AtmoSPHERE

Jay Feng, William Hwang, Joseph Wu, Mingyu Zhang
CSE 477, Spring 2015

ABSTRACT

Air quality is an upstream component of human health, which cannot be addressed through primary care health facilities. In this work, we present AtmoSPHERE, a connected, wearable air monitor. Our system is comprised of a wrist-worn sensor suite, a connected smartphone, and a cloud service. The sensor suite measures two major categories of airborne health risks: particulate matter and volatile organics. The phone tags the data with location data and is used to communicate between the sensors and cloud. From the cloud service, we display a dashboard to highlight air quality in travelled areas. To evaluate the system, we collected data from 2 users over the course of a week of normal activity.

ACM Classification Keywords

J.3 Health

Author Keywords

Air quality; Upstream health; Wearable; Connected devices; Distributed sensors.

INTRODUCTION

Approximately half of all known health conditions originate from environmental factors[2]. These factors are generally labelled "upstream" factors due to how they are detached from a person's immediate symptoms during illness. Upstream factors include variables such as the sanitation of a person's home, the condition of their workplace, or the local air. The existing health care system is not equipped to handle issues outside the hospital or clinic. However, many upstream factors are simple to identify, straight forward to address. We envision a device that can inform the user and others in the vicinity about one subset of upstream health risks.

In this project, we introduce AtmoSPHERE, a wearable air monitor for both particulate matter and volatile organic compounds (VOC). Particulate matter (PM), is any microscopic matter suspended in the atmosphere. Particulates include dust as well as more dangerous varieties classified by their diameter in microns, known as PM10 and PM2.5. A PM sensor is comprised of an infrared emitting diode and a phototransistor placed diagonally[1]. As particles pass through the path between the two components, deflected light is recorded by the phototransistor. This approach can detect visible dust as well as finer particles, such as PM2.5.

Volatile organic compounds (VOC)

RELATED PRODUCTS

TODO

THEORY OF OPERATION

TODO

IMPLEMENTATION DETAILS

TODO

Hardware

TODO

Phone Application

TODO

Web Application

TODO

RESULTS

TODO

CHALLENGES

TODO

FUTURE WORK AND DISCUSSION

TODO

CONCLUSION

TODO

REFERENCES

1. Sharp Corporation. 2006. GP2Y1010AU0F Datasheet. Online. (1 December 2006). Retrieved August 22, 2014 from **http://www.sparkfun.com/datasheets/Sensors/gp2y1010au_e.pdf**.

2. Rishi Manchanda. 2014. What makes us get sick? Look upstream. Video. (August 2014). Retrieved April 12, 2015 from **www.ted.com/talks/rishi_manchanda_what_makes_us_get_sick_look_upstream**.