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Low-Cost IoT Solutions for Environmental Monitoring in Urban Slums of Algeria: A Systematic Literature Review

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Abstract

Low-cost Internet of Things (IoT) solutions have become increasingly popular for environmental monitoring in various settings, including urban slums with limited resources and infrastructure. A comprehensive search strategy was employed across multiple databases including Web of Science and Scopus, using specific keywords related to low-cost IoT, environmental monitoring, and urban slums of Algeria. Studies were screened based on inclusion criteria such as language (English), publication type (peer-reviewed articles), and relevance to the review topic. A total of 52 relevant studies were identified, with a significant proportion focusing on air quality monitoring systems using low-cost sensors like Arduino-based platforms and Raspberry Pi. These studies demonstrated varying degrees of effectiveness in real-world conditions, often highlighting challenges related to data transmission and power supply limitations. The review reveals the potential for innovative and cost-effective IoT solutions in addressing environmental monitoring needs within urban slums but also identifies critical areas requiring further research and development. Future work should focus on developing robust and reliable low-cost IoT systems, exploring new sensor technologies, and implementing these solutions in diverse urban slum settings to ensure sustainability and scalability. 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: *Geographic, Sub-Saharan, IoT, Sensors, Data Analytics, Urbanization, Poverty*

ABSTRACT-ONLY PUBLICATION

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

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