



AI-Powered Satellite Imagery for Land Use Mapping and Monitoring in Cape Verde: An African Perspective

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Abstract

Cape Verde is an archipelago in the Atlantic Ocean with limited terrestrial resources, making effective land use management crucial for sustainable development. The study utilised Sentinel-2 satellite imagery acquired over two years, processed through a Convolutional Neural Network (CNN) model with an accuracy threshold set at 95%. A significant proportion of the analysed land (73%) was found to be dedicated to agriculture and forestry, highlighting the importance of these sectors for Cape Verde's economy. AI-powered satellite imagery has proven effective in delineating land use patterns with high accuracy, supporting sustainable resource management strategies. Further research should explore inter-seasonal variations and incorporate user feedback into the model to enhance its practical utility. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{rVert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: Geographic Information Systems (GIS), Remote Sensing, Machine Learning, Precision Agriculture, Image Classification, Geographic Disparity Analysis, Sustainable Development

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