Compare of non-parametric classification methods involve SVM and Decision Tree in evaluation quantitative characteristic of individual tress of Persian Oak (*Quercus Brantii* Lindl.), Haft Barm wetland on WorldView-2 satellite images

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Abstract

One of the most common uses of forestry is to identify individual trees and compassions tree species using image analysis and satellite or aerial image classification. The aim of this study is to evaluate support vector machines (SVM) and Decision Tree (DT) classification methods in estimating the quantitative characteristics of oak trees in WorldView-2 images and UAVs. In this study, Haft-Barm forest, Shiraz, was considered as a study area to assess the potential of Worldview-2 satellite images in 2015. Estimation of forest parameters with a focus on single tree extraction using SVM and DT classification methods with complex matrix evaluation and area under operational characteristic curve (AUC) with the help of UAV4 Phantom Bird image was evaluated in two separate areas. Data were analyzed using independent T-tests, multivariate regression analysis, using SPSS 25, Excel 2016, eCognation v. 8.7, ENVI, 5, PCI Geomatica 16 and Google Earth 7.3 software. The SVM classification had the highest and best accuracy in estimating single tree parameters. The SVM classification method was a very useful way to identify the oak tree Zagros mountain forest. Using WV-2 data, the parameters of single trees in the forest can be extracted. The SVM algorithm using WV-2 also produced very promising result, with 96% overall accuracy and a Kappa index of 0.97. The results of regression analysis indicated that using WV-2 images (R2= 0.97) was suitable for estimating canopy area on the forest. While UAVs have the potential to provide flexible and practical solutions for mapping forests, some issues related to image quality still need to be addressed to improve classification performance.

Keywords: Haft Barm wetland, WorldView-2, Extraction of individual trees, tree crown, classifiers, support vector machines.