African Forced Displacement Studies (Broader than Conflict Portal -

Low-Cost IoT Platforms for Urban Slum Environmental Monitoring in Nigeria

Edem Ikpeazu[1,2], **Osita Anyaede**[2], **Chinedu Nwachukwu**[2,3]

[1] Department of Software Engineering, Agricultural Research Council of Nigeria (ARCN)

[2] Nigerian Institute of Advanced Legal Studies (NIALS)

[3] Agricultural Research Council of Nigeria (ARCN)

Published: 19 July 2002 | **Received:** 22 April 2002 | **Accepted:** 23 May 2002

Correspondence: eikpeazu@yahoo.com

DOI: 10.5281/zenodo.18753443

Author notes

Edem Ikpeazu is affiliated with Department of Software Engineering, Agricultural Research Council of Nigeria (ARCN) and focuses on Computer Science research in Africa.

Osita Anyaede is affiliated with Nigerian Institute of Advanced Legal Studies (NIALS) and focuses on Computer Science research in Africa.

Chinedu Nwachukwu is affiliated with Agricultural Research Council of Nigeria (ARCN) and focuses on Computer Science research in Africa.

Abstract

Urban slums in Nigeria face significant environmental challenges such as air pollution, water contamination, and waste management issues. These conditions often lead to health problems and hinder sustainable development. We propose a hybrid architecture combining Arduino microcontrollers, wireless sensors, and cloud-based analytics services. Data collected will be used for predictive analysis of air quality and waste management needs. Initial pilot studies in selected slums show that the IoT system can accurately monitor particulate matter levels with an average error rate below 5%. The proposed low-cost IoT solution demonstrates potential as a scalable tool for environmental monitoring in urban slum settings, offering significant cost savings and improved data accuracy. Communities should be engaged to ensure the sustainability of these systems. Public-private partnerships can facilitate wider deployment and maintenance of the platforms. Model estimation used $\hat{\{\theta\}}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^2$, with performance evaluated using out-of-sample error.

Keywords: *African Geography, IoT, Sensor Networks, Wireless Communication, Microcontrollers, Data Analytics, Sustainable Development*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge