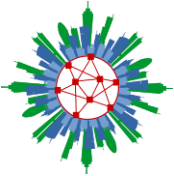


Routing in Oldenburg

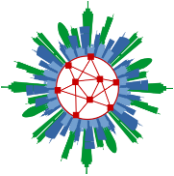
Johannes Meier, Oliver Theel, Andreas Winter



Project Group „Routing in Oldenburg“ (RiO)

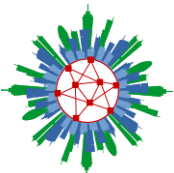
- Project Group of 11 Master's Students in Computing Science and Business Informatics:
 - Muhammad Ekbal Ahmad, Maik Appeldorn, Jan Brunnberg, Jan Johannes Haskamp, Sona Hayrapetyan, Tamme Janßen, Jacqueline Klimmek, Christian Linder, Dennis Rupprecht, Gerrit Schöne, Marcell Stosun
- Duration: 1 year
- University Groups
 - Software Engineering
 - System Software and distributed Systems
- External Partners
 - BTC
 - Embeteco
- Funding





- A high environmental impact is not perceptible to humans and is nevertheless harmful to their health
 - According to a study by the European Environment Agency (EEA), fine dust is jointly responsible for the premature death of approximately 66,000 people in 2014
- Highest fine dust values are found in urban agglomerations, e.g. large cities
 - Introduction of fine dust sticker in 2008
- Installation of sensors
 - E.g. measuring station at Heiligengeistwall





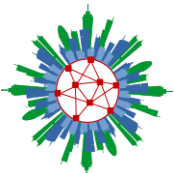
Problem Scenario

Carl

Carl wants to go to the Central Station



Fine Dust everywhere???

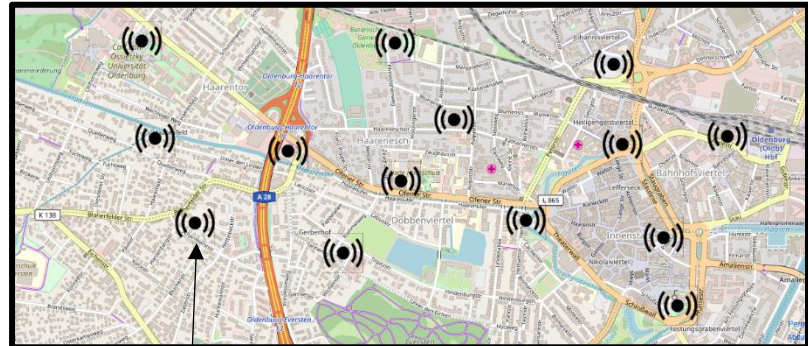
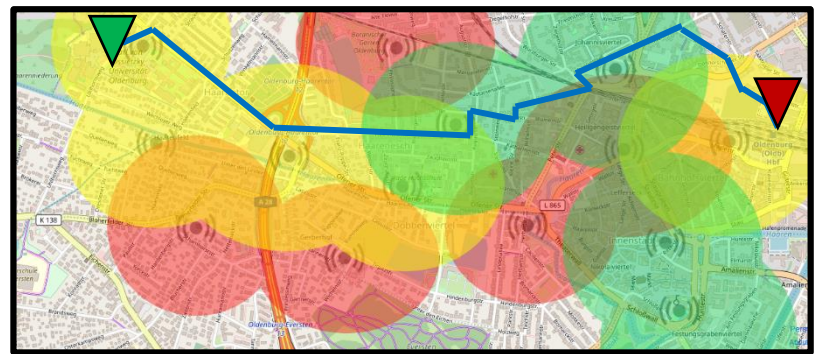


Solution Idea

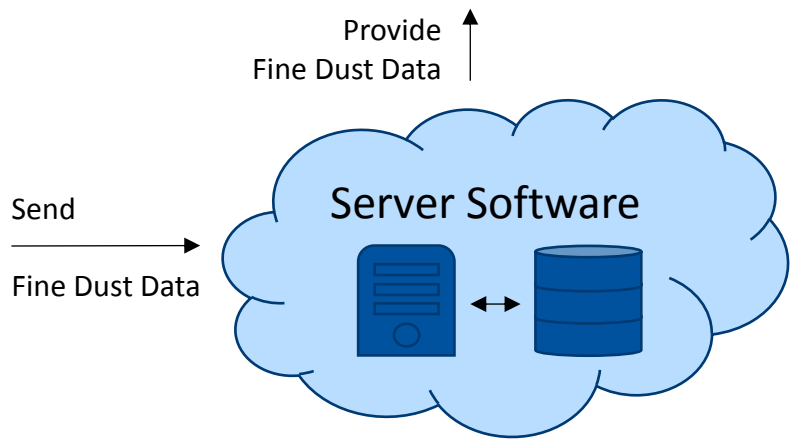
Navigation App



Information regarding
Fine Dust Pollution

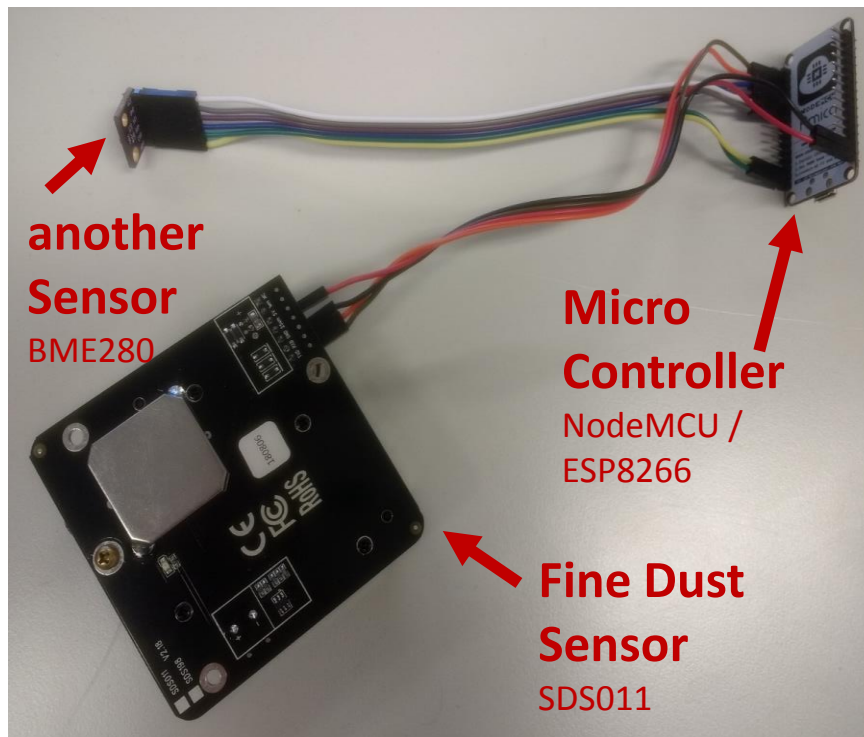


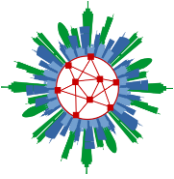
Install and configure
Sensor Nodes



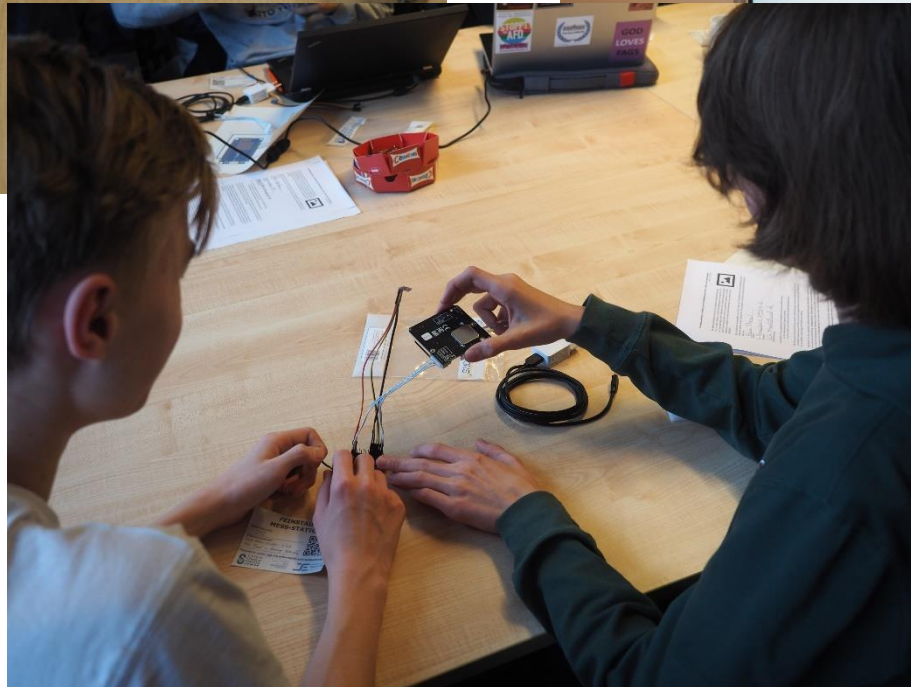
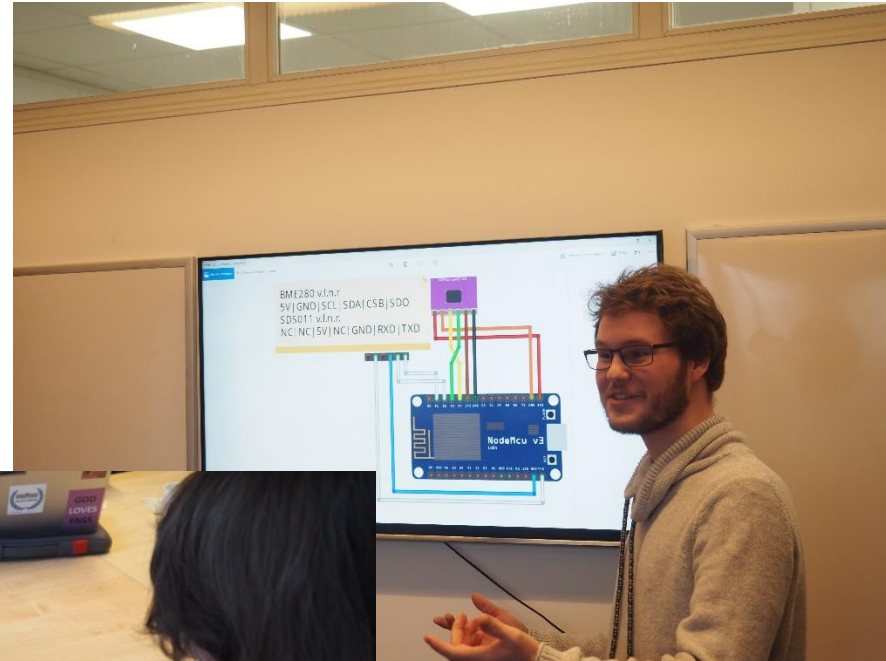
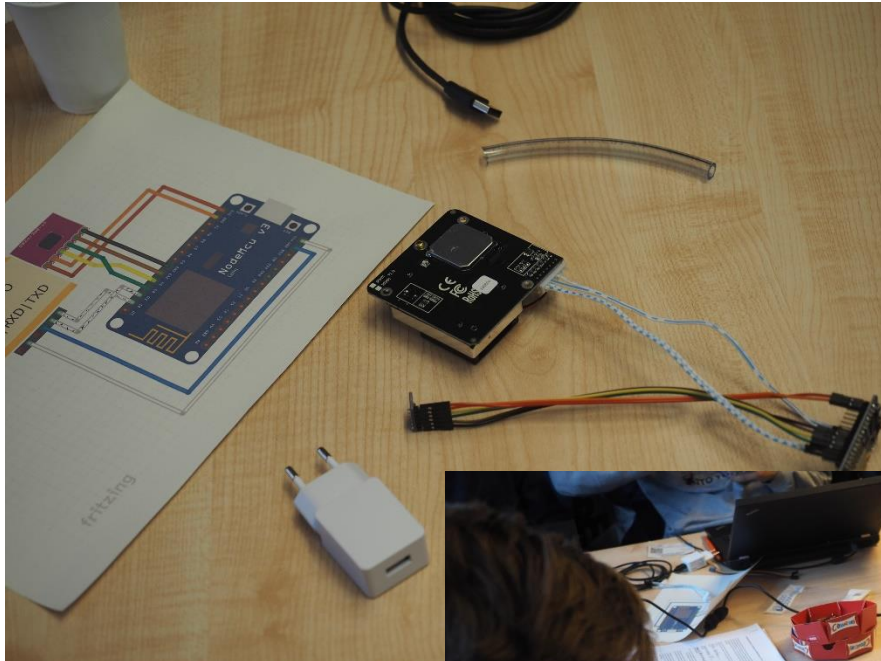
Sensor Nodes

- Installation in Oldenburg requires ...
 - lots of sensors
 - low cost
- Stuttgart Sensor (luftdaten.info)
 - Enhancements and Extension

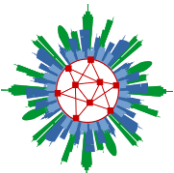




Assembling Sensor Nodes



- Pupils Workshop: 10
- Project Group: 8



RiO Website: Deployed Sensors

Map Mitmachen Über Uns

Strategy: **closest**

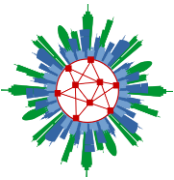
Update Heatmap

Reale Sensoren

Virtuelle Sensoren

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Leaflet | Map data © OpenStreetMap contributors, CC-BY-SA



PG-Rio

Dashboard

Maps

Messtation-PG-Raum-Theel-01

Dashboard für Sensordaten



PM 2,5
20.67 µg/m³



PM 10
24.27 µg/m³



Temperatur
7.25 °C



Luftdruck
1037.32 hPa

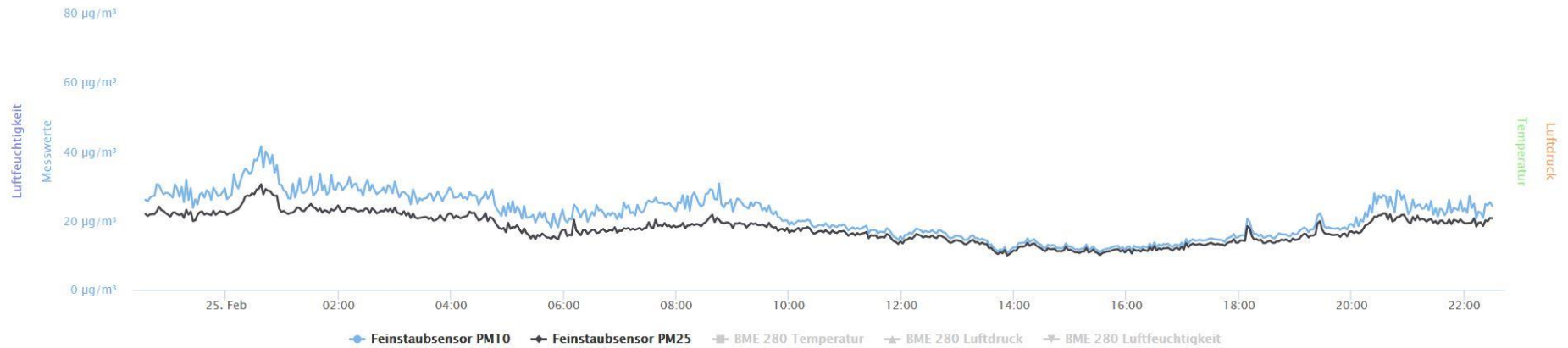


Luftfeuchte
49.13 %RH

Werte Anzeigen von

2/24/2019, 10:31 PM ~ 2/25/2019, 10:31 PM

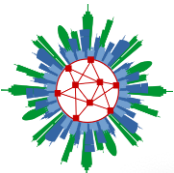
Feinstaubwerte



Highcharts.com

[Impressum](#)[Datenschutz](#)

Material Icons by Icons8



RiO Website: Fine Dust Pollution

pg-rio-uis.informatik.uni-oldenburg.de/maps

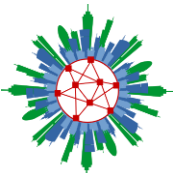
RiO Map Mitmachen Über Uns

Name: pgrio-khg
Type: physical
PM25: 2.8

Strategy: closest
Update Heatmap
 Reale Sensoren
 Virtuelle Sensoren

Impressum | Datenschutz

Leaflet | Map data © OpenStreetMap contributors, CC-BY-SA



Navigation App

Route

Steckeninformation

Fahrzeug **Fahrrad** ▾

Start

Aktueller Standort

Ziel

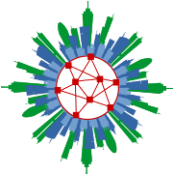
Oldenburg, Niedersachsen, 26122

Zeitintervall 00:10

ROUTE BERECHNEN

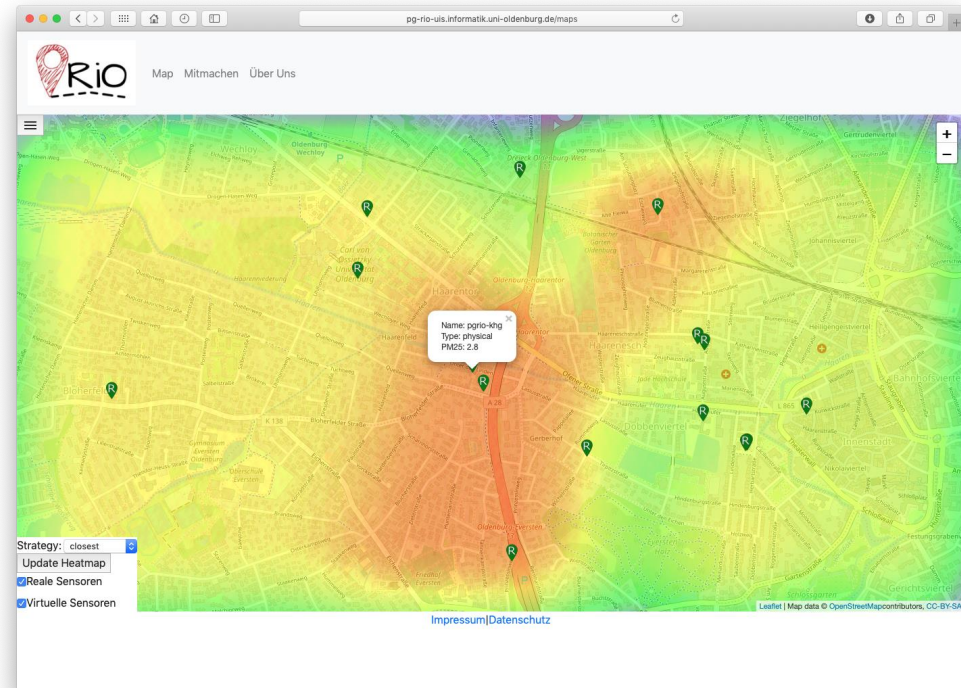
Strecke Einstellungen

Abbrechen



Extendable Architecture for Smart Cities

- Sensor Node
 - support more and different Sensors
 - push data to different Servers (PG-RiO, Madavi (planned), ...)
- Server Software
 - Virtual Sensors with different strategies (mocking, weighted, ...)
 - Different strategies for calculating pollution heatmaps (nearest sensor, interpolation, ...)
 - Routing strategies with different weights for edges
- Navigation App
 - Different Apps can be supported by Web Service
 - Support further regions
- Data Quality
 - Data Collector uses different strategies for improving data





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