

AirQuality SenseBox

Citizen Science with an Air Quality Sensor Network

Dustin Demuth



ifgi
Institut für Geoinformatik
Universität Münster



EGU 2013 – GI3.5

AirQualityEgg

Concept

"The Air Quality Egg is a sensor system designed to allow anyone to collect very high resolution readings of NO₂ and CO concentrations outside of their home. These two gases are the most indicative elements related to urban air pollution that are senseable by inexpensive, DIY sensors."

— airqualityegg.com

"Community-led sensing network"

AirQualityEgg

Concept

“The Air Quality Egg is a sensor system designed to allow anyone to collect very high resolution readings of NO2 and CO concentrations outside of their home. These two gases are the most indicative elements related to urban air pollution that are senseable by inexpensive, DIY sensors.”

— airqualityegg.com

Project founded by kickstarter campaign:
927 Backers; \$144,592 pledged of \$39,000 goal, currently delivering units to the backers; costs per unit: 185\$

AirQualityEgg

Technology

- outdoor sensors
 - NO_2
 - CO
 - temp. / rel.hum.
 - O_3 / voc
- egg base station
 - internet access
- internet component
 - cosm.com
 - store and visualize



CC-BY-SA:

<http://airqualityegg.wikispaces.com/AirQualityEgg>

AirQualityEgg

Challenges

- limited precision and accuracy
- cross-sensitivity of sensors
- where are the sensors currently?
- what kind of sensors are used?
- calibration?

AirQualityEgg

Challenges

- limited precision and accuracy
- cross-sensitivity of sensors
- where are the sensors currently?
- what kind of sensors are used?
- calibration?

“Impossible. We cannot build a consumer-focused product that requires regular maintenance/calibration of the sensors.”

—Ed Borden @ kickstarter.com

AirQualityEgg

Challenges

- limited precision and accuracy
- cross-sensitivity of sensors
- where are the sensors currently?
- what kind of sensors are used?
- calibration?

device has a low value

network is expected to be of high value

AirQualityEgg

Challenges

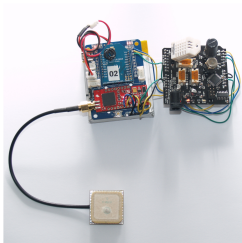
- limited precision and accuracy
- cross-sensitivity of sensors
- where are the sensors currently?
- what kind of sensors are used?
- calibration?

AirQuality SenseBox

Concept

sensor

sensor platform: autonomous,
location aware, mobile, wireless

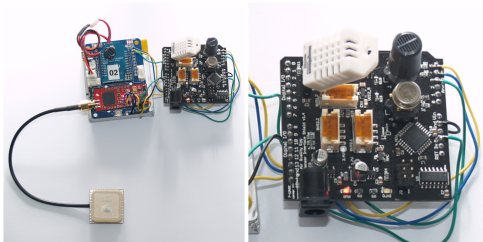


AirQuality SenseBox

Concept

sensor

sensor platform: autonomous,
location aware, mobile, wireless

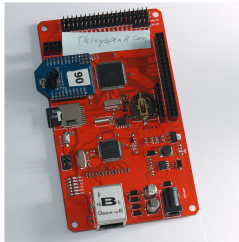
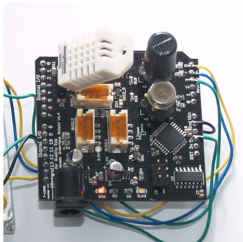


AirQuality SenseBox

Concept

gateway

receives data wireless, identifies sensor platform, converts and forwards data to a service



AirQuality SenseBox

Concept

logging platform

interfaces for inserting and querying of data, stores data, visualize data if possible

Sensor Observation Service



AirQuality SenseBox

Improvements

- outdoor unit is autonomous
- gateways can identify the sensors
- more powerful gateways allow data processing and the use of more sophisticated services
- logging platforms can be OGC compliant

AirQuality SenseBox

Improvements

- outdoor unit is autonomous
- gateways can identify the sensors
- more powerful gateways allow data processing and the use of more sophisticated services
- logging platforms can be OGC compliant

AirQuality SenseBox

Improvements

- outdoor unit is autonomous
- gateways can identify the sensors
- more powerful gateways allow data processing and the use of more sophisticated services
- logging platforms can be OGC compliant

AirQuality SenseBox

Improvements

- outdoor unit is autonomous
- gateways can identify the sensors
- more powerful gateways allow data processing and the use of more sophisticated services
- logging platforms can be OGC compliant

SOS, WFS, etc...

Citizen's Sensor Network

Chances and Challenges

Challenges

- massive amount of data
- data fragmentation, inaccuracy
- how to work with citizen sensed data?
- organization of the CS communities
- training of those communities

Citizen's Sensors

Chances and Challenges

Chances

- include citizens into the scientific process
- increase understanding of sc. processes
- raise environmental awareness
- find hotspots which had fallen through the grid
- change the monitored environment to the better

thank you



ifgi

Institut für Geoinformatik
Universität Münster

Dustin Demuth d.demuth@uni-muenster.de

appendix

images

The ifgi logo is property of ifgi.

If not denoted otherwise, images are self-made or had been licensed as public domain