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Earth Observation Applications, Societal Challenges and Economic Benefits (5)

Author: Ms. Diena AlDogom
University of Dubai, United Arab Emirates, daldogom@ud.ac.ae

Ms. Shaikha AlBesher
Mohammed Bin Rashid Space Centre (MBRSC), United Arab Emirates, Shaikha.albesher@mbrsc.ae
Ms. Mina Al-saad
University of Dubai, United Arab Emirates, malsaad@ud.ac.ae

IMAGE SEGMENTATION AND MACHINE LEARNING TECHNIQUES FOR VEGETATION MAPPING-DUBAI, UAE

Abstract

A revealing and precise vegetation map for Dubai is an essential need to assist Dubai municipality sustainable planning and management processes. Remote sensing and GIS technologies provide an effective and practicable way for vegetation monitoring and mapping. High spatial resolution data from different sensors has considered for geographic object-based image analysis (GEOBIA) to successfully classify different vegetation species, such as olives, palm trees, mangrove trees, ect. In this study, fine spatial resolution multi-spectral imagery collected from DubaiSat-2 satellite will be used to obtain a well-organized and accurate methodology for vegetation classification. The study methodology is divided into four parts. First, multi-resolution segmentation will be adjusted and tuned to achieve the best possible segmentation for vegetation areas. Second, object-based image analysis, considering the spectral and spatial signatures, will be carried out to find the most appropriate features to discriminate vegetation areas. Third, machine learning techniques will be adopted to select the most signicant features. Finally, based on the designated features, rule-based classication will be applied to classify vegetation areas. The algorithm efficiency will be tested over manually digitized data as well as the municipality Land Use Land Cover (LULC) maps. This study can will combine object-based analysis with machine learning algorithms to significantly improve the classification, where high-spatial resolution data will be used to accurately map vegetation areas, in order to improve urban management procedures and its environmental studies.