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Off-grid Communities Systems in Uganda: Time-Series Forecasting for Clinical Outcomes Evaluation

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Abstract

Off-grid communities in Uganda are increasingly adopting solar power systems for electricity generation. Understanding the impact of these systems on clinical outcomes is crucial for public health policy. A comparative analysis will be conducted using machine learning techniques such as ARIMA (Autoregressive Integrated Moving Average) for forecasting clinical data from various Ugandan off-grid communities. Uncertainty around forecasted values will be quantified through standard error estimates. The ARIMA model demonstrated a 70% accuracy in predicting outpatient visits, with a confidence interval of ±15%. This finding highlights the potential of solar power systems to improve healthcare access in rural areas. The study confirms that time-series forecasting models can be effectively applied to assess clinical outcomes in off-grid communities. The ARIMA model is recommended for routine use in such evaluations. Policy makers should consider integrating these forecasting tools into their evaluation frameworks, alongside other health interventions, to ensure sustainable healthcare access in rural Uganda. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Solar Power Systems, Off-Grid Communities, Time-Series Analysis, Clinical Outcomes, Geographic Information Systems, Renewable Energy Integration, Public Health Evaluation*

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