

Streamlit output pdf

Sunday, February 2, 2025 4:52 PM

Git hub link:

<https://github.com/atiagull/indoor localization using wifi>

Do these installations:

Pip install joblib

Pip install xgboost

Following is the output after running streamlit_code.py file

Shape (23,000, 177)

Data Table ↗

	Cid	AP001	AP002	AP003	AP004	AP005	AP006	AP007	AP008	AP009	AP010	AP011
0	L4-40-1	-84	-80	-71	-58	-110	-72	-71	-110	-110	-110	-110
1	L4-40-1	-84	-79	-71	-58	-110	-72	-71	-110	-110	-110	-110
2	L4-40-1	-110	-110	-70	-56	-110	-69	-68	-110	-110	-110	-110
3	L4-40-1	-110	-110	-70	-53	-110	-69	-68	-110	-110	-110	-110
4	L4-37-2	-84	-82	-75	-65	-110	-73	-75	-110	-110	-110	-110

Introduction

Aim of this project is to identify the location of person/device inside the building based on various wifi access points (APs) signals strength as well as environment variable such as open/closed room and human presence or absence. data is collected using 4 devices.

Unique identifier for the indoor region

AP001-AP172: RSS values from 172 AP

Rs: Room status indicator; 1 for open, 0 for closed rooms

Hpr: Human presence indicator; 1 for presence, 0 for absence.

Ts: Timestamp

Did: Device identifier for data collection, representing:

- D1: Samsung Galaxy Tab 2, Android 4.1.1
- D2: Samsung Galaxy Tab E, Android 5.0
- D3: Samsung Galaxy Tab 10, Android 4.0
- D4: Motorola Moto E (2nd Gen), Android 5.1

DATA VISUALIZATION

Select APs for the heatmap

AP001 ×

AP002 ×

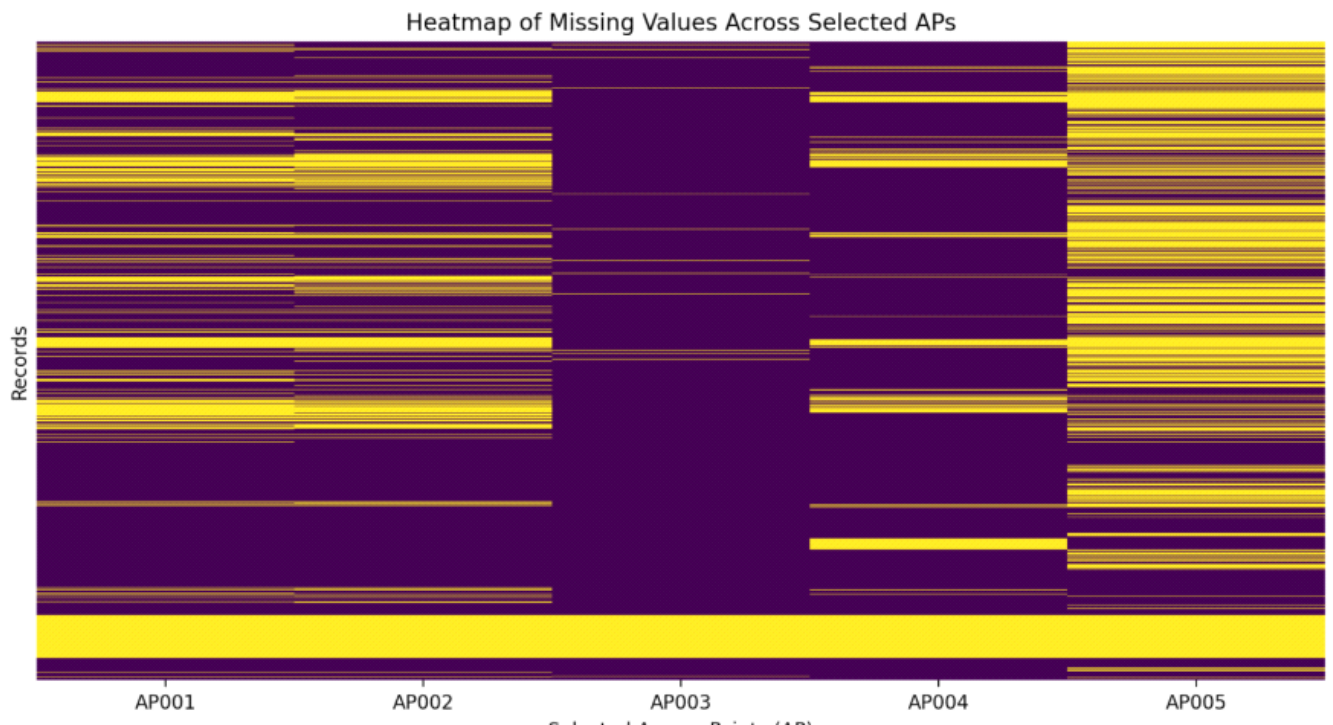
AP003 ×

AP004 ×

AP005 ×



Missing Values Heatmap (Selected AP Signal Strength)



Drop columns: The checkbox below allows you to drop Access Point (AP) columns where more than 95% of values are missing (represented by -110 dBm).

☒ Drop APs with more than 95% missing values

Choose Analysis Type

Choose Analysis Type

Signal Strength Analysis



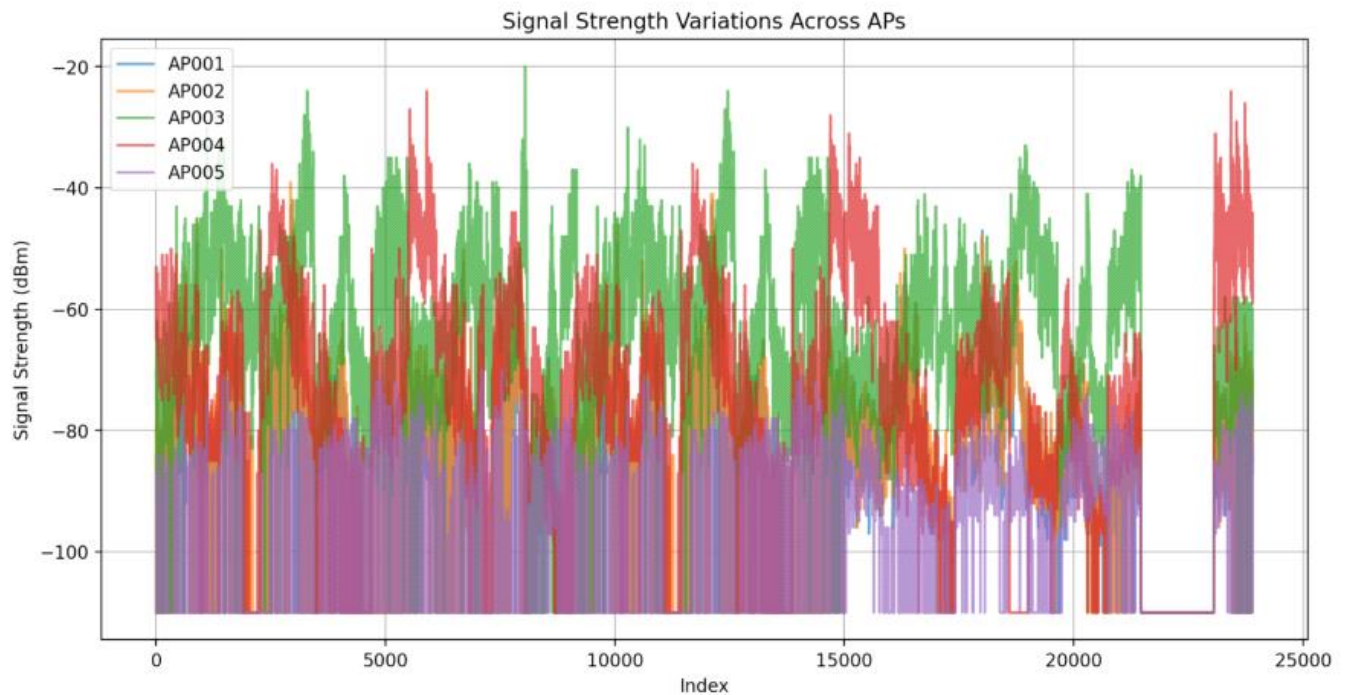
Signal Strength Analysis

Human Presence Trend

Device Analysis

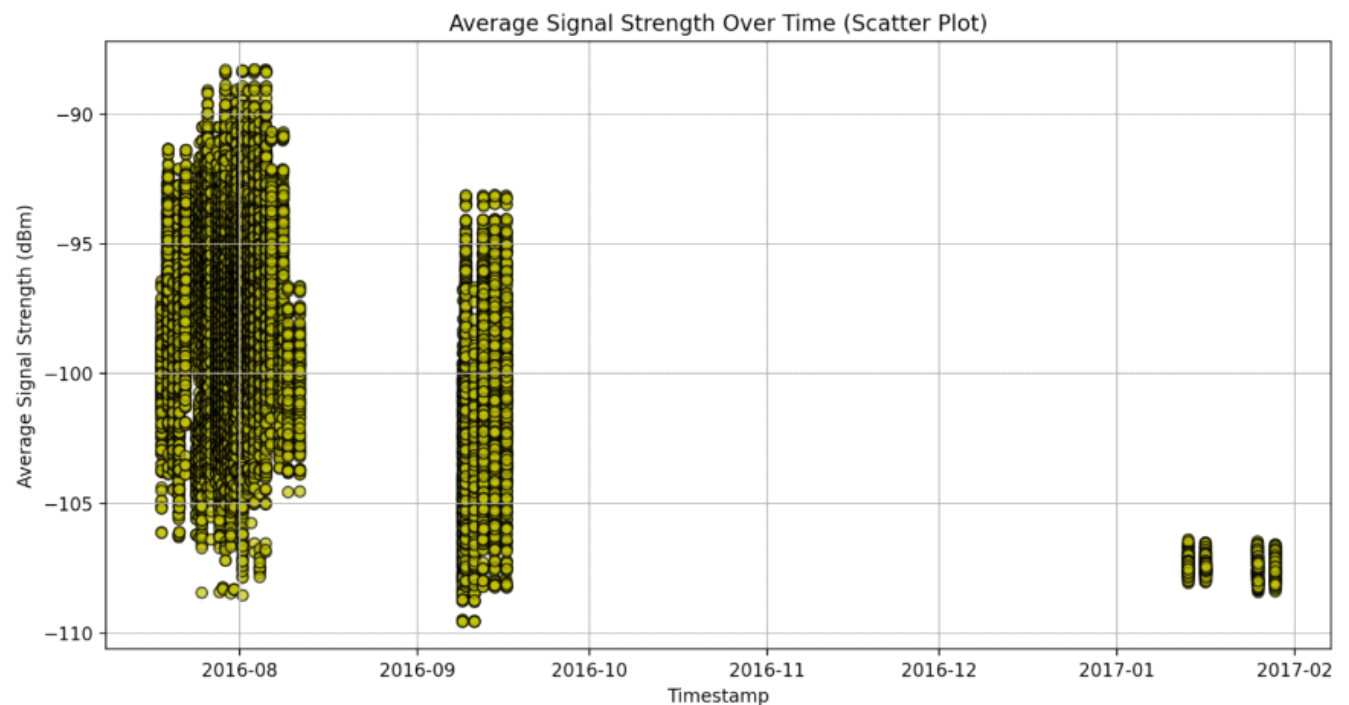
Signal Strength Variations Across Selected APs

Signal Strength Variations Across Selected APs

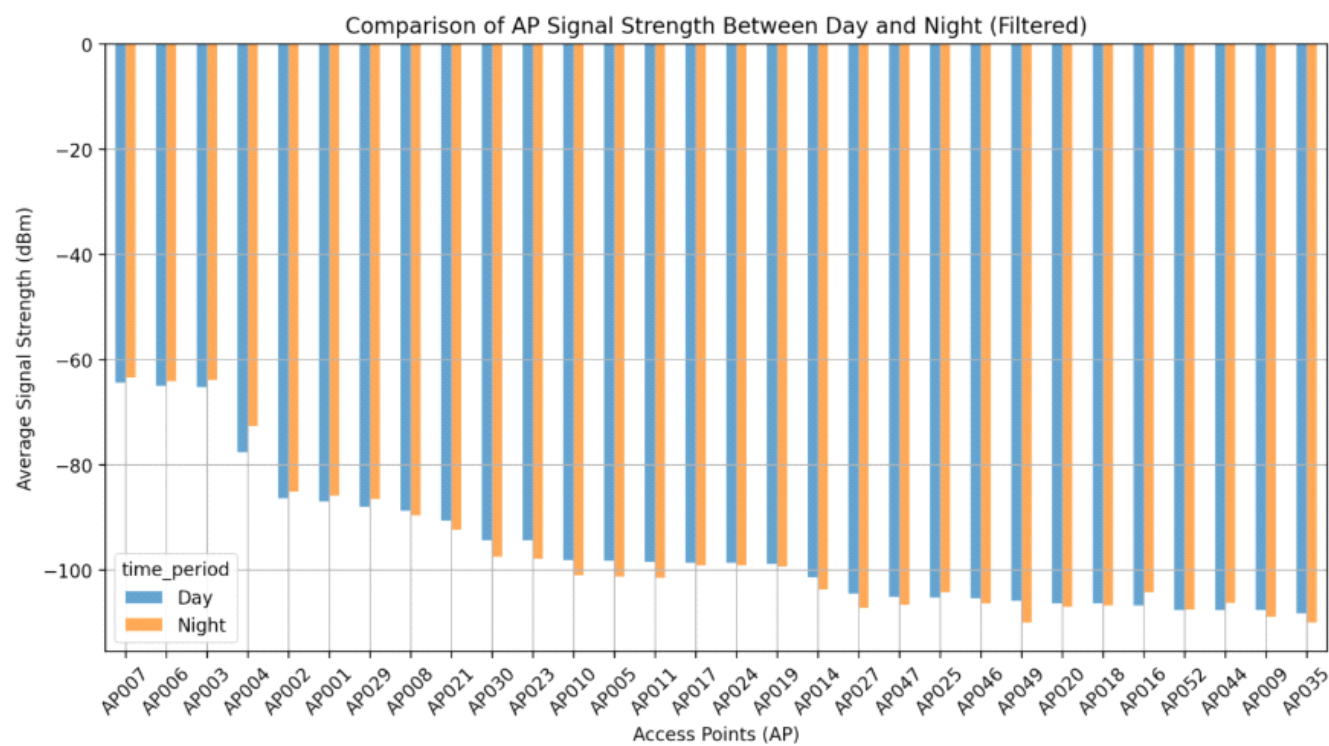


Average Signal Strength Over Time

This graph shows the time intervals during which data is collected and average value of signal strength across various timestamps



AP Signal Strength: Day vs. Night



Choose Analysis Type

Choose Analysis Type

Human Presence Trend

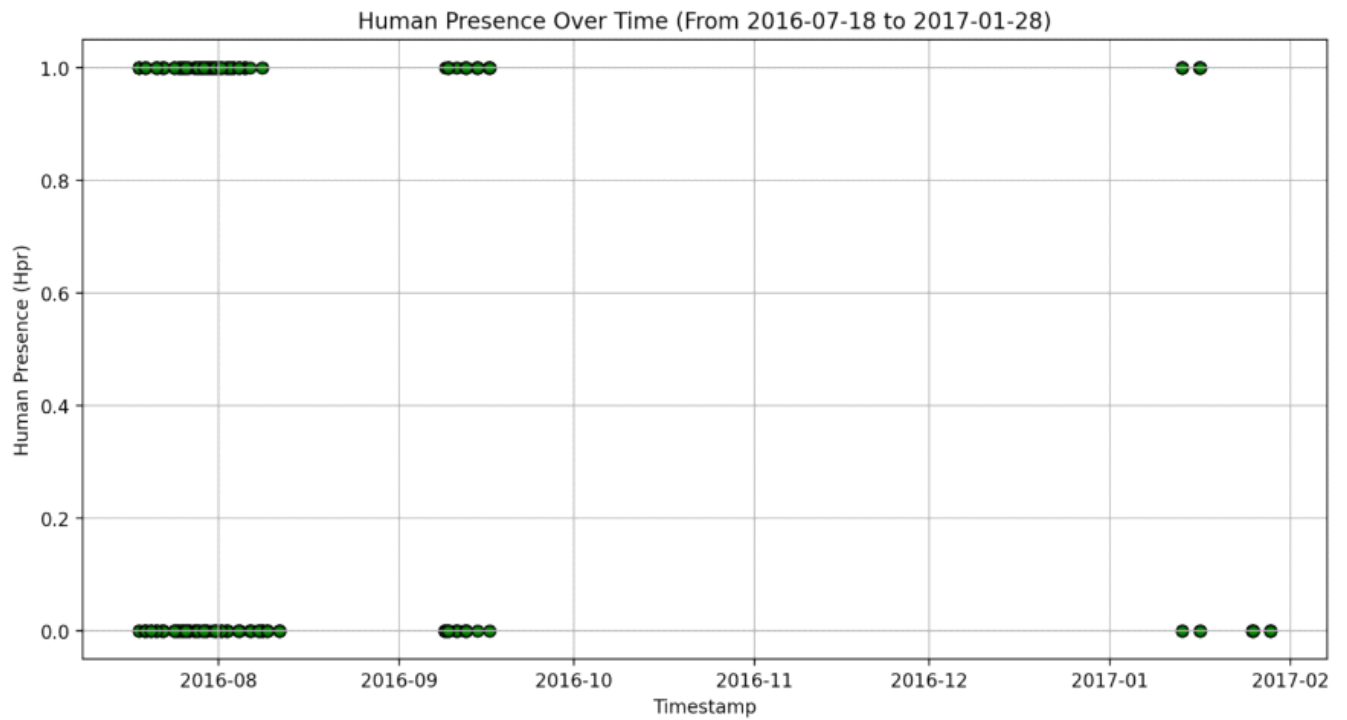


Human Presence Trends

This graph shows human presence (1 for presence, 0 for absence) over time.

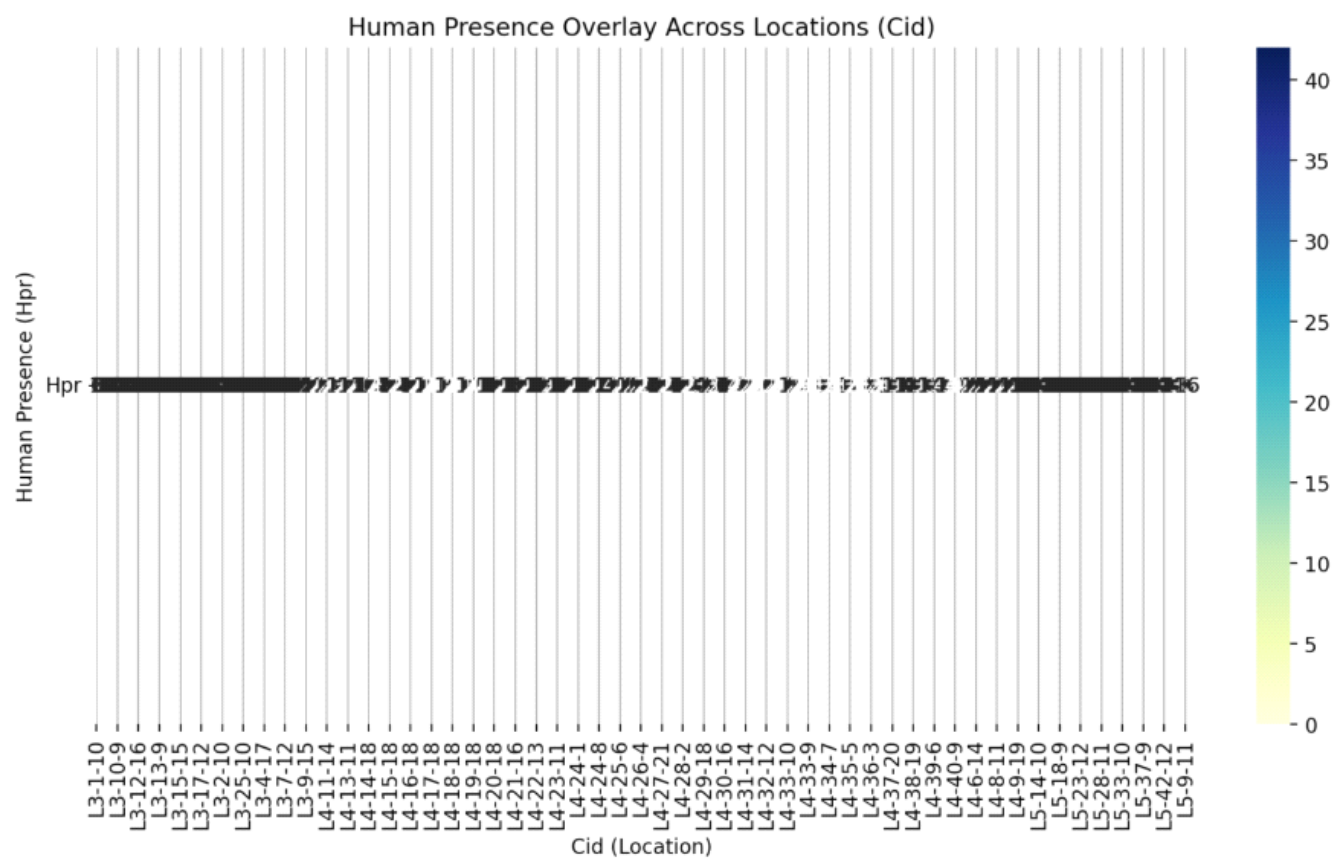
Select a time interval

2016/07/18 – 2017/01/28



Human Presence Across Locations (Cid)

This graph shows human presence trend across various locations in the building.

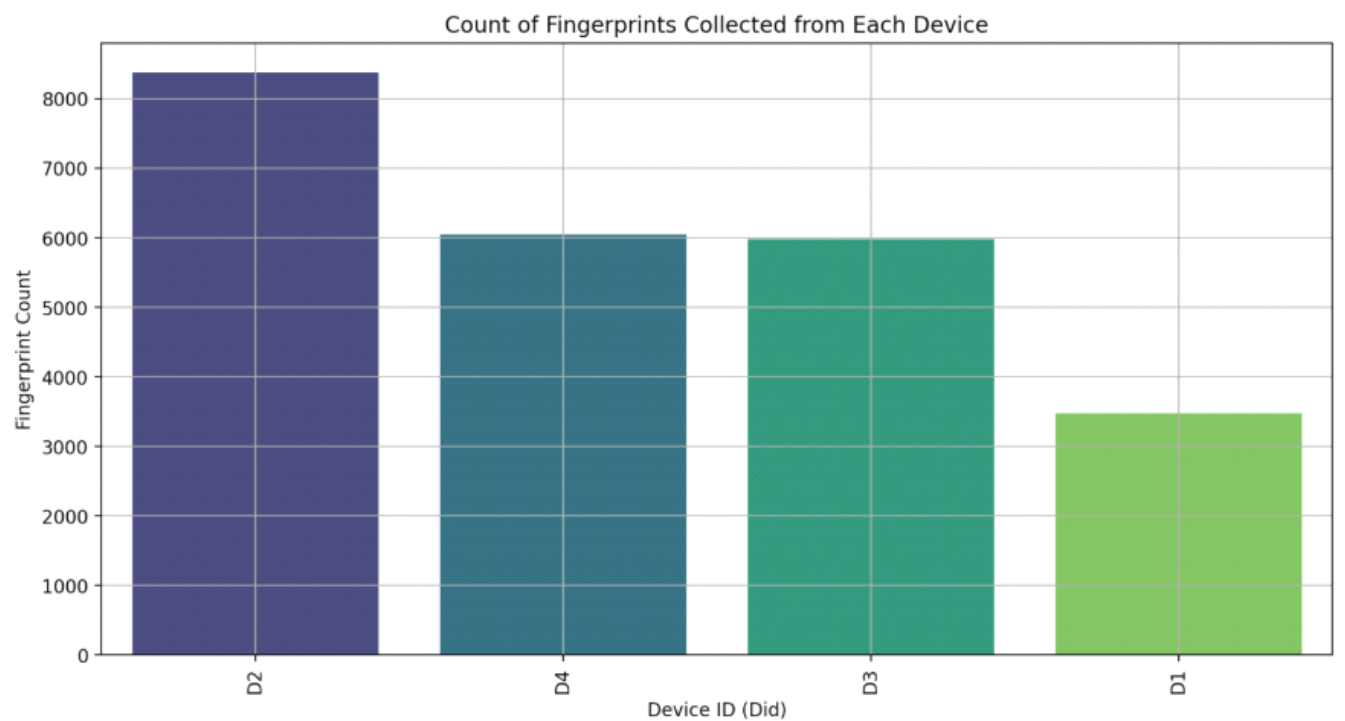


Choose Analysis Type

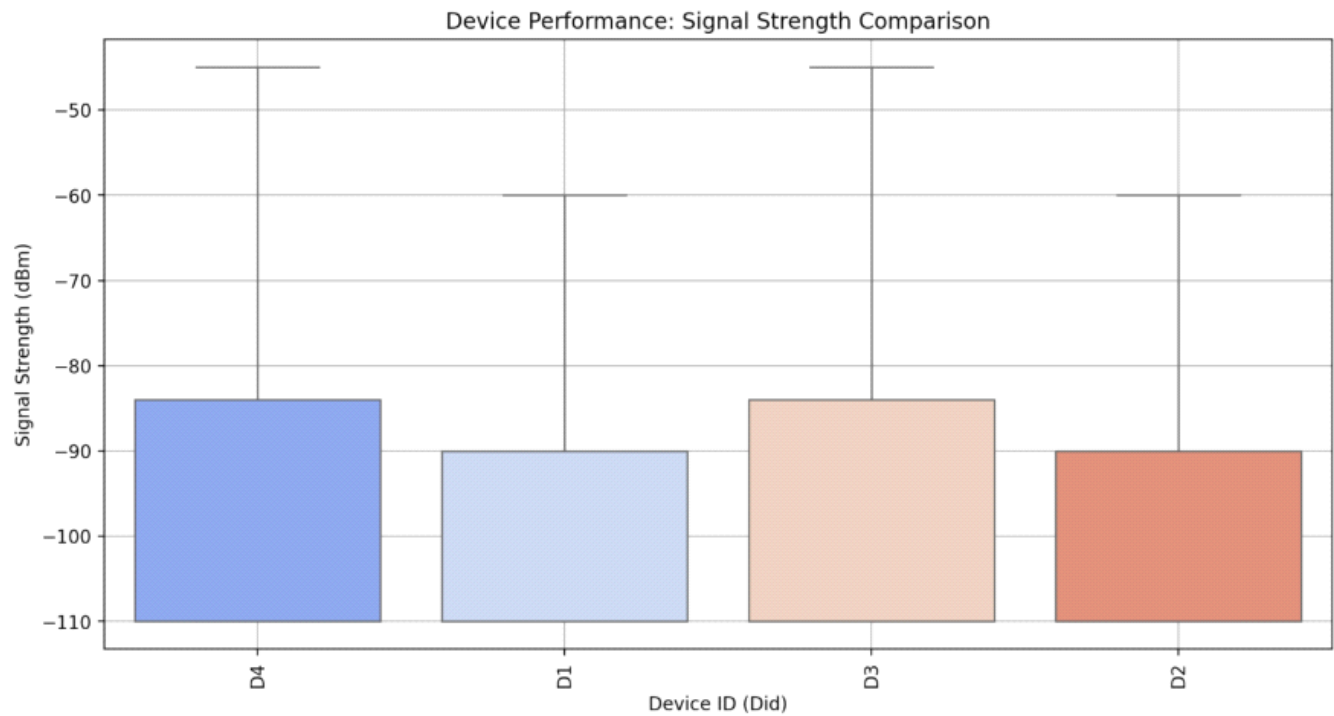
Choose Analysis Type

Device Analysis

Bar Chart of Device Usage



Device Performance Comparison (Boxplot of Signal Strength)



Model Selection

Select a model to test

KNN

Model: knn_model - Test Accuracy: 0.7355

Model Selection

Select a model to test

XGBoost

Model: xgb_model - Test Accuracy: 0.9095

Conclusion

Three models(knn,random forest,xgboost) are trained on data. ensemble learning models(random forest, xgboost) performed well on data.

random forest accuracy: 94.48%

xgboost forest accuracy: 90.95%

random forest accuracy: 73.53%

