User Experience of bAir

Kristian S. M. Andersen

Advisor: Thomas Pederson
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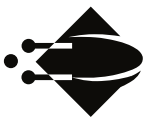

IT University
of Copenhagen

Abstract

This is an abstract

Contents

Chapter 1

Introduction

Air quality has significant impact on human health. The World Health Organization (WHO) estimates that several hundred million people world-wide die prematurely from air pollution induced diseases such as Chronic Obstructive Respiratory Disease (COPD). Medical studies have shown that poor air quality has adverse impact on human health. However, these studies consider aggreagates of populations, and use coarse data pollution levels, often at the city surburb level, taken from traditional fixed monitoring sites operated by governments.

In recent years, with the rapid growth of portable sensors, several studies have tried to use participatory sensing and crowdsourcing systems to get fine-gained urban air pollution data, including systems developed here at the IT University of Copenhagen (ITU).

At ITU a new project based on the prior research done with NoxDroid is currently running, called bAIR. In this project most problems with prior projects for personal air quality measurements are being addressed such as:

- Sensor sensitivity
- Power consumption
- Casing for the sensor
- Calibration
- Infrastructure for local and Cloud storage

One aspect that has not been rigorously covered is the user experience, the usability of the sensor system and the evaluation of the system by users. In this paper we will improve upon the existing systems from the bAir project, by running iterative evualuation studes,

1.1 Notes on bAir Prototype

The current prototype is developed through several iterations of this project, but also previous generations of the project (NoxDroid and SinoxSense). A new iteration of the hardware in the prototype is currently being developed and is unlikely to be the last.

The hardware has developed from something that is roughly the size of a can of tomatoes to something that is only the size of a small box of matches. The next iteration is planed to be smaller i size, rougly 3,6 cm in diameter and about 2 cm high. The constraining factor is now the battery. The current iteration will hold battery for about 7 hours of use (depending on the data resolution). The next iteration will likely laster a little longer.

The current hardware is at a pretty stable state. The hardware itself has no enclosure, which it will need before it can really be used on a bicycle. The battery is good, and will last several days for comuters. The sensor has fine data and the board for processing is fast enough. There has only been a mintor issue where the Bluetooth connection to the phone would drop once in a while. Wireless connections a volatile in nature so this is to be expected. The software should be as ressiliant to lossing connection as possible. If possible the software should have fail mechanisism that will try to restablish bluetooth connections if lost.

The software for the prototype is working but a little outdated. It is dating back a couple of android releases and will likely need to be updated a little bit. I have had quite some issues getting the code to actually run on my android phone. I will need to borrow another device and maybe get some help from Sebastian.

1.2 End users

We need to find out what the end users actually want. What factors are important for them when using something like this? Is the size, form factor, where it is placed, how easy is it to use? Is charging too anoying? Is it how precise the data is? Or how usefull it is?

Two part: 1. online survey with specific questions. 2. interviews with elaboration based on part 1.

Talk to Sebastian about the collab witht the other University with Environmentalists. Opportunity for piggy backing on hardware/evaluation?

Chapter 2

Related Work

2.1 Identified research areas

The related work can mostly be grouped into the following main areas of research:

- Air Quality & Polution
- Wearable Computing
- Mobile Computing

2.2 Related Papers

2.3 Common Acronyms & More

- **BTEX**: *Benzene, Toluene, Ethylbenzene and Xylene's. These are VOCs found in petroleum and derivatives such as Gasoline*
- **VOC**: *Volatile Organic Compound. These are organic chemicals that have a high vapor pressure at room temperature. These compounds have a low boiling point*

Chapter 3

Design

Chapter 4

Evaluation

4.1 Method

4.2 Short Term

4.3 Long Term

Chapter 5

Results

Chapter 6

Discussion

Chapter 7

Conclusion

7.1 Acknowledgements

Bibliography