Low-Cost IoT for Urban Slum Environmental Monitoring in Libya

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Abstract

Urban slums in Libya face significant environmental challenges due to inadequate infrastructure and resources for monitoring air quality, water supply, and waste management. A mixed-method approach was employed, involving surveys to understand the specific needs of urban slum residents, laboratory testing of proposed sensor designs, and field trials in selected slums. Data from these trials were analysed using statistical models to evaluate device performance and user satisfaction. The initial field trials demonstrated that IoT devices could reliably monitor air quality parameters with a precision of ±5% relative humidity (RH) and ±2°C temperature readings under ambient conditions, indicating the potential for accurate environmental monitoring in slum settings. This study has shown promising results in developing low-cost IoT solutions for urban slums. The devices were found to be robust enough to operate in challenging environments with minimal maintenance requirements. Future research should focus on expanding the scope of monitored parameters and integrating data into local decision-making processes, aiming to improve living conditions in urban slums. Low-Cost IoT, Urban Slums, Environmental Monitoring, Libya 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	Terms:
Libyan		*Desert*
Methodological		*Terms:*
Mixed		*Methods*
Theoretical		*Concepts:*
Urban		*Informality*

Environmental   *Monitoring*

Low-Cost   *Technology*   *Deployment*

Sensor Networks

ABSTRACT-ONLY PUBLICATION

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