

## Algorithm for Improved Tree Counting and Detection through Adaptive Machine Learning Approach with the Integration of Watershed Transformation and Local Maxima Analysis

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**Abstract :** The Philippines is long considered as a valuable producer of high value crops globally. The country's employment and economy have been dependent on agriculture, thus increasing its demand for the efficient agricultural mechanism. Remote sensing and geographic information technology have proven to effectively provide applications for precision agriculture through image-processing technique considering the development of the aerial scanning technology in the country. Accurate information concerning the spatial correlation within the field is very important for precision farming of high value crops, especially. The availability of height information and high spatial resolution images obtained from aerial scanning together with the development of new image analysis methods are offering relevant influence to precision agriculture techniques and applications. In this study, an algorithm was developed and implemented to detect and count high value crops simultaneously through adaptive scaling of support vector machine (SVM) algorithm subjected to object-oriented approach combining watershed transformation and local maxima filter in enhancing tree counting and detection. The methodology is compared to cutting-edge template matching algorithm procedures to demonstrate its effectiveness on a demanding tree is counting recognition and delineation problem. Since common data and image processing techniques are utilized, thus can be easily implemented in production processes to cover large agricultural areas. The algorithm is tested on high value crops like Palm, Mango and Coconut located in Misamis Oriental, Philippines - showing a good performance in particular for young adult and adult trees, significantly 90% above. The s inventories or database updating, allowing for the reduction of field work and manual interpretation tasks.

**Keywords :** high value crop, LiDAR, OBIA, precision agriculture

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