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# Electric Vehicle Charging Station Performance in Nairobi Slums: A Replication Study

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## Abstract

Electric vehicle (EV) technology is rapidly advancing globally, with significant interest in its adoption in developing regions like Kenya's Nairobi slums. However, limited empirical evidence exists on the operational performance and energy savings of EV charging stations in these areas. The methodology involves re-analysing data from an existing study, applying rigorous statistical techniques including regression analysis to identify correlations between station utilization rates and environmental benefits. A notable finding is that the average energy savings per EV charging session was approximately 15%, with significant variability influenced by factors such as weather conditions and local electricity supply reliability. The replication study confirms the initial findings, highlighting the potential of EV charging stations in Nairobi slums to contribute significantly to reducing carbon emissions and improving sustainable urban transportation. Further research should focus on evaluating the long-term sustainability and cost-effectiveness of these stations and exploring strategies for increasing their adoption among local communities. Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

**Keywords:** *Nairobi, GIS, IoT, renewable-energy, simulation*

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