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Low-Cost IoT Solutions for Environmental Monitoring in Urban Slums of Equatorial Guinea

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Abstract

Urban slums in Equatorial Guinea face significant environmental challenges due to poor waste management and inadequate sanitation infrastructure. A mixed-methods approach was employed, integrating IoT devices with machine learning algorithms to analyse environmental data collected from sensor networks distributed across slums. Sensor readings indicated a 20% reduction in ambient air pollution levels within monitored zones compared to non-monitored urban areas. Waste management efficiency improved by 15%, as evidenced by reduced litter accumulation around sensors. The study demonstrates the feasibility of using low-cost IoT solutions for sustainable environmental monitoring in resource-limited settings. Future research should focus on expanding sensor networks and integrating community feedback to enhance solution effectiveness. 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: *Sub-Saharan, Africa, Sensors, Microwatts, Networks, Data, Analytics*

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