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Sensors and IoT Systems for Environmental Monitoring in Botswana Mining Sites: A Development Case Study

Olisipho Magwaza[1], **Dumetille Mmagoza**[2], **Mokgopang Molekane**[3,4]

[1] Department of Electrical Engineering, University of Botswana

[2] Department of Mechanical Engineering, Botswana International University of Science & Technology (BIUST)

[3] Botswana University of Agriculture and Natural Resources (BUAN)

[4] University of Botswana

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Correspondence: omagwaza@outlook.com

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Author notes

Olisipho Magwaza is affiliated with Department of Electrical Engineering, University of Botswana and focuses on Engineering research in Africa.

Dumetille Mmagoza is affiliated with Department of Mechanical Engineering, Botswana International University of Science & Technology (BIUST) and focuses on Engineering research in Africa.

Mokgopang Molekane is affiliated with Botswana University of Agriculture and Natural Resources (BUAN) and focuses on Engineering research in Africa.

Abstract

In Botswana's mining sector, environmental monitoring is crucial for sustainable operations. However, current systems are often inadequate and prone to errors. The methodology involved the design and deployment of IoT systems equipped with sensors, data collection, and analysis using statistical models. Data collected from the sensors showed a significant correlation ($R^2 = 0.95$) between temperature and humidity levels in mine pits, indicating high reliability of monitoring systems. The developed IoT systems successfully monitored environmental conditions in mining sites with minimal human intervention. Further research should focus on integrating AI for predictive maintenance and expanding the system to other mine sites. Environmental Monitoring, IoT Systems, Mining Sites, Botswana

Keywords: *Botswana, Geographic Information Systems (GIS), Sensor Networks, Internet of Things (IoT), Environmental Monitoring, Wireless Sensor Networks (WSN), Data Analytics*

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