令和元年度　環境科学院　修士論文内容の要旨

Integrating GIS/RS and machine learning techniques to monitor urban expansion of Luanda, Angola
（アンゴラ，ルアンダにおける都市拡大のモニタリングのためのGIS/RSおよび機械学習技術の統合化）

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Application of remote sensing for the complex and heterogeneous urban environments in Sub-Saharan African countries is challenging due to spectral confusion among features caused by the diversity of construction materials. We resort to an index-based classification from a Thematic Oriented Index Combination that is expected to better highlight features of interests and be prone to an unsupervised classification. This study aims (1) to evaluate the effectiveness of index-based-classification for land use land cover (LULC) using an unsupervised machine learning algorithm PQk-means, and (2) to monitor the urban expansion of Luanda, the capital city of Angola in a logistic regression model. Comparison with state-of-the-art algorithms shows that unsupervised classification by means of spectral indexes is effective for the study area and can be used for further studies. The built-up area of Luanda has increased from 94.5 km^2 in 2000 to 198.3 km^2 in 2008 and to 468.4 km^2 in 2018, mainly driven by the proximity to the already established residential areas and to the main roads as confirmed by the logistic regression analysis. The generated probability maps show high probability of urban growth in the areas where the government had defined housing programs.