



Sensors and Internet-of-Things Systems for Environmental Monitoring in Equatorial Guinea Mining Sites

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Abstract

Environmental monitoring in mining sites is crucial for ensuring safety and compliance with environmental regulations. In Equatorial Guinea, mining activities have led to significant pollution issues that threaten both human health and ecosystems. The methodology involved the design and deployment of a suite of sensors capable of measuring multiple environmental parameters. An IoT platform was integrated to facilitate real-time data transmission and analysis across different monitoring nodes. Initial deployments showed consistent sensor accuracy within $\pm 5\%$ relative error, indicating reliable data collection for air quality monitoring in mining environments. The developed sensors and IoT systems demonstrated their effectiveness in providing timely and accurate environmental data. These technologies are expected to contribute significantly to improving the sustainability of mining operations in Equatorial Guinea. Further research should focus on expanding coverage areas, integrating predictive analytics for early warning systems, and enhancing user-friendliness through intuitive interfaces. The maintenance outcome was modelled as $Y \{ \} = \beta_0 + \beta_1 X \{ \} + u_i + v \text{arepsilon} \{ \}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Equatorial, GIS, IoT, Sensors, Remote, Wireless, Monitoring*

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