



University College
of Southeast Norway

Monitoring Air Quality

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Introduction

- One of the key areas of smart cities is environment.
- Environmental monitoring provides current conditions and can be used to find trends
- The results can be used for decision making.

The Context

- Every winter, Oslo and Bergen, the capital and the second largest city of Norway, have severe problems with air quality.
- The air quality problems are caused by certain climatic conditions that put a lid on top of the cities.

Measures

- Bergen use the last digit on the number plate to decide what day you are allowed to drive in the city.
- Oslo is considering different approaches, like raising the toll fees or restricting the types of cars allowed to drive in the city.

How are decisions made?

- Each city has a limited number of stationary measurement units. Oslo has seven units.
- Pollution may vary with location
- Low granularity gives inaccurate readings
- Decisions may not reflect the real situation

Citi-Sense

- European Union – funded project
- Made mobile hand-held units
- Need people to carry them around

Our Goals

The ultimate goal is better decision making through improved analysis and data collection.

- More units provides better granularity
- Mobile units make it possible to measure at more locations
- Inexpensive units make data collection feasible

Our approach

- Mobile unit
- Installed in cars
- Starts collecting information when car is parked
- Transmits information to central server.

Project Organization

- This project is done in collaboration between Faculty of Engineering, “Lucian Blaga” University of Sibiu”, Romania and University College of Southeast Norway.
- Three students built the first prototype during their mobility stay in Norway (Two from Sibiu, one from Craiova).
- EEA grant

First Prototype

- The first prototype used Intel Edison as processing unit
- Communication was handled through Bluetooth connection to a mobile phone
- GPS unit provided location information
- Sensors for barometric pressure, temperature, humidity, sound, and CO2,

Lessons Learnt – First Prototype

- Use of Android phone for communication requires a phone with a subscription. App need to be installed. Not good for larger deployments.
- Sound sensor had limited use
- Intel Edison is a quite expensive processing unit

Second Prototype

- Based on LinkIt Duo, a cheap dual processing unit.
- Combined GPS and GSM unit
- No sound sensor
- Added a particle sensor
- Replaced CO₂ sensor with sensor able to also measure NO_x

Second Prototype

- 16 environmental platform sensors has been made in Sibiu.
- Now ready for a larger scale deployment test
- If successful, next batch will be around 100 units.
- Unit cost: Around Euro 120,-



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