

Automatic detection of oil palm tree from UAV images based on the deep learning method

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ABSTRACT

Palm oil is a major contributor to Malaysia's GDP in the agriculture sector. The sheer vastness of oil palm plantations requires a huge effort to administer. An oil palm plantation in regards to the irrigation process, fertilization, and planning for planting new trees require an audit process to correctly count the oil palm trees. Currently, the audit is done manually using aerial view images. Therefore, an effective and efficient method is imperative. This paper proposes a new automatic end-to-end method based on deep learning (DL) for detection and counting oil palm trees from images obtained from unmanned aerial vehicle (UAV) drone. The acquired images were first cropped and sampled into small size of sub-images, which were divided into a training set, a validation set, and a testing set. A DL algorithm based on Faster-RCNN was employed to build the model, extracts features from the images and identifies the oil palm trees, and gives information on the respective locations. The model was then trained and used to detect individual oil palm tree based on data from the testing set. The overall accuracy of oil palm tree detection was measured from three different sites with 97.06%, 96.58%, and 97.79% correct oil palm detection. The results show that the proposed method is more effective, accurate detection, and correctly counts the number of oil palm trees from the UAV images.

KEYWORDS

Deep learning (DL); DL algorithm; Oil palm tree detection; UAV images

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