strength measurements of high dimensions) to predict locations (i.e. Building ID, Floor, Longitude, Latitude).

REFERENCES

POTORTÌ, F., P. BARSOCCHI, M. GIROLAMI, J. TORRES-SOSPEDRA, AND R. MONTOLIU (2015): "Evaluating indoor localization solutions in large environments through competitive benchmarking: The EvAAL-ETRI competition," in *2015 International Conference on Indoor Positioning and Indoor Navigation (IPIN)*, pp. 1–10. IEEE.

TORRES-SOSPEDRA, J., R. MONTOLIU, A. MARTÍNEZ-USÓ, J. P. AVARIENTO, T. J. ARNAU, M. BENEDITO-BORDONAU, AND J. HUERTA (2014): "UJIIndoorLoc: A new multi-building and multi-floor database for WLAN fingerprint-based indoor localization problems," in *2014 international conference on indoor positioning and indoor navigation (IPIN)*, pp. 261–270. IEEE.