Acquisition of aerial photographs using drone and computing high resolution ortho mosaic imagery for utilizing as Land use/Land cover image classification

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Landuse/Landcover mapping utilizing remote sensing data such as satellite imageries, is a promised method used in various fields such as for land use planning’ s or environmental analysis, to understand the current status at the region of interest. Recent technology of satellite imageries can observe the land environment in finer spatial resolution with higher revisiting time, showing its high versatility. However, effects of cloud covers are unavoidable issues when observations are made from space, and availability of optical data is occasionally seen with lacking number of scenes for the analysis, which can even extend to months of no data. This often occurs in the tropic regions, where frequent cloud covers makes impossible to seek the land features. Unmanned Aerial Vehicle (UAV: hereafter called drones), which showed large attention in the past year with rapid development of the technology, led to increment of opportunities in the utilization of the drones as for a tool in observing and collecting data in a remote sensing way, for various environmental analysis. Due to its potential -for observing wider areas in less time consumption- it has provided the users and made it possible to collect the ground information simpler and easier. Because it flies at lower altitude then the clouds, observations of the land can even be accomplished without considering its interference.

This work focus on Indonesia as a case study where less frequent optical data can be collected due to the restriction from the clouds. The drone was utilized and multiple aerial photo where collected through the survey and processed with the Structure from Motion (SfM) technique to develop an ultra-high resolution ortho mosaicked imagery. The produced ortho mosaicked imagery was separated into a three byte binary image each representing the RGB bands, then a conventional approach was taken for image classification to obtain a categorical map of the area. The Multilayer Perceptron neural network classification was performed and segmentation classification was further performed to produce a smoother map-like classification result. The method has shown well in developing the map by using the generated image approximate 5 cm resolution which no other satellite imageries provides. Even with this short limited time of observation, it has maximized the performance for obtaining in-depth detail spatial information of the region, and using its output can lead to sound decisions for land use planning’ s or environmental reclamation of the areas.

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