



EVALUATING MULTIPLE MACHINE
LEARNING MODELS

INDOOR
LOCATIONING

using wifi fingerprinting

Today's Discussion

Topics to Cover

- The Problem
- The Process
- About the dataset
- Improving the performance
- Is it feasible?





Where the GPS fails...

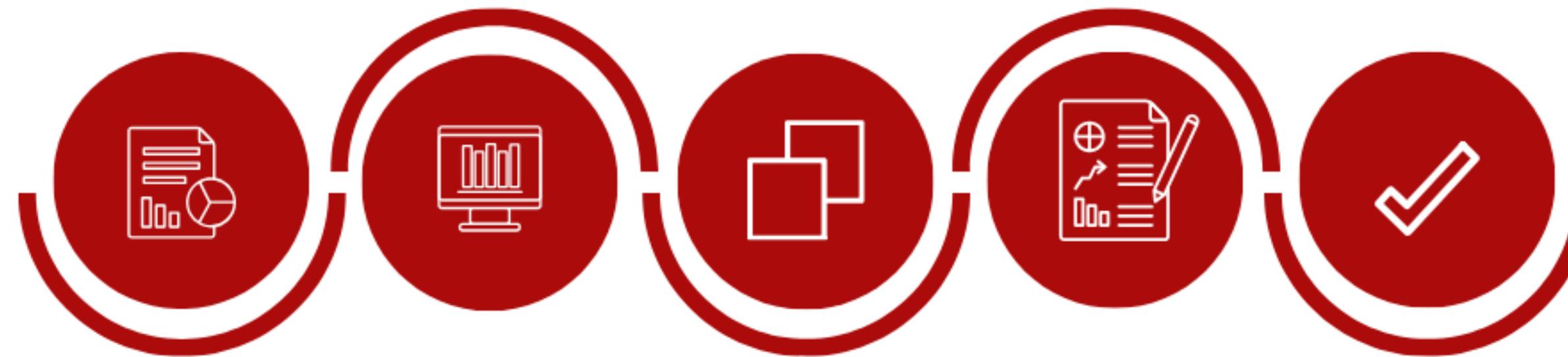
We can make use of Wifi fingerprints

But is it reliable and is the accuracy enough?

Wifi Fingerprinting

Basic Steps to Find the Best Solution

An overview



Explore the dataset

Preprocessing

NZV and PCA

Run models and check
accuracy

Change parameters and
models until the best
performance is reached

About the Dataset

- It covers a surface of 108703m², including 3 buildings with 4 or 5 floors depending on the building.
- The number of different places (reference points) appearing in the database is 933.
- 21049 sampled points have been captured: 19938 for training/learning and 1111 for validation/testing.
- Dataset independence has been assured by taking Validation (or testing) samples 4 months after Training ones.
- The number of different wireless access points (WAPs) appearing in the database is 520.
- Data were collected by more than 20 users using 25 different models of mobile devices (some users used more than one model).

001–520	RSSI levels
521–523	Real world coordinates of the sample points
524	BuildingID
525	SpaceID
526	Relative position with respect to SpaceID
527	UserID
528	PhoneID
529	Timestamp

Improving Performance

Changing models and tuning parameters

IS IT WORTH IT?

1

Good accuracy

Models showed up to be quite reliable

2

Wifi is practical

Wifi are easy to use to locationing because it does not require infrastructure improvements

3

Replicable

Not only in this case, but wifi fingerprinting should be useful in many situation

4

Improvements

There is always room for improvement. Using Wifi Fingerprinting with other methods, for example.



RMSE	Rsquared	MAE
15.3012297	0.9837909	6.7621304

RMSE	Rsquared	MAE
11.3688408	0.9739818	6.4611055

(accuracy around 9 meters)

more accurate systems: radio mapping, VPS