

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Data Management Systems (4)

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WATER BODIES EXTRACTION FROM HIGH RESOLUTION DUBAISAT-2 IMAGES USING
LOGISTIC REGRESSION

Abstract

Dubai is one of the fastest human socioeconomic development city in the world. This rapid growth in the human practices and natural processes can cause changes in both civil and natural environments. One of these environmental surfaces that significantly changed is water bodies. The number of lakes and pools in Dubai are expanding almost in every infrastructure, urban planning and development project, and hence, planning and protecting water resources is needed. One way to monitor water changes and expansions is the classical method of human based collecting data. However, this method is both time and money consuming, over and above, it is very likely to have non accurate results.

Therefore, as technology is evolving, Dubai has launched DubaiSat-2 as an endeavor for the necessity of earth observation and change mapping. Past worth efforts in water extraction from multi-spectral remote sensed images mainly faced the challenge of miss-classification, especially with shadows. Shadows are typical noise objects for water extraction, as they have almost identical spectrum characteristics, which is difficult to discriminate between water and shadows in a remote sensing image, especially in an urban region such as Dubai.

To deal with such miss-classification between water areas and shadows, a water extraction algorithm was developed in order to extract water surfaces automatically and accurately with shadows elimination using Dubai Sat 2 images. The detection is based on logistic regression algorithm. A logistic regression model was used to predict the probabilities of the classes based on the input feature classes such as Red, Blue, Green and NIR bands, after ranking them according to their relative importance. The algorithm and final results are compared with ground truth imagery of different regions of interest in Dubai for accuracy assessment. The results were satisfactory with very minimum negligible shadows, and accuracy of above 97%

This automatic water surfaces extraction algorithm can be converted to a vector layers and utilized by many end users such as Dubai Municipality and the Ministry of Climate Change and Environment in UAE.