



AI-Powered Satellite Mapping for Land Use Dynamics in Burundi,

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Abstract

Satellite imagery has been increasingly used for monitoring land use changes in various regions, including Africa. However, satellite data often require manual interpretation and can be time-consuming. A convolutional neural network (CNN) was trained using Sentinel-2 satellite imagery from to . The CNN model was fine-tuned with reference data provided by local authorities, ensuring high accuracy and reliability of the land use classifications. The AI-powered system achieved an overall classification accuracy of 85% for detecting changes in agricultural lands compared to manual interpretation methods. The automated approach significantly reduced the time needed for monitoring land use dynamics while maintaining high levels of precision and consistency. Future studies should explore the integration of AI with other remote sensing data sources and evaluate the impact on policy-making at local government level in Burundi. AI, satellite mapping, land use change, convolutional neural networks (CNN), digital transformation Model estimation used $\hat{\theta} = \operatorname{argmin} \{ \theta \} \operatorname{sumiell} (y_i, f\theta (\xi)) + \lambda l \operatorname{Vert} \theta r \operatorname{Vert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: Sub-Saharan, Africa, SpatialAnalysis, Landsat, DigitalEarthAI, MachineLearning, GeospatialInformatics

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