

# Stolen bicycles detection using Bluetooth Low Energy technology

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## Problem and Solution Idea

### Stolen bicycles

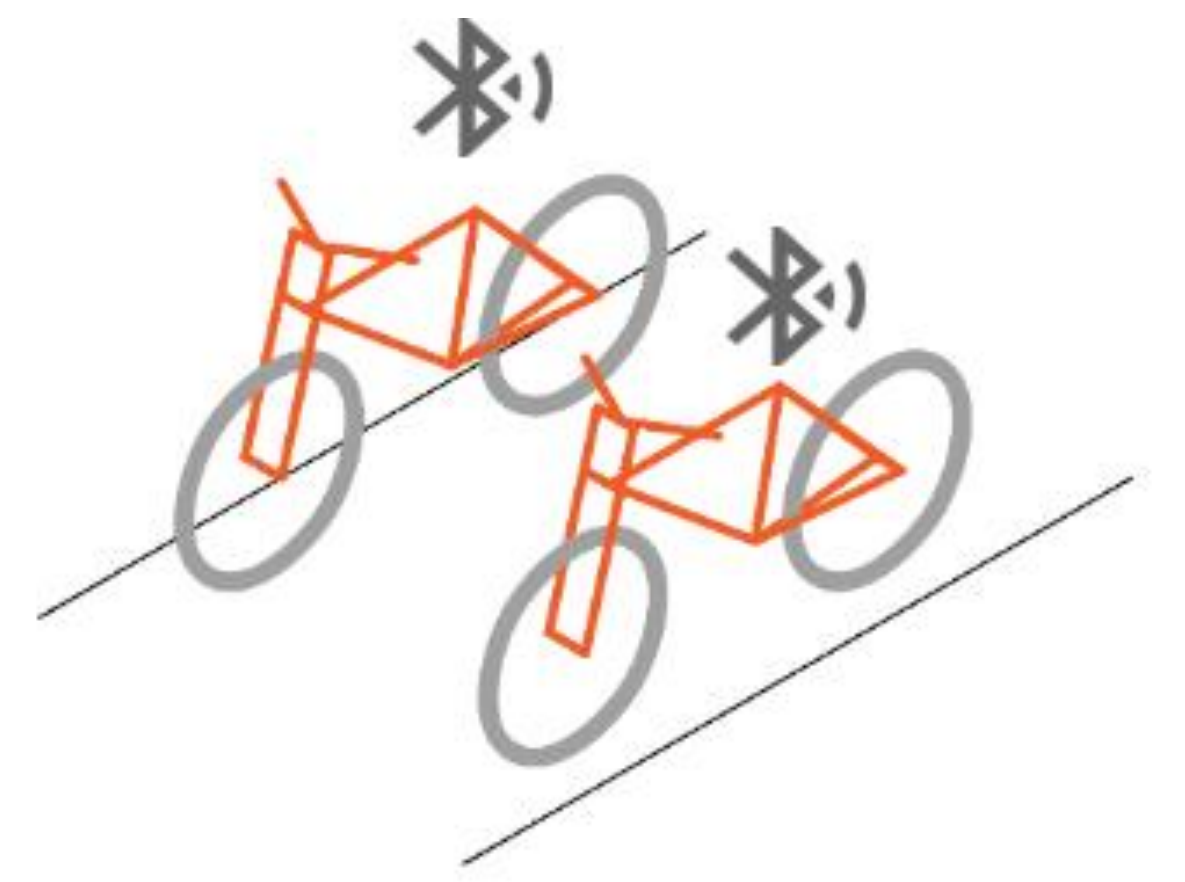
Dozens of rented bicycles are stolen every day which makes the fleet management very difficult and bring huge lost costs.



### Solution for stolen bicycles detection

Add a system to the fleet bicycles, to detect stolen ones, using:

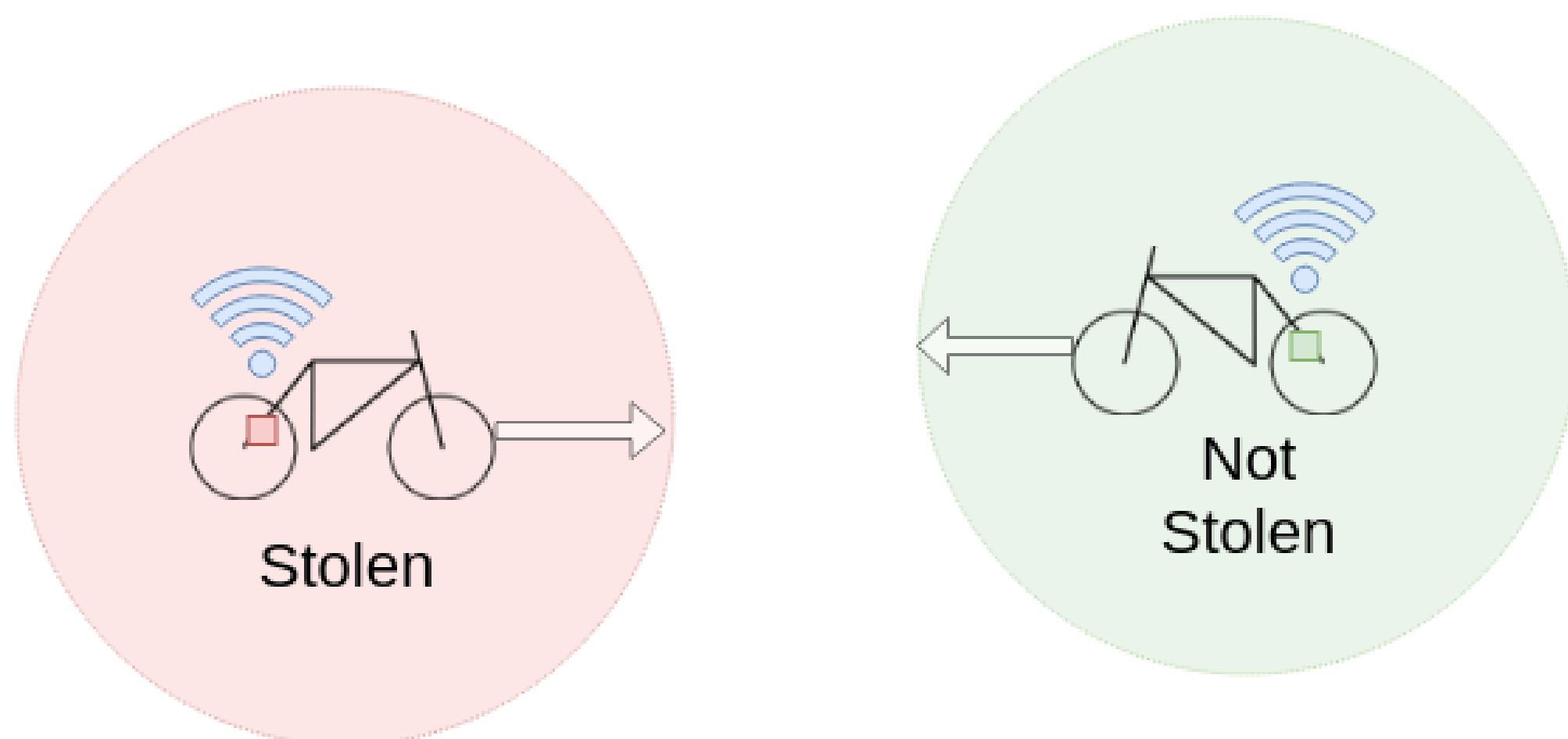
- Bluetooth Low Energy (BLE) technology;
- Stolen bicycles black list;
- Connection to the cloud.



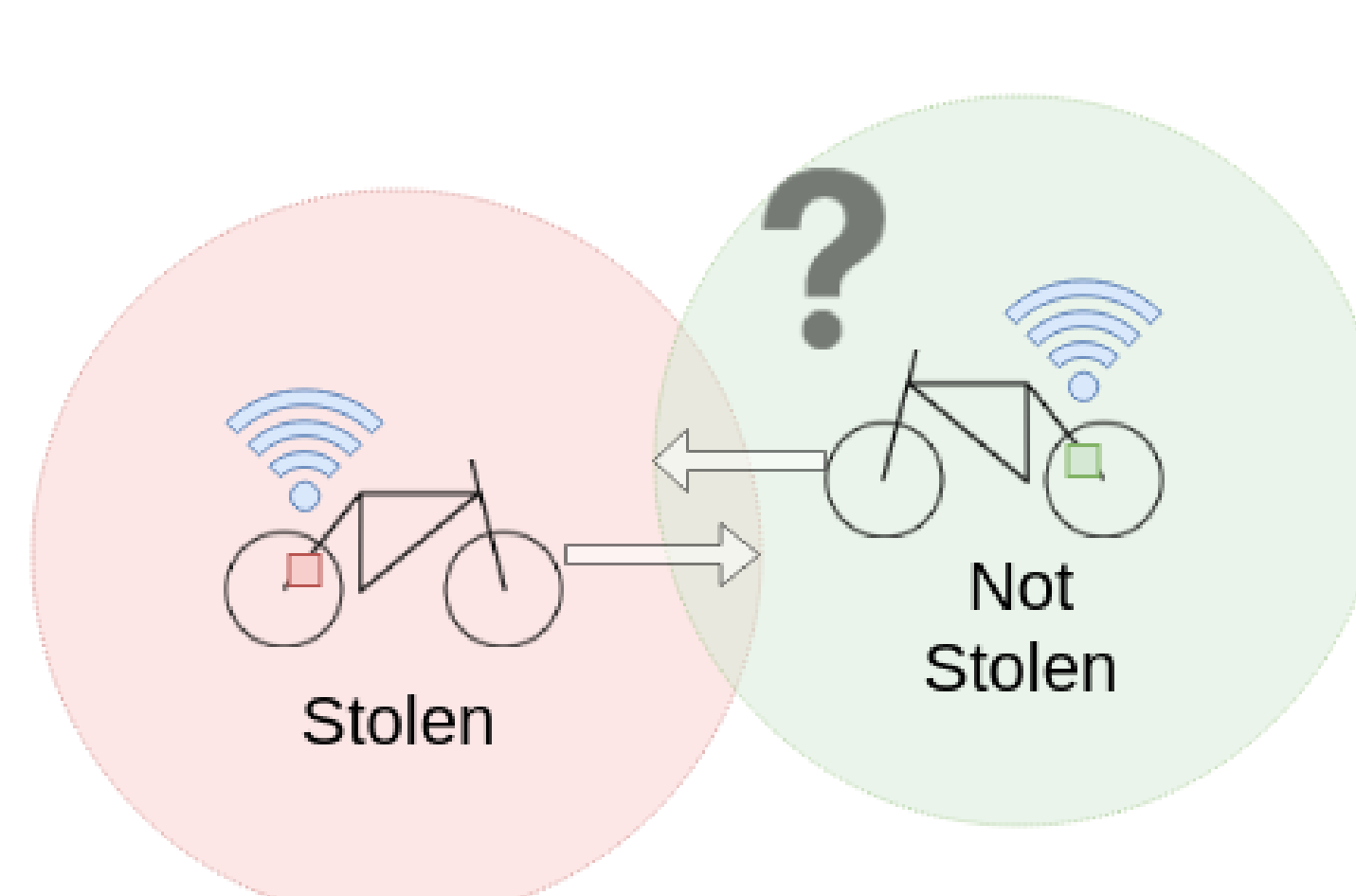
## Solution Development

System Approach: Use BLE technology to perform stolen bicycles detection

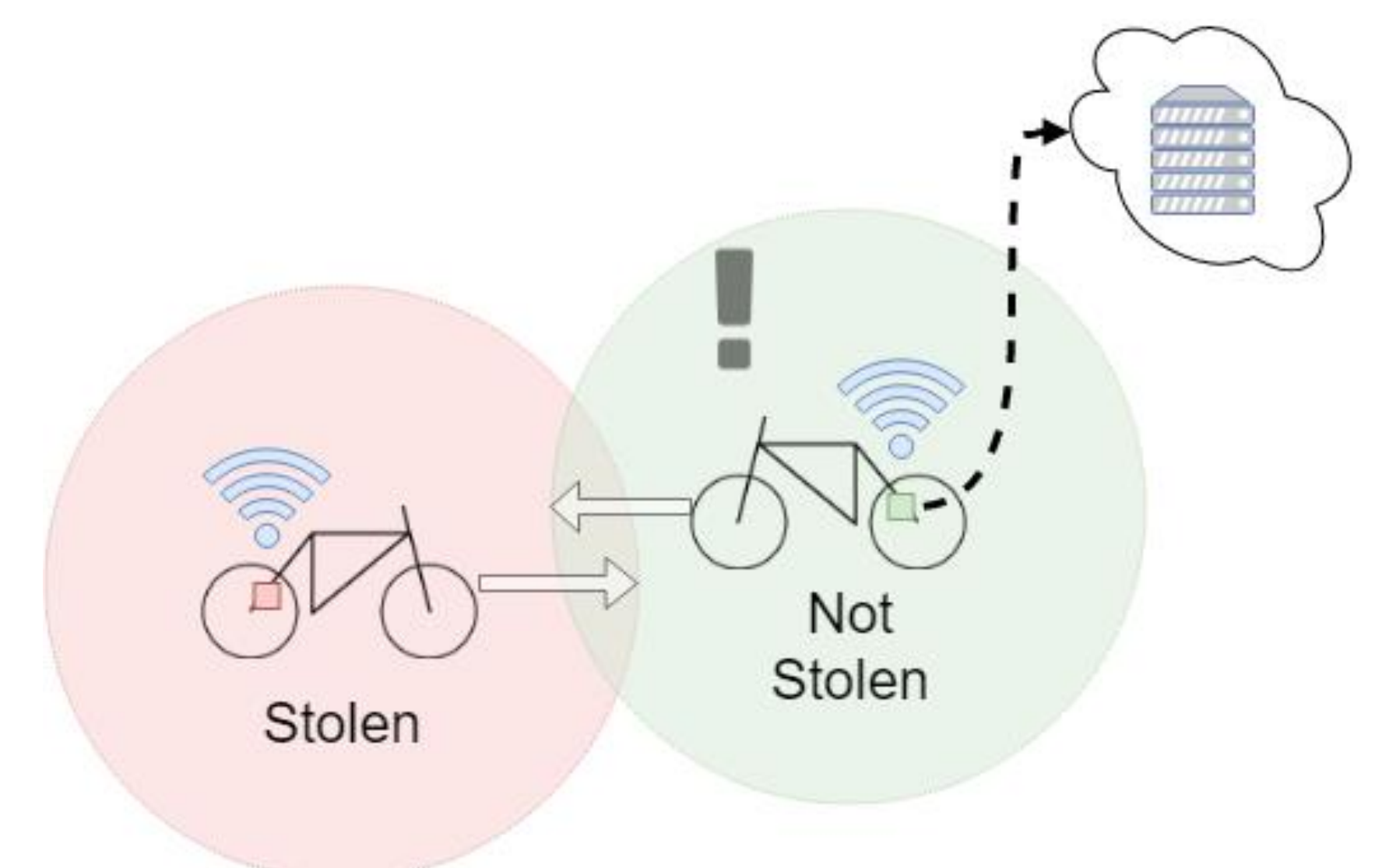
The system works based on three stages:



**First stage** – both “stolen” and “not stolen” are nearby each other but not in range of the BLE system.



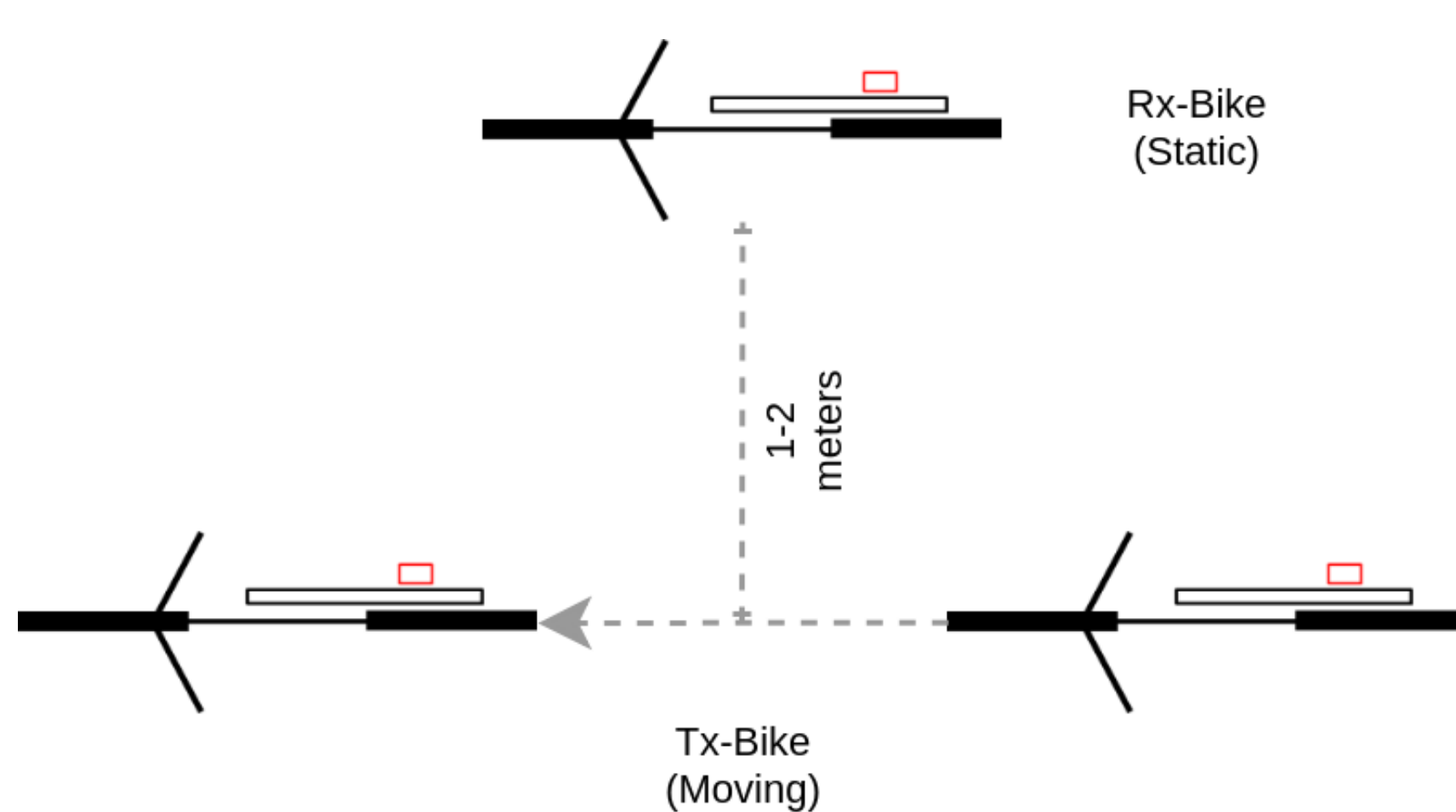
**Second stage** – the “not stolen” detects a bicycle in range and checks if it is in the “stolen black list”.



**Third stage** – the “not stolen” reports that found a stolen bike nearby its location to a system in the “cloud”.

## Range Evaluation

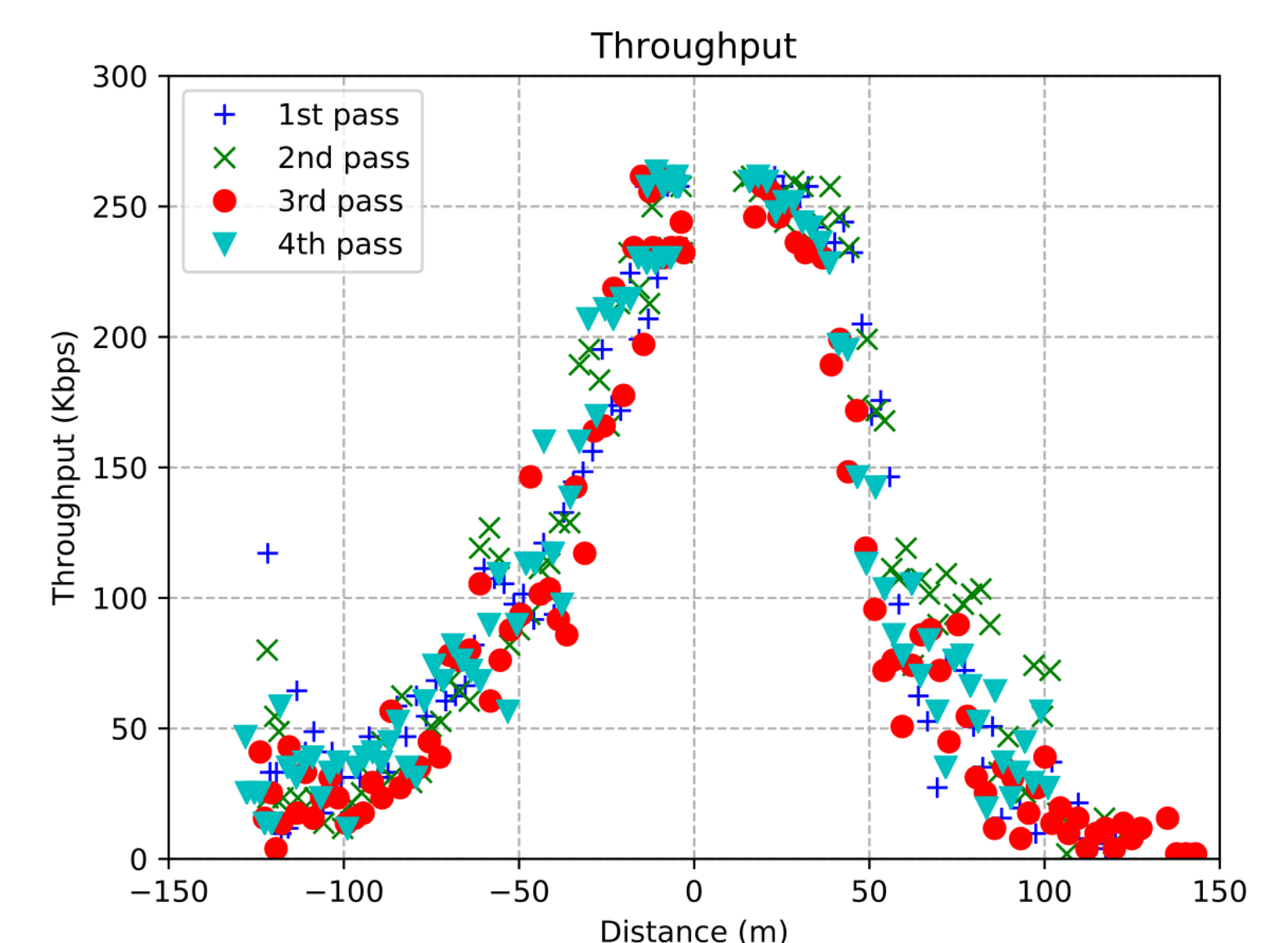
Maximum range evaluation between bicycle with BLE



Experiments of throughput communication and location between two bicycles achieved using:

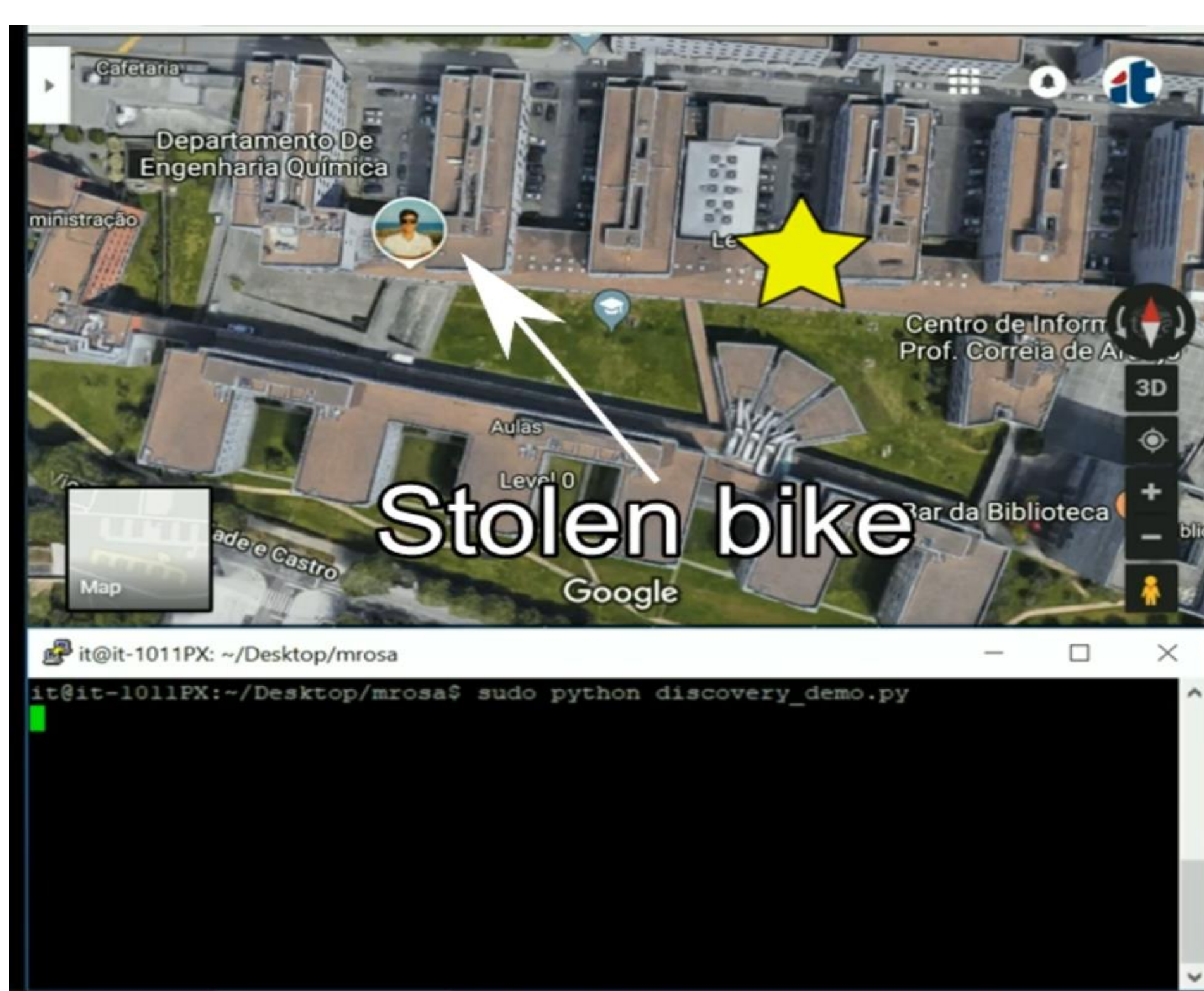
- BLE technology;
- GPS logging.

The range between the two would be reached around ~ 150 meters.



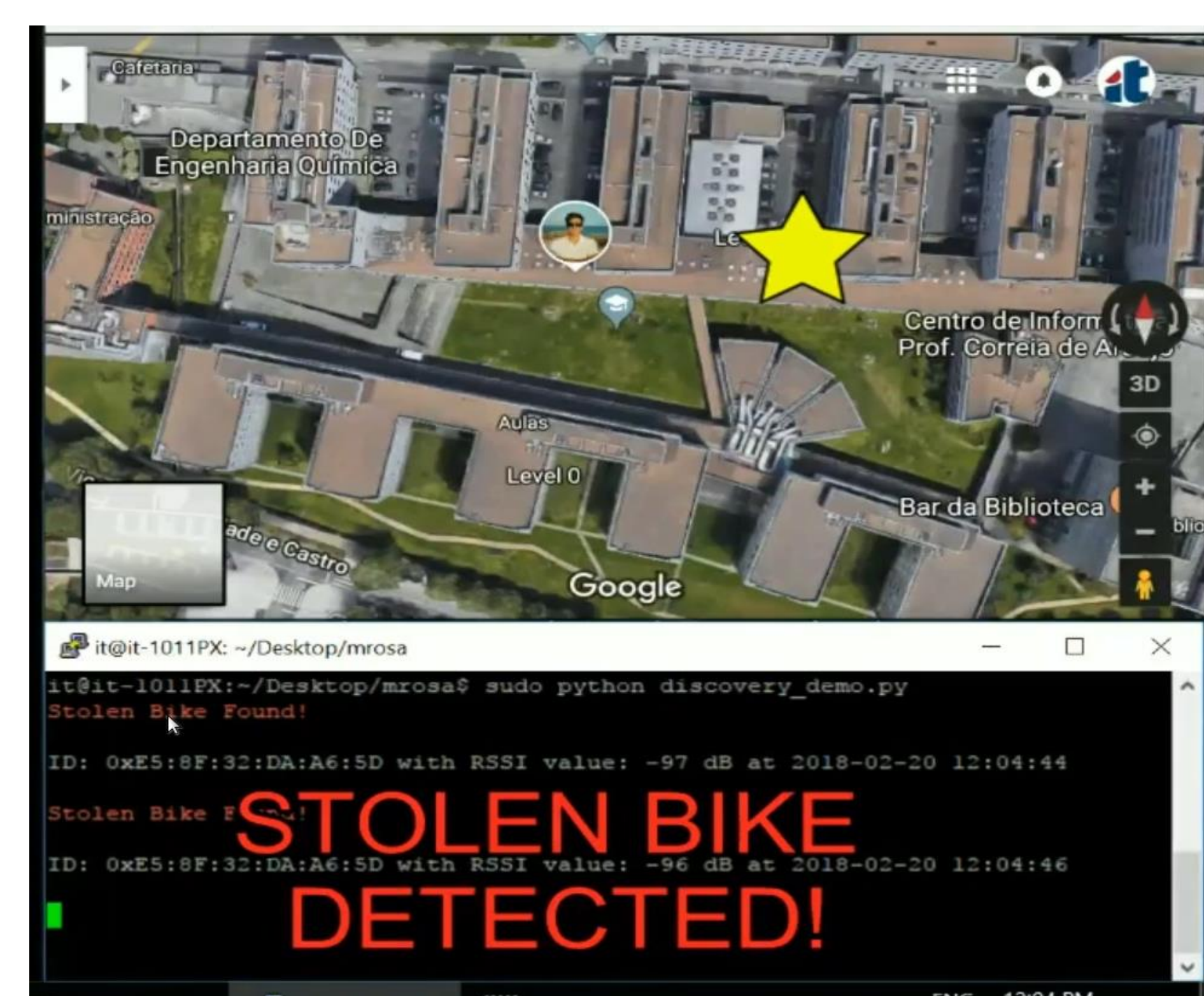
## Live Demonstration

Live demonstration performed with “real-life” situation



Live demonstration achieved with:

- “Stolen” bicycle outside of range of “not stolen” bicycle;
- When “stolen” bicycle was in range, the “not stolen” started reporting its finding.



**Acknowledgment:** “This work is a result of the project Generation.Mobi, reference POCI-01-0247-FEDER-017369, co-funded by the European Regional Development Fund (ERDF), through the Operational Program for Competitiveness and Internationalization (COMPETE 2020), under the PORTUGAL 2020 Partnership Agreement”

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