Geotagged application for durian trees using aerial imagery and vegetation indices algorithm

ABSTRACT

Durian demand has increased considerably, and it has gained popularity in the market. Under Industrial Revolution 4.0, precision agriculture is expanding globally with a wide range of digital technologies that provide the farming industry with information to improve farm productivity. The objectives of this study are to geotag the durian trees and to compare several Vegetation Indices (VIs) algorithms (VisibleBand Difference Vegetation Index (VDVI), Visible Atmospherically Resistant Index (VARI), Normalized Green-Red Difference Index (NGRDI), Red-Green Ratio Index (RGRI), Modified Green-Red Vegetation Index (MGRVI), Excess Green Index (ExG), Color Index of Vegetation (CIVE), and Vegetativen (VEG)). One hundred sixty durian trees at the Durian Valley in Kluang (Johor), were tagged, which consist of four sample trees for each treatment. Every two weeks of ground data such as the height of trees, canopy width, girth's diameter, node distance, pH value, moisture content, electrical conductivity (EC) reading, and leaf sizes were exported into the QGIS software and joined with the tagged durian trees. The aerial imagery data captured the durian plantation area using Red Green Blue (RGB) sensor with a 100 m flight attitude. pH, EC, and moisture content were interpolated using Inverse Distance Weighted (IDW) technique. The processed image by VIs and geotagged trees could help farmers to identify the problem areas in the farm and monitor durian plantation effectively.

Keyword: Aerial imagery; Durian; GIS; Unmanned aerial vehicles; Vegetation index