UNIVERSITI TEKNOLOGI MARA

Semi-Automatic Oil Palm Tree Counting from Pleiades Satellite Imagery and Airborne LiDAR

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AUTHOR'S DECLARATION

I declare that the work in this thesis/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Oil palm is becoming an important source in its production of vegetable oil. Oil palm tree information is important for sustainability assessments and agriculture precision. Therefore, the oil palm tree counting technique is crucial to monitor the development of the oil palm plantations especially when it can to a large area. However, the most difficulties are to develop a method to detect, extract and count trees automatically from the image. This study aimed to develop the automatic oil palm tree counting using remote sensed data and two different algorithms at Felda Pasoh. There are three objectives, firstly, to produce tree height estimation by using the Canopy Height Model (CHM). Secondly, to develop the rule sets of watershed transformation segmentation and local maxima algorithm using Pleiades and LiDAR. Lastly, to compare the accuracy assessment of watershed transformation segmentation and local maxima algorithm. The data used is Pleiades high spatial resolution satellite imagery and LiDAR data. In this study, the software used for data processing and analysis includes eCognition, ERDAS, and ArcGIS. The study is to categorize and evaluates methods for automatic tree counting detection. For the methodology of this study, object-based image analysis (OBIA), watershed transformation segmentation and local maxima algorithm are applied. The CHM result shows the lowest height was determined at 0m and the highest was 9.376m. Therefore, the final output of tree crown shows the watershed transformation algorithm is the best method for use represented oil palm tree counting in the map which is the accuracy assessment is 38.9%.

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