Deep learning faster region-based convolutional neural network technique for oil palm tree counting

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ABSTRACT

With the current development of image processing techniques, deep learning and machine learning methods have achieved tremendous performance specifically in aerial view image classification and detection. Deep learning convolutional neural network (CNN) has been known to be a state-of-art technique that produces high accuracy and efficiency of detection. Faster Region-Based Convolutional Neural Network (Faster RCNN) model is one of the detection methods that can be used in the field of aerial image classification specifically for high-resolution images from drones. In the oil palm tree counting, the traditional method of hand-crafted image processing is known to be computationally intensive and lack of generalization capability due to their highly dependent on the image appearance. Furthermore, the extracted features by the image processing method are only applicable and dependent on one application and need to be designed again for other different applications. In this paper, we propose a deep learning method of Faster RCNN for oil palm tree counting by using a pre-trained network ResNet50. The transfer learning model of ResNet50 then was trained again by the Faster RCNN network to get the weight for automatic oil palm tree counting. The proposed model is validated on the young, matured and mixed (young and matured) palm trees respectively, and we also compare the result with other machine learning methods of ANN and SVM. The Faster RCNN shows a promising result of oil palm tree counting where we achieved overall accuracy up to 97%.

KEYWORD
Image processing; Deep learning; Faster RCNN; Oil palm tree