smartmicro Distributor Workshop

2.2.2021 | Timo Majala, Nodeon Finland Oy

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Use-case basics

- **Project name:** Jätkäsaari district (in the city of Helsinki) short-term visitor and western ferry terminal (West Terminal) pick-up and drop-off traffic and CO2 emission analysis.

- **Public tendering:** yes
- **Location:** Helsinki, Finland
- **Time:** 21st Nov – 17th Dec 2020 (4 weeks measurement)
- **Sensors:** 4 pcs of smartmicro TRUGRD radars (+ 4 pcs ANPR cameras)

- **Goal:** Recognize short-term visitors in the Jätkäsaari district as well as pick-up and drop-off traffic in Helsinki West Terminal, analyse how much CO2 emissions traffic produces.

- **Contact:** Timo Majala, Nodeon Finland Oy, timo.majala@nodeon.com

Source: European council, free

Source: Timo Majala, free

Jätkäsaari district in the city of Helsinki.

Background

- **The Port of Helsinki became the world's busiest passenger terminal in 2017**
    - About 12 million passengers using scheduled routes and about half a million cruise passengers during the cruise season.
    - Most of the traffic, 9 million passengers, is generated by ship traffic between Helsinki and Tallinn.
    - A lot of heavy logistics traffic from Via Baltica to Finland.
    - The new West Terminal is built for supporting the continuous growth of these activities in the city.

- **The challenge**
    - West Terminal related passenger car and heavy traffic creates temporary traffic lock-downs in the growing Jätkäsaari district.

Source: Shutterstock
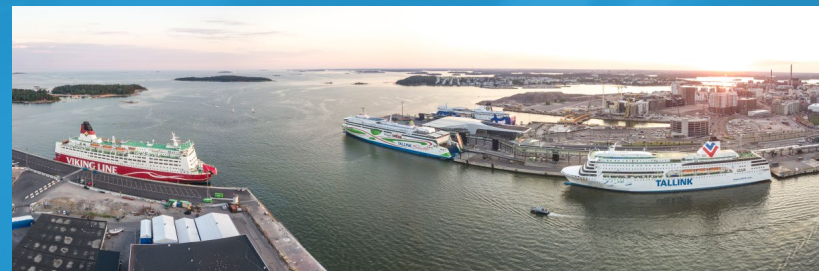
Ferries parked in the West Terminal in the city of Helsinki.

Source: Timo Majala

Reflection from the West Terminal window to the drop-off and parking zone.

Definition of the measuring problem

- The goal is to understand the amount of short-term visitors in the district and the amount of drop-off/pick-up passenger car traffic in West Terminal.

    - Two main connections to the district (island).
    - 2-way traffic, 2+2 lanes in Point 1, 1+1 lanes in Point 2.
    - All inbound and outbound traffic to the district must be measured.
    - All vehicles must be uniquely recognized to catch-up the short-term visitors in the district.
    - Entry and exit inside 45 minutes is interpreted as a short-term visitors.
    - For emission analysis vehicle CO_2 emission values must be combined to estimated travel distance.
    - 4 weeks measurement and no fixed power available.

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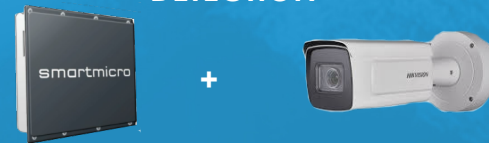SMART MICROWAVE SENSORS
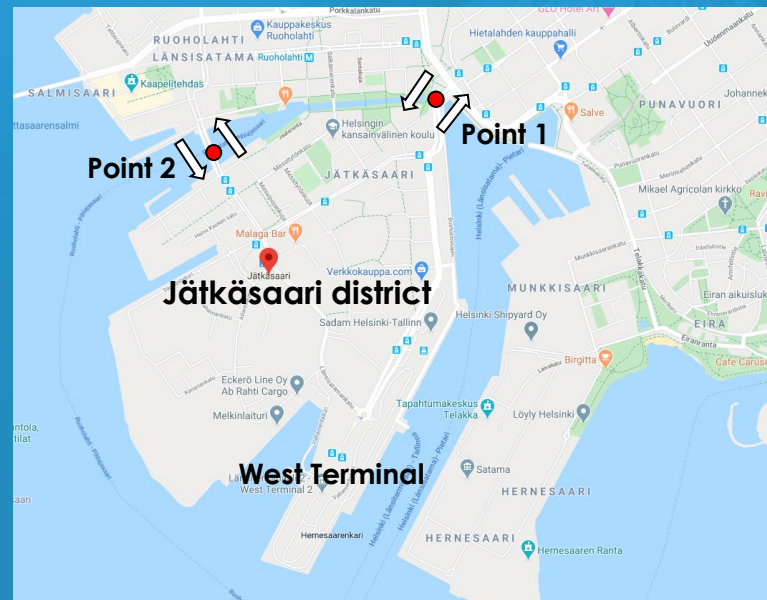
Solution

- **Combination of**
  - Nodeon energy self-sufficient measuring stations with real-time communication,
  - smartmicro TRUGRD radar measurement (trustworthy traffic volumes),
  - ANPR camera measurement (proportional share of short-term visitors),
  - Nodeon traffic data collection cloud service,
  - integration to state-owned vehicle registration database (to fetch CO_2 values)
  - and traffic data analytics cloud service.

  - ANPR gives unique detections and proportional share of short-term visitors while TRUGRD provides trustworthy traffic volumes.
  - Amount of recognitions from ANPR and TRUGRD are compared to each other in every 15 minutes and this gives correcting factor for calculating amount of short-term visitors and CO_2 emissions.
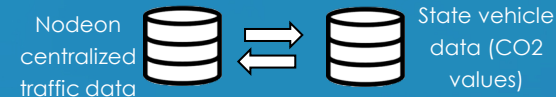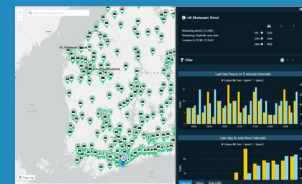
NODEON SHORT-TERM MEASUREMENT STATION

DETECTION

DATA COLLECTION AND FUSION

Nodeon centralized traffic data

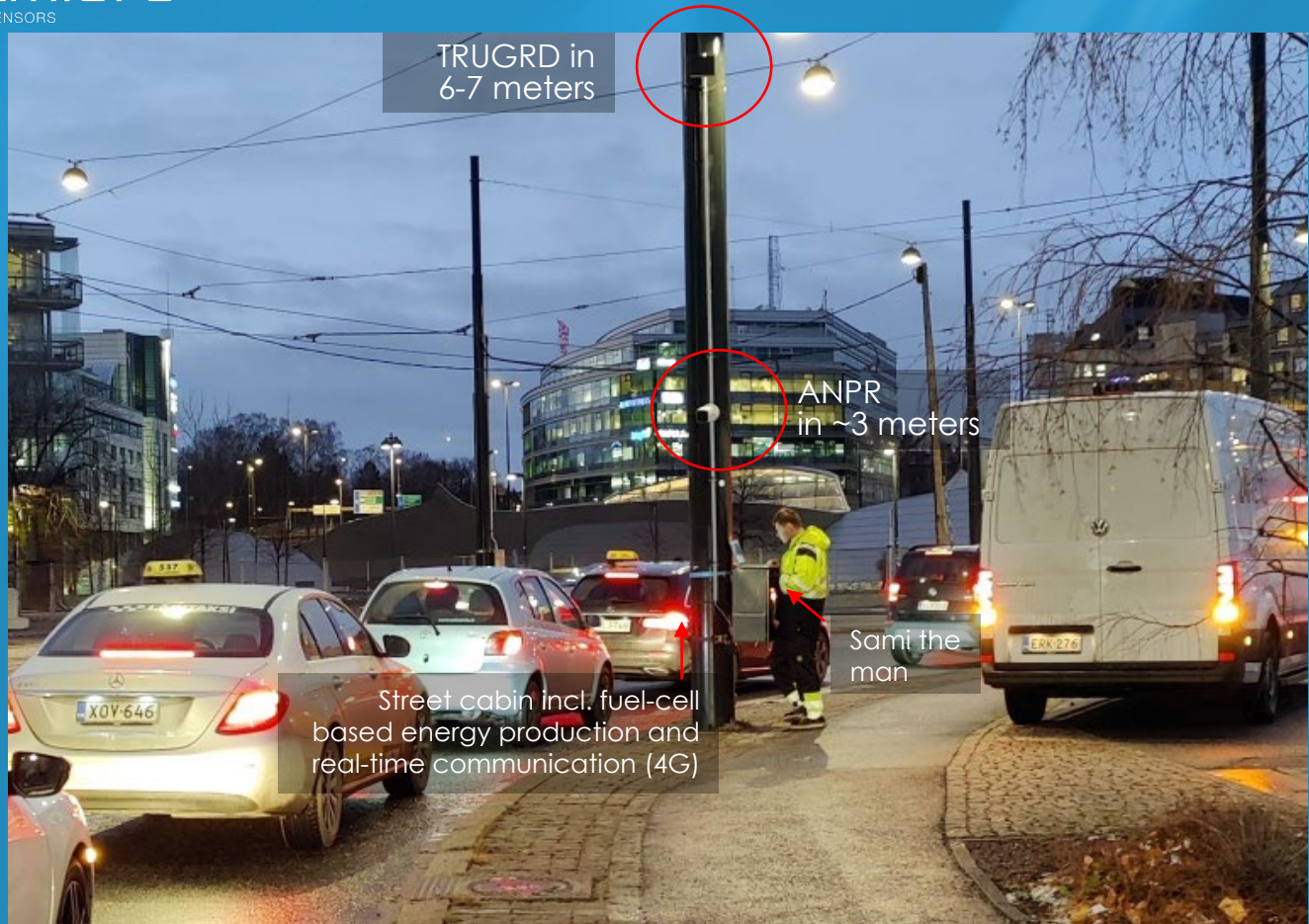State vehicle data (CO_2 values)

NODEON ANALYSIS AND VISUALIZATION

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And this is how it looks on the site.

Installation time for one measurement station 45 minutes.

TRUGRD in 6-7 meters

ANPR in ~3 meters

Sami the man

Street cabin incl. fuel-cell based energy production and real-time communication (4G)

And this is how it looks on the cloud.

Data is gathered, analysed and visualized in real-time (in 5 minute intervals).

smartmicro SMART MICROWAVE SENSORS
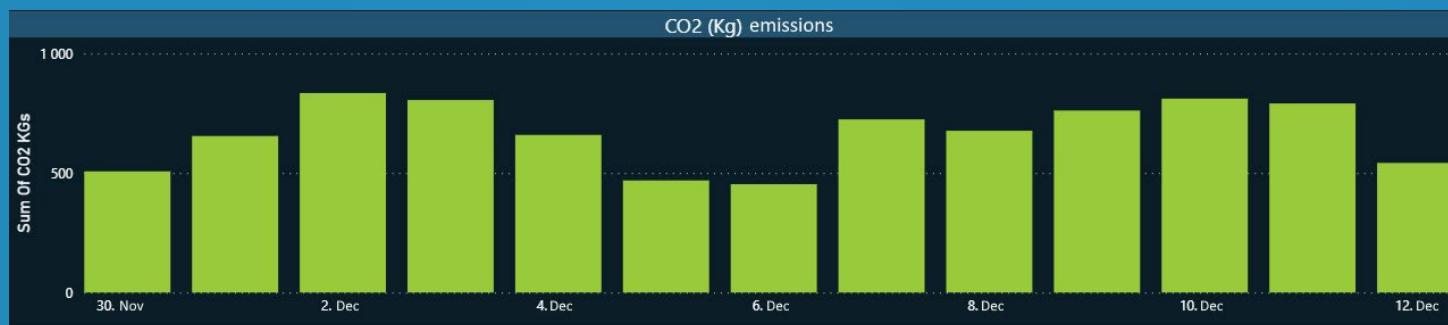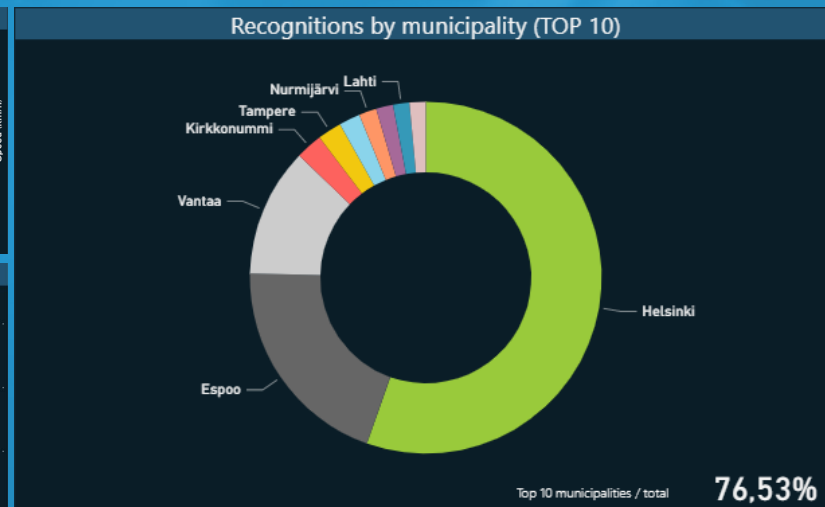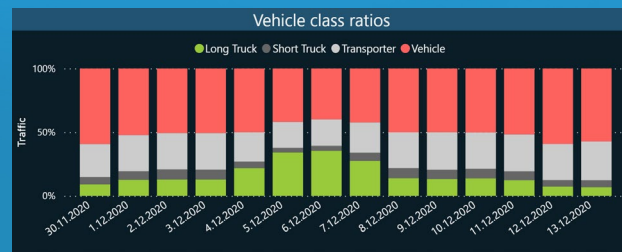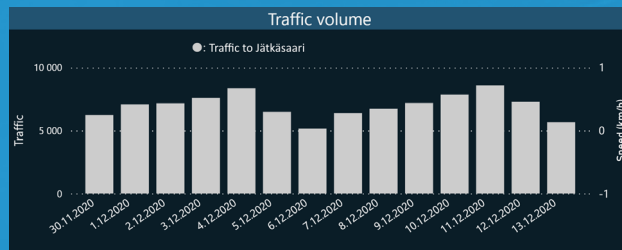
Results

- **Detection rate TRUGRD vs. ANPR**
  - In 1 lane situation TRUGRD was able to provide pretty close 100 % accuracy, while ANPR detection rate varied from 90 to 99 % (variation related to traffic and environmental conditions)
  - In 2 lane situation TRUGRD mostly provided approx. 95 % detection rate but in difficult truck queuing cases rate dropped under 90 % (see pic.), ANPR did not provide good results in this difficult traffic environment (only 1 camera per two lines and forward-firing from the street <u>side</u>, accuracy varied from 60 – 80 %.

- **Results provided to customer**
  - Customer were happy and valued the integration of smartmicro TRUGRD radars and ANPR cameras which provided excellent base for creating correcting factors for sometimes poor and especially alternating ANPR detection rates.
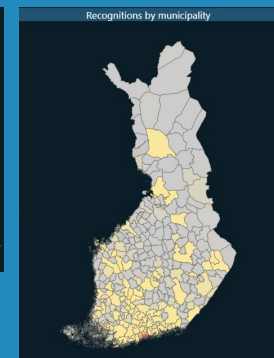

Source: Helsinki city traffic camera

Outbound traffic from the Jätkäsaari district after ferry arrived from Tallinn.
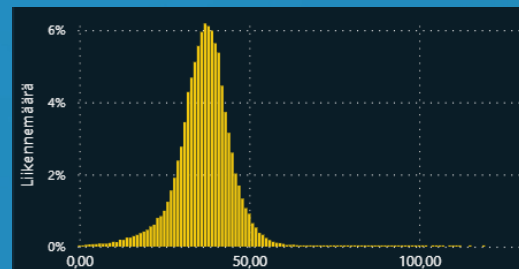
Example of speed distribution in Point 1.

Heat map of origin areas.