55. Portable multi sensor participatory sensing application system for environmental monitoring

Dorothy Mwongeli Kalui[1], Julius Ratumo Toeri[2], Geoffrey Muketha[3], Jared Onsomu[4]
[1]School of Computing and Informatics, Meru University of Science and Technology, Meru
[2]School of Pure and Applied Sciences, Meru University of Science and Technology, Meru
[3]Muranga University of Technology, Muranga, Kenya,
[4]Upworth Ltd., Nairobi, Kenya
Corresponding authors email: jratumo@must.ac.ke and dkalui@must.ac.ke

Subtheme: Computing and Informatics - Leveraging Computing and informatics Technologies for Climate adaptation and resilience

Abstract

Mobile phone users in Participatory Sensing Systems (PSS) are invited to collect information from their immediate locations. Authors believe that sensor-equipped mobile phones will transform many sectors of Kenya economy, including environmental monitoring. Significantly, today's smartphones are programmable while others come with a growing set of cheap powerful embedded sensors, such as Global Positioning Systems etc. which are enabling the emergence of crowd sensing applications. Gas detectors and sensors play a critical role in ensuring safety, environmental protection, and industrial efficiency. With advancements in technology and ongoing research efforts, gas sensing technologies continue to evolve, offering enhanced performance, versatility, and applicability across diverse domains. Despite the stable growth of participatory sensing application worldwide, there is still little understanding of participatory sensing adoption and user's experiences in other countries, especially in Africa. These few research efforts have provided valuable findings and lessons for improving users' experiences and adoption; however, the participants in all these studies were drawn in the U.S., Europe, and Asia. The extent to which these findings about adoption and experiences generalize to other regions, such as Kenya, is still largely neither unaccounted nor unknown. To achieve this objective, the researchers conducted a questionnaire-based study involving 400 participants to investigate the possible key preconditions necessary for successful implementation of Participatory sensing in Kenya. To this end, we present a generic multi sensor tool that collects real time data simultaneously to monitor air quality. The selected multiple gases are carbon monoxide, carbon (IV) oxide, Ozone, particulate matter, methane, smoke, acetone, pressure, temperature, and humidity.

Keywords: *Participatory sensing, Air quality, Assessment, Embedded sensors, Portable sensing device*

NB: This work was supported in part by the National Research Fund (NRF), Kenya, Multidisciplinary Research, under Grant 2016/2017.