

Indoor Location Competition 2.0

Webinar on Sample Data and Code Release

July 16th, 2020



Overview

Yuanchao Shu, Senior Researcher
Microsoft Research

History

2014 Microsoft Indoor Localization Competition

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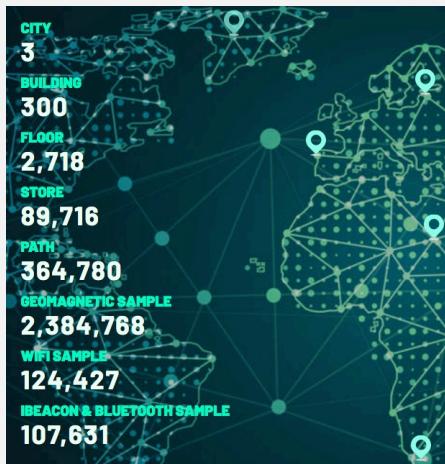
2018

2020 Indoor Location Competition 2.0



What's New This Year?

- Completely Virtual
 - Easy setup
 - Flexible schedule
 - Online ranking
- Real-world Dataset
 - Structured data with large coverage
 - Standardized evaluation
 - Research beyond competition



Timeline

April: announcement

July: sample data & code release

August: complete data release & competition launch

November: workshop & award ceremony

Competition Logistics

- Kaggle
- Evaluation metric
 - Euclidean distance between the ground truth coordinates and the estimated by the system under test coordinates.
 - The average Euclidean distance across all evaluation points will be the overall score of each team.
- Awards
 - Top 3 teams will be awarded prizes.
 - Top teams will be invited to present at ACM SenSys'20.





Sample Data & Code Walk-through

Zhe Ji, Chief Scientist
XYZ10

Our Dataset

Site 1 (Xixi Yintai)

Shuanglong Rd, Westlake District, Hangzhou, Zhejiang,
China

Five floors: B1, F1, F2, F3, F4

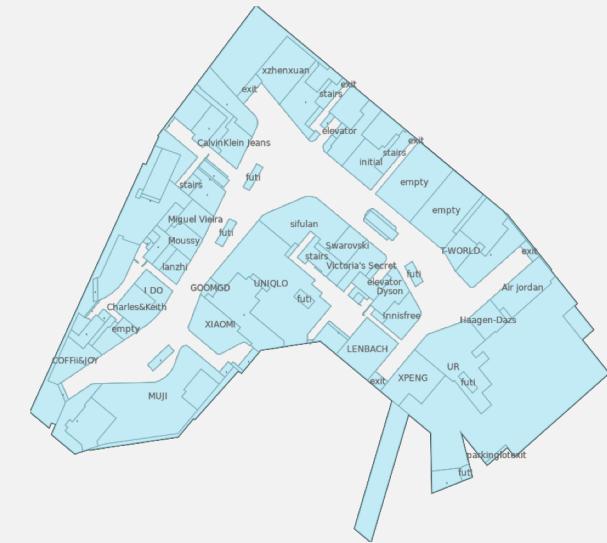
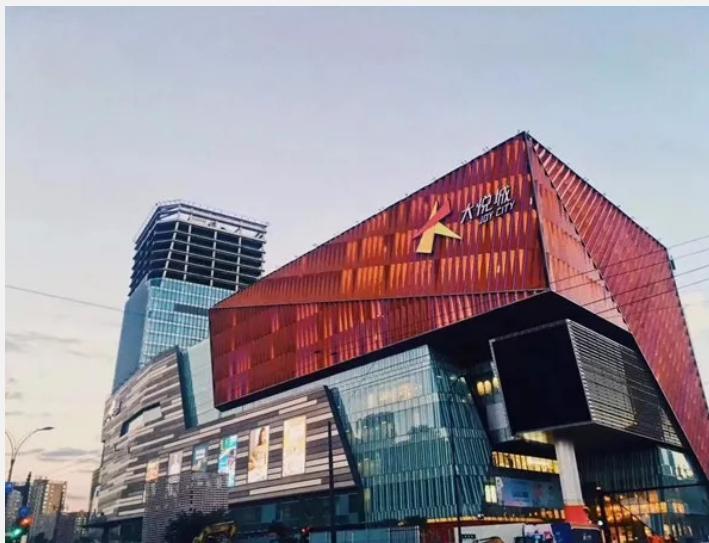


Our Dataset

Site 2 (Joy city)

Moganshan Rd, Gongshu District, Hangzhou, Zhejiang, China

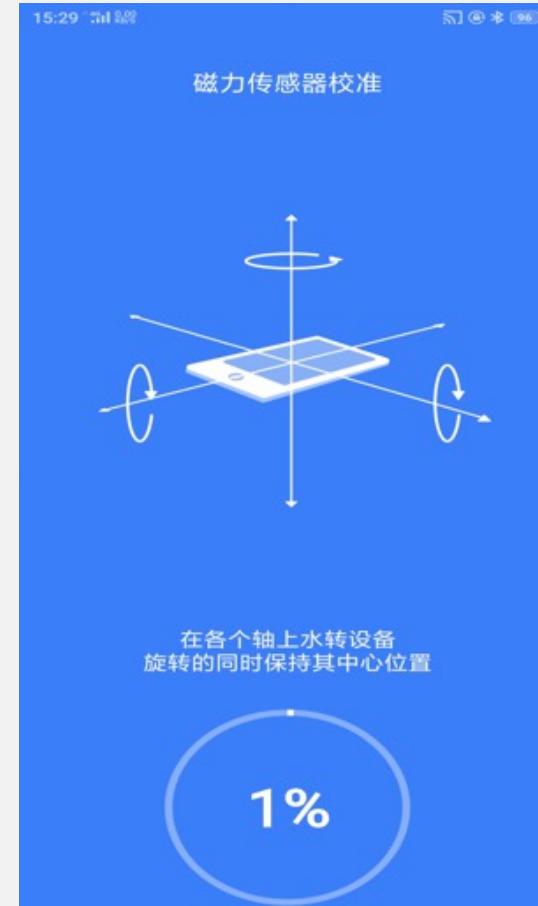
Nine floors: B1, F1, F2, F3, F4, F5, F6, F7, F8



Contents

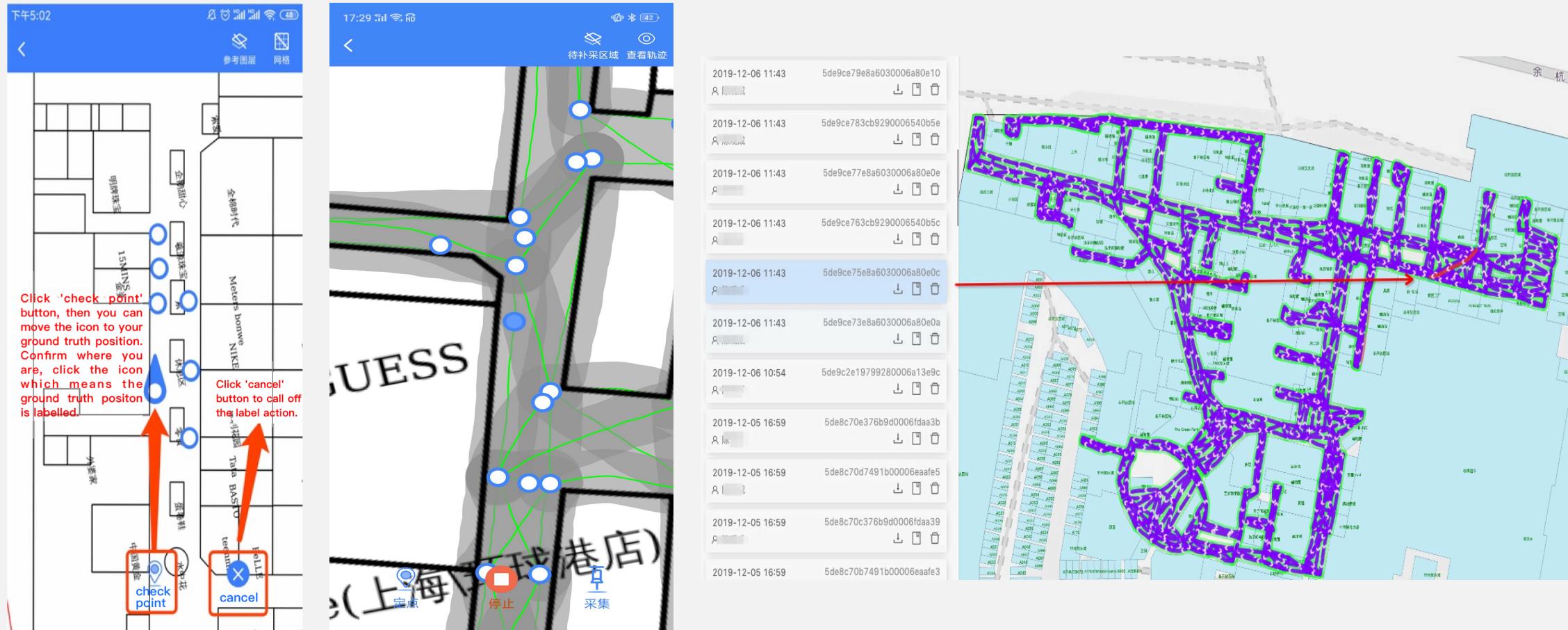
The data collection

1. Check the permission and calibrate the sensor



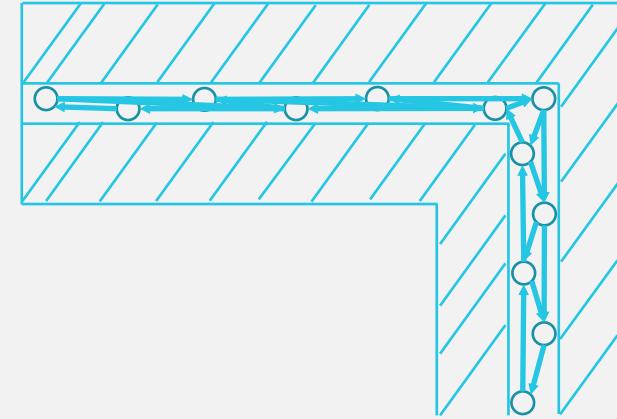
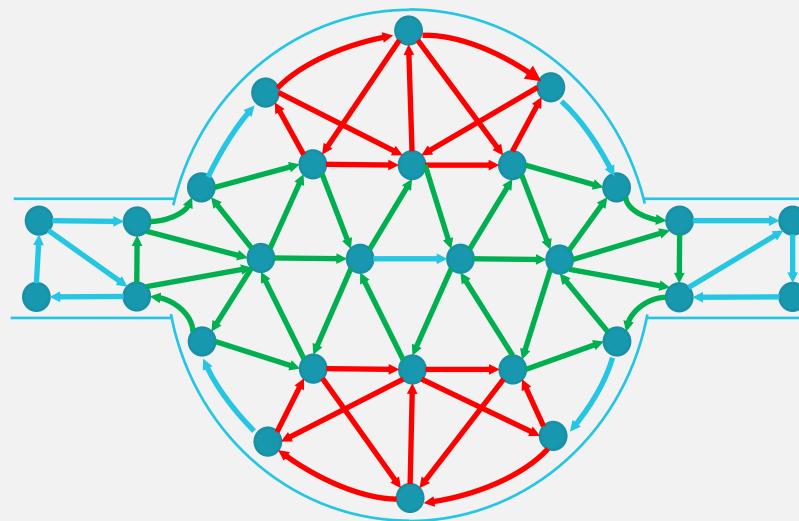
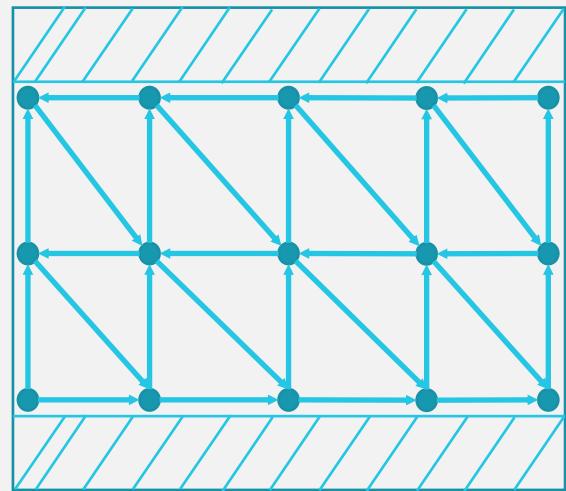
The data collection

2. Collect the data and upload the data to the server



The data collection

3. Data collection specification



The data collection

4. Quality Analysis



Trace File Format (*.txt)

Meta info

```
# startTime:1574559495255
# SiteID:5dd3d7732a57a34356595932 SiteName:杭州西溪银泰城 FloorId:5dd3d7732a57a34356595934 FloorName:F1
# Brand:OPPO Model:PBCM10 AndroidName:8.1.0 APILevel:27
# type:1 name:BMI160 Accelerometer version:2062600 vendor:BOSCH resolution:0.0023956299 power:0.18 maximumRange:39.22661
# type:4 name:BMI160 Gyroscope version:2062600 vendor:BOSCH resolution:0.0010681152 power:0.9 maximumRange:34.906586
# type:2 name:AK09911 Magnetometer version:1 vendor:AKM resolution:0.5996704 power:2.4 maximumRange:4911.9995
# type:35 name:BMI160 Accelerometer Uncalibrated version:2062600 vendor:BOSCH resolution:0.0023956299 power:0.18 maximumRange:39.22661
# type:16 name:BMI160 Gyroscope Uncalibrated version:2062600 vendor:BOSCH resolution:0.0010681152 power:0.9 maximumRange:34.906586
# type:14 name:AK09911 Magnetometer Uncalibrated version:1 vendor:AKM resolution:0.5996704 power:2.4 maximumRange:4911.9995
# VersionName:v20191105-nightly-16-gcd7805b VersionCode:403
```

Trace File Format (*.txt)

Sensor and ground truth info

Ref: <https://developer.android.com/guide/topics/sensors>

```
1574559495263 TYPE WAYPOINT 81.317215 93.31349
1574559495323 TYPE SENSOR_MAGNETIC_FIELD_ACCURACY_CHANGED 3
1574559495401 TYPE_ACCELEROMETER -0.85562134 1.8243561 9.826508 2
1574559495401 TYPE_MAGNETIC_FIELD 29.78363 6.427002 -30.062866 3
1574559495401 TYPE_GYROSCOPE -0.3919525 -0.07966614 0.09211731 3
1574559495401 TYPE_ROTATION_VECTOR 0.062149726 0.0793645 0.57060283 3
1574559495401 TYPE_MAGNETIC_FIELD_UNCALIBRATED -18.037415 -74.92523 -322.41974 -47.821045 -81.352234 -292.35687 3
1574559495401 TYPE_GYROSCOPE_UNCALIBRATED -0.3508911 0.001739502 0.057357788 -0.0015563965 -6.2561035E-4 -1.373291E-4 3
1574559495401 TYPE_ACCELEROMETER_UNCALIBRATED -1.0758972 2.0404358 9.67807 0.0 0.0 0.0 3
```

Trace File Format (*.txt)

Sensor and ground truth info

Ref: <https://developer.android.com/reference/android/net/wifi/ScanResult.html>
<https://developer.android.com/reference/android/bluetooth/le/ScanRecord>

```
1574559499117  TYPE_WIFI    intime_lease    12:74:9c:2b:4e:ab  -81 5825    1574559496631
1574559499117  TYPE_WIFI    cloud_time_license_5  1e:74:9c:2b:4c:17  -81 5745    1574559496394
1574559499117  TYPE_WIFI    intime_pos     06:74:9c:2b:4e:ab  -81 5825    1574559496629
1574559499117  TYPE_WIFI    SZXSY      94:d9:b3:f3:68:6f  -81 2462    1574559497881
1574559499117  TYPE_WIFI    16:74:9c:2b:52:e7  -81 5765    1574559496469
1574559499117  TYPE_WIFI    ChinaNet-mHwV   24:7e:51:dd:89:68  -81 2457    1574559491065
1574559499117  TYPE_WIFI    guangdang-pos  a8:0c:ca:0d:80:33  -81 2472    1574559491278

1574559496436  TYPE_BEACON  9195B3AD-A9D0-4500-85FF-9FB0F65A5201  0  0    -56 -93 45.036237302850786 E0:78:A3:3D:B5:D6  1574559496436
1574559496519  TYPE_BEACON  616C6970-6179-626F-7869-626561636F6A  49662  37272  -49 -78 32.51982924359314 AC:5D:5C:2C:79:95  1574559496519
```

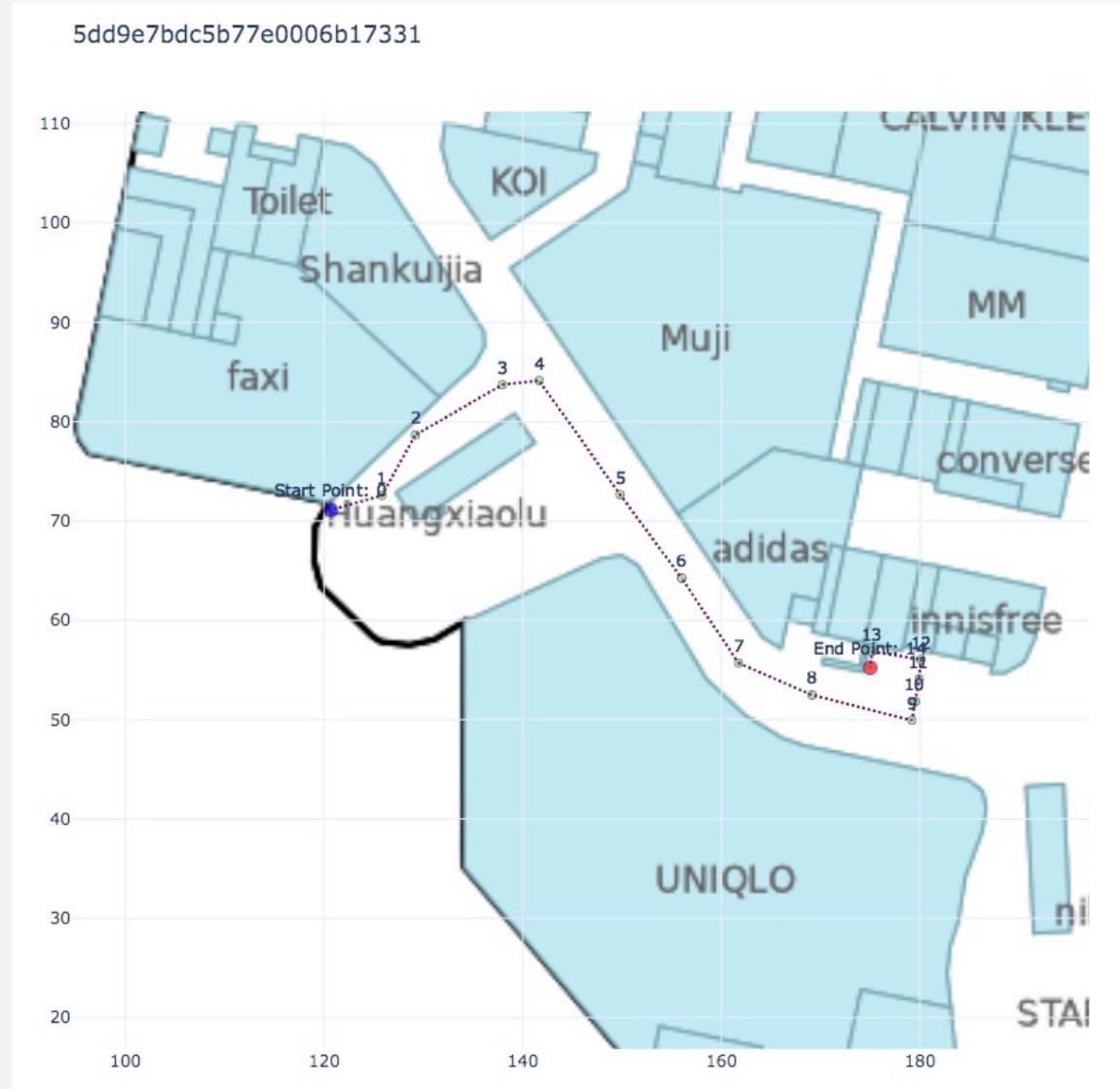
Sample code

Run the code: `python main.py`

Functions	Output
Ground truth location visualization	output/site1/F1/path_images
Sample step detection and visualization	output/site1/F1/step_position.html
Geo-magnetic field intensity visualization	output/site1/F1/magnetic_strength.html
WiFi RSSI heatmap generation	output/site1/F1/wifi_images
iBeacon RSSI heatmap generation	output/site1/F1/ibeacon_images
WiFi SSID counts visualization	output/site1/F1/wifi_count.html

Output

1. path_images



Output

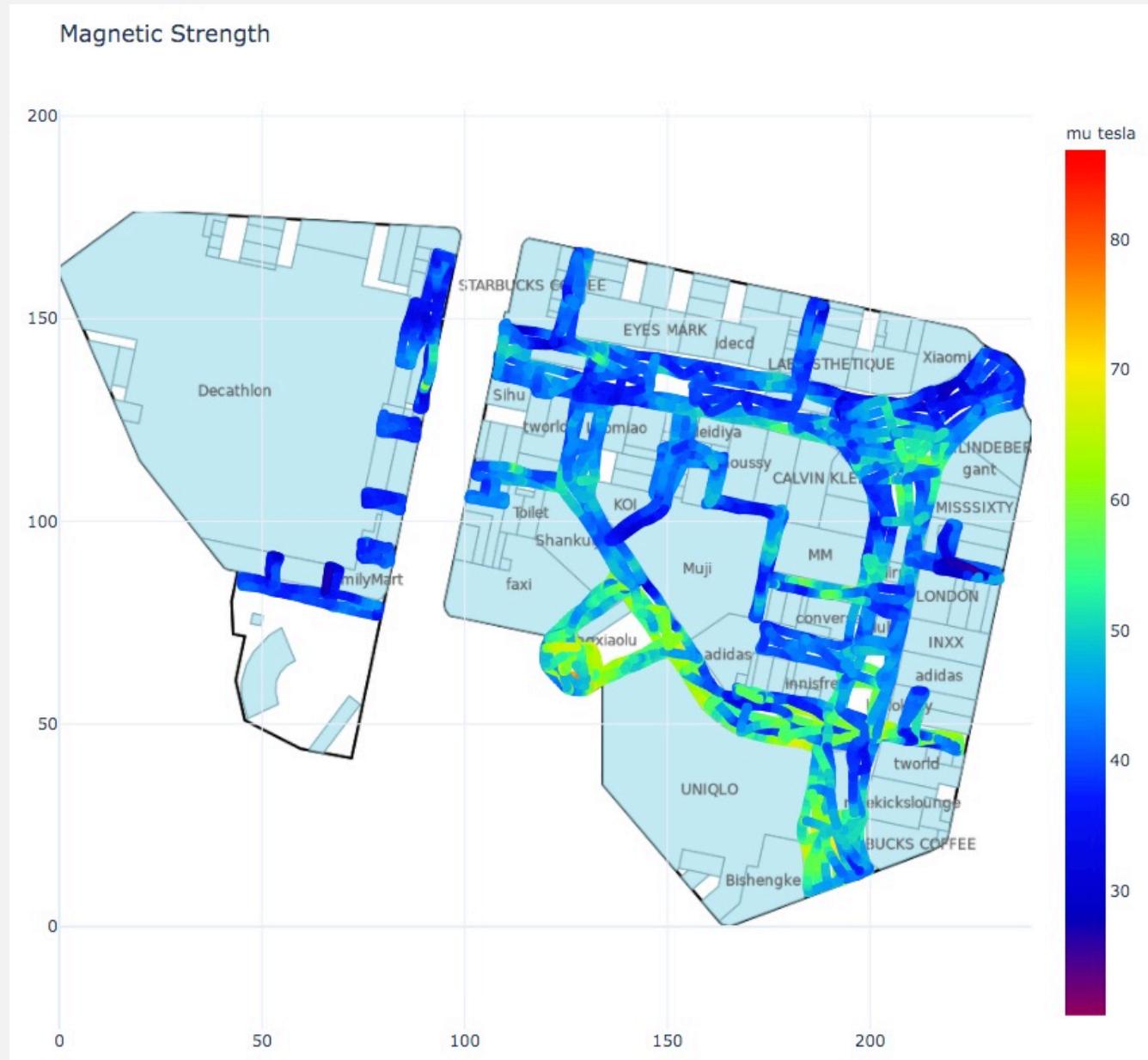
Step Position

2. Step position



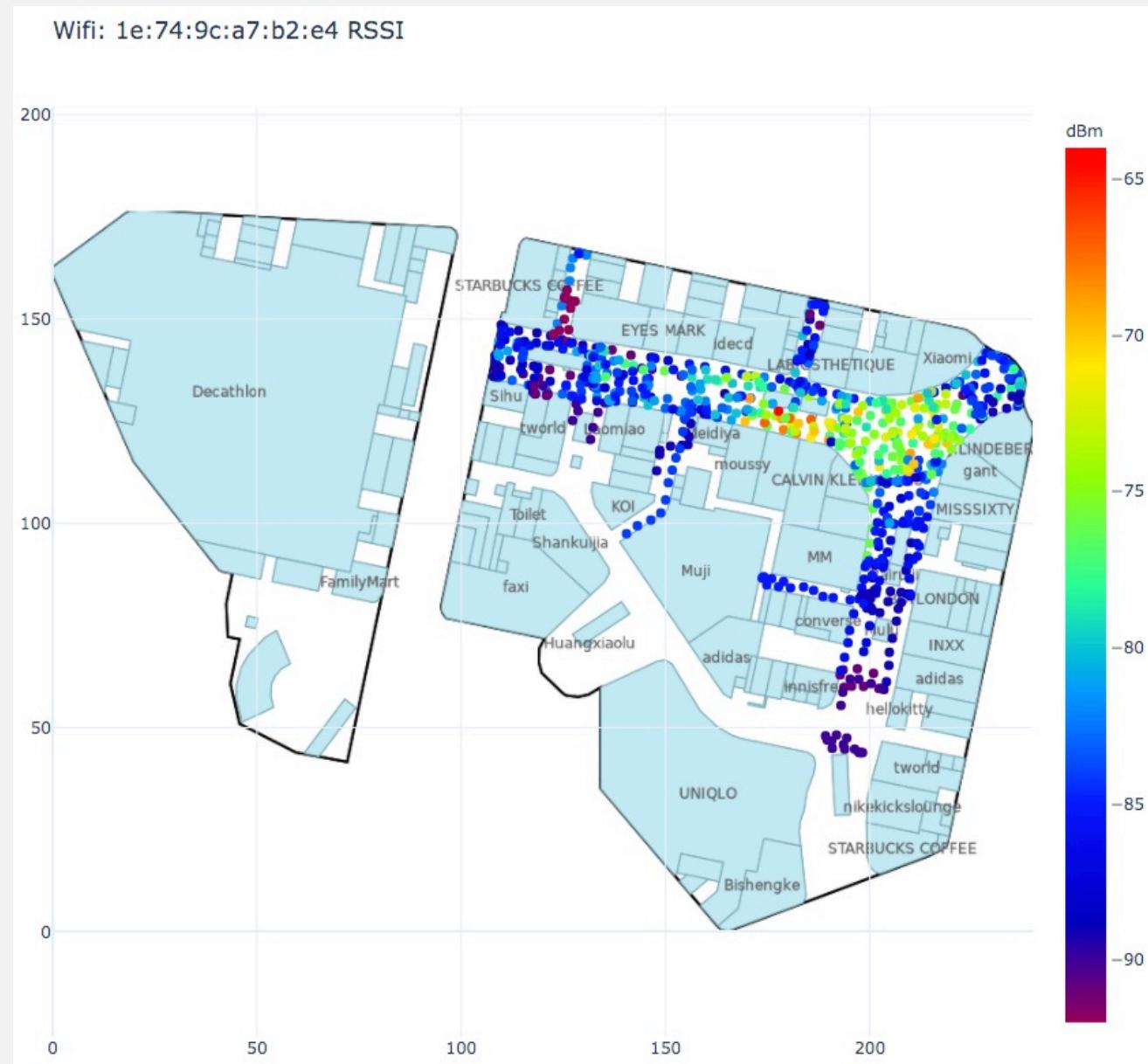
Output

3. Magnetic strength



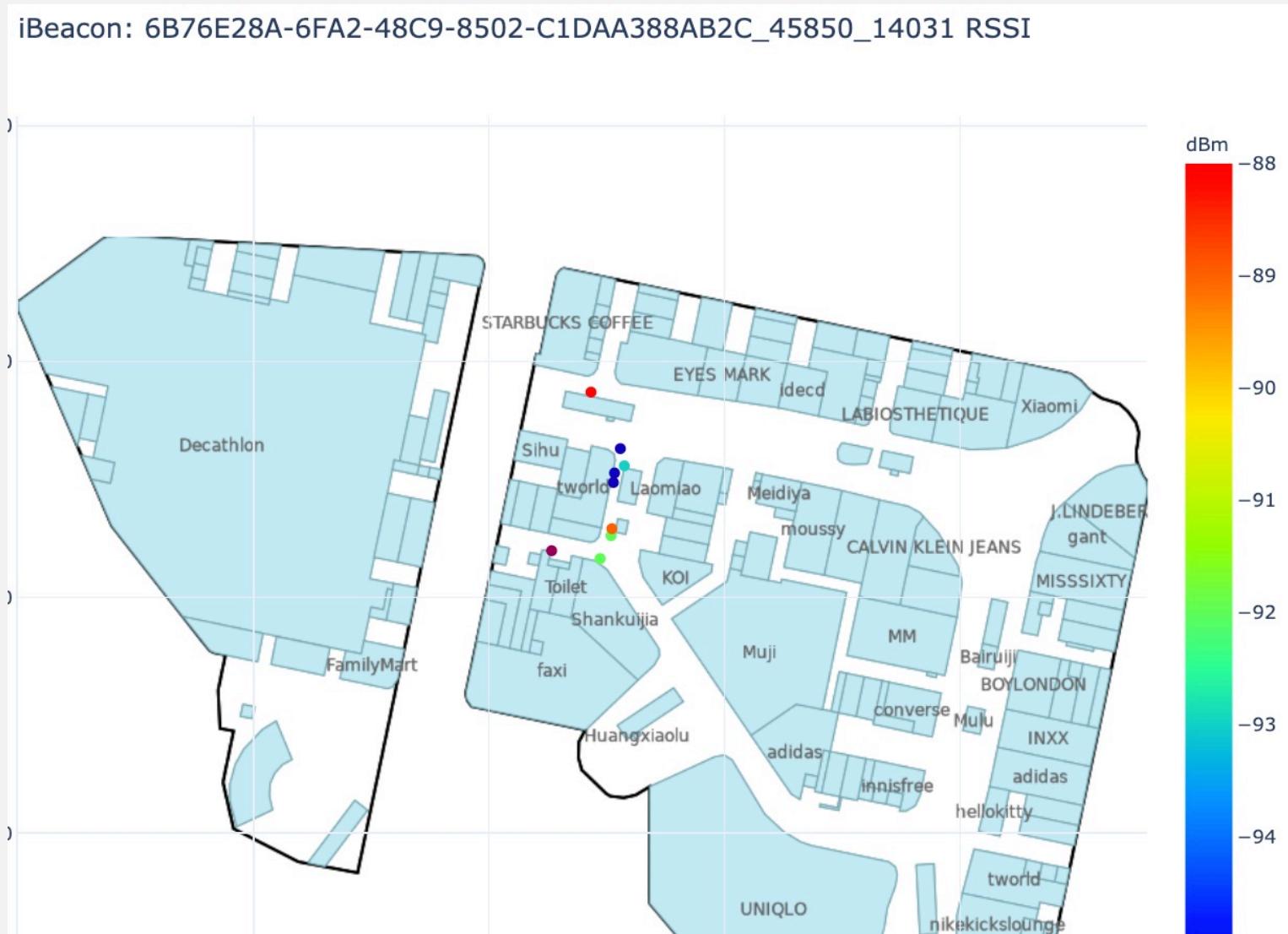
Output

4. Wifi image



Output

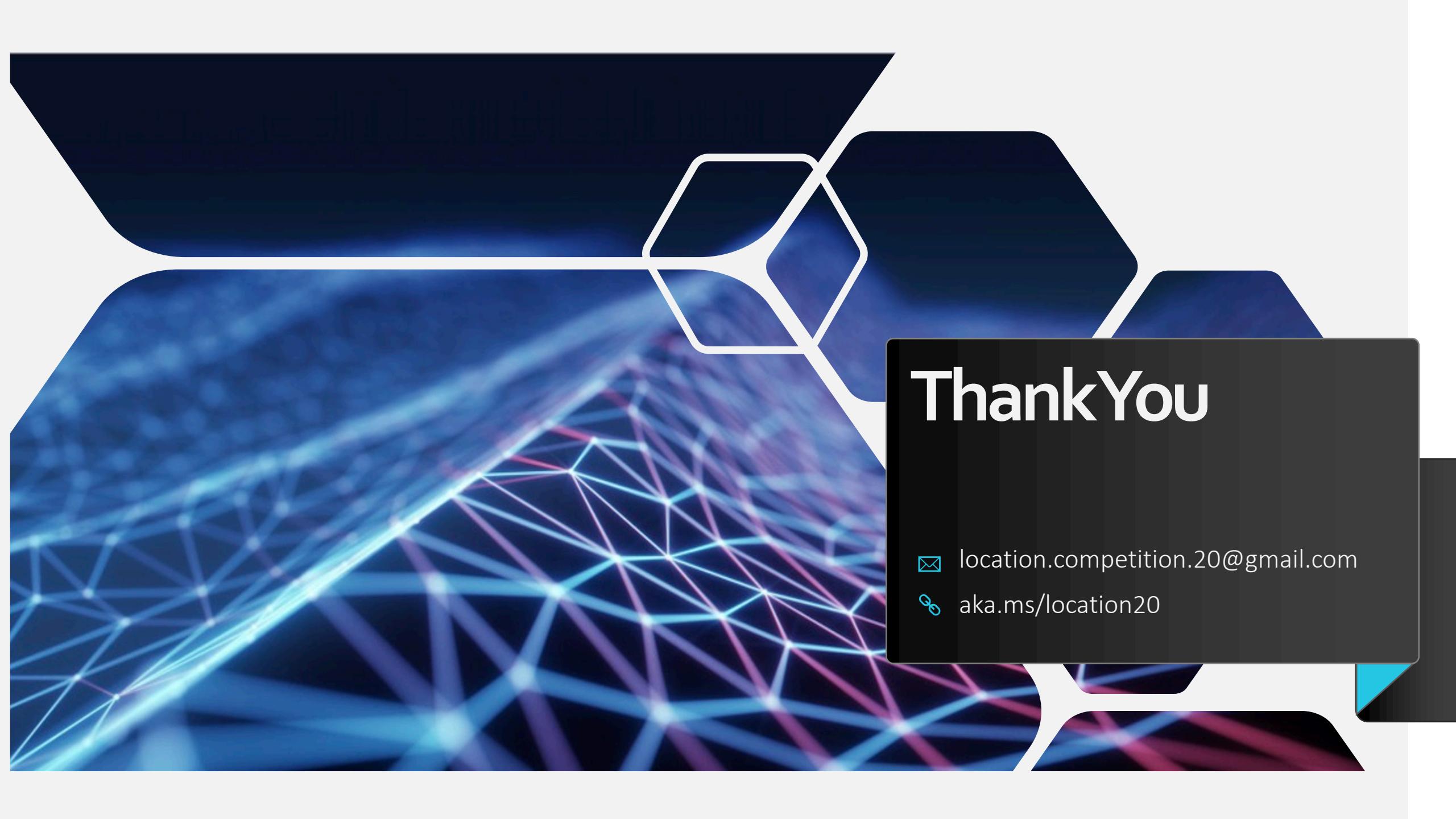
5. iBeacon image



Output

6. Wifi count





Thank You

- ✉ location.competition.20@gmail.com
- 🔗 aka.ms/location20