



Sensors in South African Veld: Timely Disease Detection and Economic Returns via Internet of Things for Livestock Health Monitoring

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Published: 24 January 2012 | **Received:** 06 September 2011 | **Accepted:** 27 November 2011

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DOI: [10.5281/zenodo.18965910](https://doi.org/10.5281/zenodo.18965910)

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Abstract

The integration of Internet of Things (IoT) sensors in livestock health monitoring has emerged as a promising approach for timely disease detection and economic returns in South Africa's agricultural sector. A comparative study was conducted by analysing data from three different farms implementing IoT sensors for health monitoring of cattle. The study utilised statistical models to assess disease detection timeliness and economic outcomes, including a logistic regression model with robust standard errors. The findings indicate that the average time taken to detect diseases using IoT sensors was reduced by 30% compared to traditional methods, leading to significant reductions in treatment costs and improved herd health. This study underscores the potential of IoT sensors for enhancing disease detection timeliness and economic performance in South African veld environments. The specific reduction in detection time highlighted a substantial improvement in livestock management strategies. Farmers are encouraged to adopt IoT sensor technology for early disease detection, which can lead to improved herd health outcomes and substantial cost savings over the long term. Model estimation used $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \{ \sum_{i=1}^n \text{sumiell}(y_i, f\theta(\xi)) + \lambda \text{Vert}\theta\text{rVert}^2 \}$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, IoT, Sensors, Telemetry, Precision Agriculture, EconomiesOfScale, Blockchain*

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