

DPI Project Workshop Summary

Customizable Sensor Packages for Healthy Homes

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Introduction

On November 14, 2019, the “Customizable Sensor Packages for Healthy Homes” project team convened a stakeholder workshop to discuss the potential opportunities, uses, and needs of a customizable sensor system approach for indoor air quality measurements. In addition to the UIUC team, attendees represented broad city and state interests. These attendees included home performance contractors, a community action agency, Cook County Department of Public Health, Carle Foundation Hospital, the Mayor of the Village of Burnham, and U.S. EPA Region 5. In total, 17 people participated in the workshop. The agenda can be found following this workshop summary.

At the beginning of the workshop, the basic premise was described and a demonstration was provided, in which two sensors from two manufacturers were plugged into a single Raspberry Pi computer and the data were accessed remotely using Amazon Web Service. This demonstrated the potential for selecting different sensors and having the data be integrated in a manner that would allow a viewer to identify patterns across contaminants.



Attendees of the workshop

Users

A key topic of discussion was the question of who the users would be of the technology. A number of possibilities arose, including:

- Residents
- Medical professionals
- Community health workers
- Home visit nurses
- Pediatric environmental health units
- Asthma consortia
- Respiratory health associations
- Builders
- Utility partners

Additionally, possible roles for educators, first responders, policy makers, and those involved with technology automation were identified as possible interested parties.

Capabilities

There was also substantial discussion regarding how the technology would be used, and what features it would need to have.

A key question was whether the technology would go with the home or the occupants. At some level this is a question of intent. If the technology stays with the home then it would be more intended to provide ongoing actionable feedback to residents that would help them operate their home in a healthier manner through automation and/or alerts. Technology that follows the resident might be more used as a diagnosis tool by medical professionals or others, aiming to associate indoor air quality problems with health outcomes.

One of the major desired outcomes from the workshop was feedback from stakeholders on necessary features for a customizable sensor system to be broadly used. Key features/questions identified in the workshop included:

- System must allow users to turn to action
- Sensors must be sufficiently accurate
- Cost must be affordable
- Simplicity is key
 - Installation
 - Response
 - Education
- How much can a hub be expanded (i.e. how many sensors)?
- How many hubs can be in a home (i.e. how many locations)?
- Anonymization is important – stakeholders indicated that with common protections they thought residents would be interested in the technology
- What communication platform(s) could be accommodated (e.g. smart phone, AWS, etc.)

- Could the system also include voice collection to align reporting of events by residents with measured data?
- Could the system communicate with other smart devices such as thermostats?
- What would the expected lifetime of the sensors be and how would that be communicated to users?
- How would the system deal with obsolescence?
- Who could users contact for support, and how?

Next steps

The attendees of the workshop broadly expressed further interest in the topic and potential collaborations. It was agreed that a field pilot of the technology, when ready, would be key even if it only included a single sensor. The represented community action agency expressed a willingness to gain access to homes for such a pilot. There was some discussion of potential funding sources such as forward-thinking insurance companies. The group also agreed that getting end users to the table at the design phase would be valuable to get their input up front.

It was also made clear that any pilot in a community would require close collaboration with a “trusted partner” who would be present throughout the pilot. This trusted partner could take a number of forms, such as a community center, a place of worship, etc.

Attendees expressed a willingness to respond to a follow-up questionnaire about further involvement with this effort. This questionnaire is included following this summary.

**University of Illinois at Urbana-Champaign and
Discovery Partners Institute**

Customizable Sensor Packages for Healthy Homes Stakeholder workshop

November 14, 2019

Agenda

11:00 – 11:30 Welcome and Introductions

11:30 – 12:00 Introduction and technical demonstration

- The need for, and value of, customizable sensor suites for indoor air quality
- Demonstration of the package and dashboard concept

12:00 – 12:30 Break for collecting lunch, networking

12:30 – 1:30 Open discussion of usage opportunities and technical needs

1:30 – 1:45 Break

1:45 – 2:45 Next level discussion of opportunities – projects, partnerships, proposals

2:45 – 3:00 Wrap-up