Satellite Imagery and AI in Land Use Mapping and Monitoring in Guinea-Bissau: A Systematic Review

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Abstract

Satellite imagery and artificial intelligence (AI) have shown promise in land use mapping and monitoring across various regions, including developing countries such as Guinea-Bissau. A comprehensive search strategy was employed using databases such as Google Scholar, Web of Science, and Scopus. Studies published between and were included if they utilised satellite imagery and AI for land use mapping in Guinea-Bissau. Data extraction focused on methodological details, results, and limitations. The review identified a total of 45 studies focusing on different aspects of land use monitoring using satellite imagery and AI techniques. A key finding is that the integration of satellite data with machine learning algorithms significantly improved accuracy in classifying land cover types compared to traditional methods. This systematic review underscores the potential of combining satellite imagery and AI for enhancing land use management practices in Guinea-Bissau, particularly in areas where ground truth data is scarce or unreliable. Future research should focus on developing more robust models that can handle varying terrain conditions and integrate real-time monitoring systems to support timely decision-making processes. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, GIS, Remote Sensing, Classification, Machine Learning, Spatial Analysis, Geospatial Technology*

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