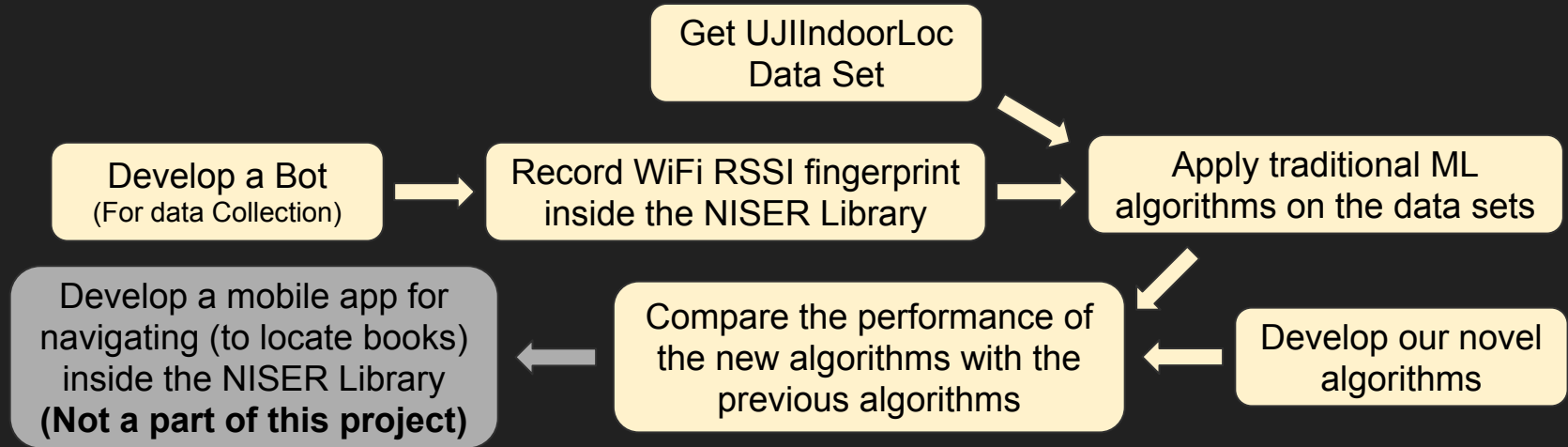# Indoor Localization using WiFi RSSI fingerprinting

(Group 13 | Rahul Vishwakarma, Jyothish Kumar J.)

Aim: To develop a novel ML algorithm for indoor localization using WiFi RSSI fingerprint mapping.

Data Sets:
1. UJIIndoorLoc Data Set: This dataset covers three Jaume I University buildings with four floors, whose total coverage area is approximately 110 m^2. This data set can be used both for classification and regression.
2. NISER Library: We will collect the RSSI fingerprint in NISER library using a bot.

Algorithms (Baseline to implement)
1. kNN (K-Nearest Neighbor)
2. ANN (Artificial Neural Network)
3. ANN with GNN(Considering the location of APs)

Our Novel Algorithm:
Based on Ray tracing and Dual-band WiFi
(Avoids overfitting, Efficient use of parameters,
Mimics the EM wave propagation)

Midway:
1. Collect RSSI data from NISER Library
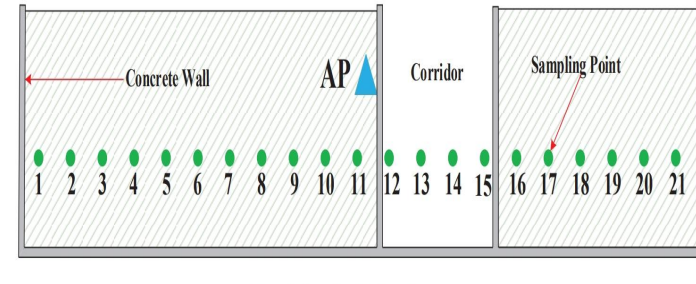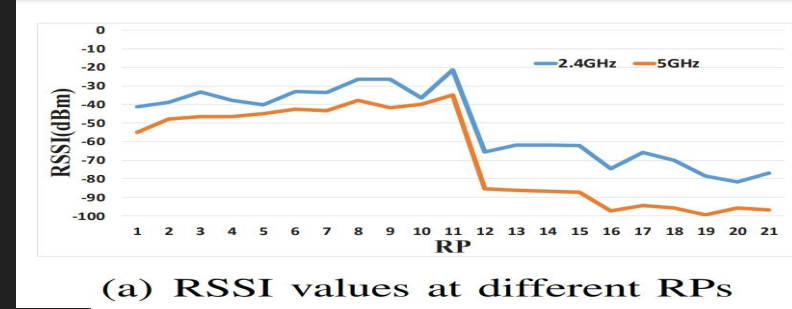2. Develop a novel algorithm

Work Division:
Jyothish: Develop Bot to Collect data
Rahul: Develop novel model, Compare performance
Together we will write the report.

Expected results: We expect that
our model will have better performance
than previous models.

(a) RSSI values at different RPs

Relevant Papers:
- Hao Zhang, Kai Liu, Qingxia Shang, Liang Feng, Chao Chen, Zhou Wu, and Songtao Guo. 2019. Dual-band wi-fi based indoor localization via stacked denoising autoencoder. In 2019 IEEE Global Communications Conference (GLOBECOM). IEEE, 1–6.
- Ashraf Tahat, Rozana Awwad, Nadia Baydoun, Shurooq Al-Nabih, and Talal A.Edwan. 2022. An Empirical Evaluation of Machine Learning Algorithms for Indoor Localization Using Dual-Band WiFi. In 2021 2nd European Symposium on Software Engineering (Larissa, Greece) (ESSE 2021). Association for Computing Machinery, New York, NY, USA, 106–111. https://doi.org/10.1145/3501774.3501790
- Behlul Numan Ozdemir and Ayhan Ceylan. 2020. Constructing a precise radio map and application of indoor positioning with dual-frequency Wi-Fi fingerprinting method. Measurement 163 (2020), 107997.