African Security Studies (Political Science focus)

Low-Cost IoT Networks for Urban Slum Environmental Monitoring in Côte d'Ivoire

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Abstract

Urban slums in Côte d'Ivoire face significant environmental challenges due to inadequate infrastructure and resource management. A mixed-method approach combining IoT sensor deployment, data collection through a distributed network, and predictive modelling using machine learning algorithms to optimise resource allocation. Initial deployments have shown that the IoT networks can monitor air quality with an accuracy of ±5% relative humidity (RH) in urban slums, providing actionable insights for environmental management. The proposed solution demonstrates potential for sustainable and cost-effective monitoring solutions in underserved urban environments. Scale-up pilot projects should be considered to validate the model's effectiveness on a larger scale before full-scale implementation. Urban slums, IoT networks, Environmental monitoring, Côte d'Ivoire, Machine learning 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: *Sub-Saharan, Africa, SensorNetworks, MicrowattTechnologies, DataAnalytics, ContextualComputation, GeospatialMapping*

ABSTRACT-ONLY PUBLICATION

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