African Logistics and Supply Chain
(Business/Engineering crossover)

Low-Cost IoT Solutions for Environmental Monitoring in Cape Verde Urban Slums: A Replication Study

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Abstract

This study addresses a current research gap in Computer Science concerning Developing Low-Cost IoT Solutions for Environmental Monitoring in Urban Slums in Cape Verde. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Developing Low-Cost IoT Solutions for Environmental Monitoring in Urban Slums, Cape Verde, Africa, Computer Science, replication study This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Cape Verde, Geographic Information Systems (GIS), Sensor Networks, Wireless Communication Protocols, Data Analytics, Energy Harvesting, Sustainable Technologies*

ABSTRACT-ONLY PUBLICATION

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