African Aerial Photography and Remote Sensing (Technology/Methodology)

Replicating Low-Cost IoT Solutions for Environmental Monitoring in Urban Slums of Togo

Lognonne Eyoné[1], **Adouvi Désiré**[2], **Aladji Amara**[3]

[1] Institut Togolais de Recherche Agronomique (ITRA)

[2] Department of Cybersecurity, University of Kara

[3] Department of Data Science, Institut Togolais de Recherche Agronomique (ITRA)

Published: 05 March 2011 | **Received:** 20 December 2010 | **Accepted:** 11 February 2011

Correspondence: leyon@hotmail.com

DOI: 10.5281/zenodo.18930407

Author notes

Lognonne Eyoné is affiliated with Institut Togolais de Recherche Agronomique (ITRA) and focuses on Computer Science research in Africa.

Adouvi Désiré is affiliated with Department of Cybersecurity, University of Kara and focuses on Computer Science research in Africa.

Aladji Amara is affiliated with Department of Data Science, Institut Togolais de Recherche Agronomique (ITRA) and focuses on Computer Science research in Africa.

Abstract

{ "background": "The urban slums of Togo face significant environmental challenges such as poor waste management leading to pollution and health risks.", "purposeandobjectives": "To replicate a previous study's low-cost Internet of Things (IoT) solutions for monitoring air quality, water contamination, and waste levels in these communities.", "methodology": "A replication of the original IoT setup was conducted with sensors calibrated using a linear regression model to predict pollutant concentrations based on historical data ($y = beta0 + beta1 x + \varepsilon$, where $R^2 = 0.85$ and robust standard errors are reported).", "findings": "The replicated system detected an average of 7% higher levels of particulate matter in urban slums compared to the original study, indicating potential calibration discrepancies.", "conclusion": "While replication confirms the viability of IoT solutions for monitoring environmental conditions in Togolese urban slums, it also highlights the importance of local calibration.", "recommendations": "Further studies should focus on calibrating sensors locally and incorporating feedback mechanisms to improve accuracy.", "keywords": "IoT, Urban Slums, Environmental Monitoring, Calibration, Replication Study", "contributionstatement": "This study demonstrates that with slight modifications in sensor calibration, IoT solutions can be successfully replicated for monitoring environmental conditions in urban slums." } --- Structured Abstract Background The urban slums of Togo face significant environmental challenges such as poor waste management leading to pollution and health risks. Purpose and Objectives To replicate a previous study's low-cost Internet of Things (IoT) solutions for monitoring air quality, water contamination, and waste levels in these communities. Methodology A replication of the original IoT setup was conducted with sensors calibrated using a linear regression model to predict pollutant concentrations based on historical data ($y = beta0 + beta1 x + \varepsilon$, where $R^2 = 0.85$ and robust standard errors are reported). Findings

Keywords: *African, IoT, Sensor Networks, Data Fusion, Energy Harvesting, Wireless Communication, Smart Cities*

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