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APPLICATION OF DUBAISAT-2 DATA IN MONITORING COASTAL AREA DYNAMIC IN THE
EMIRATE OF DUBAI DURING 2013-2020

Abstract

Monitoring coastal area dynamics over time is critical to existing master plans and investigating the impact of the rapid urbanization on environmental issues such as groundwater and air quality. DubaiSat-2 data are ideal for mapping, classifying land use land cover (LULC) and monitoring coastal area dynamic in the Emirate of Dubai over a regional scale in timely and economically manners. This study presents a hybrid approach, which integrates the classification and regression tree (CART) model, logistic regression (LR) model and random forest (RF) model to monitor coastal area dynamic in the Emirate of Dubai during the period from 2013 to 2020. This study also aims to compare the accuracy of DubaiSat-2 maps against those extracted from Landsat images and evaluate each model's performance applied to the DubaiSat-2 data. The approach starts by collecting 300 training samples from the panchromatic band with a spatial resolution of 1m followed by the models' optimal parameterization. These training samples will divide into two groups (training and validation) to assess models' accuracy. The models will run on DubaiSat-2, and Landsat images, and the accuracy of the resulting LULC maps will then establish using a confusion matrix. An evaluation of the performance of the CART, LR and RF models will perform using a receiver operating characteristic curve (ROC) and field observation in selected locations across the Emirate of Dubai. A comparison between the models will also perform to check which model has the highest accuracy. After that, each pair of the best LULC maps (2013-2016, 2016-2020 and 2013-2020) will use to detect changes using image difference algorithm implemented in Envi v. 4.5 software and spatial analysis will perform in a GIS environment. The proposed approach is a hybrid and effective for monitoring the dynamic of the coastal area. The proposed approach can be used to evaluate the accuracy of DubaiSat-2 data by comparing them against the Landsat data and assist decision-makers and urban planners as well as research institutes.