INTEGRATION OF AIRBORNE HYPERSPECTRAL IMAGERY AND AIRBORNE LIDAR POINT CLOUDS FOR OBJECT-BASED CLASSIFICATION

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**KEY WORDS:** hyperspectral, lidar, data integration, object-based classification

**ABSTRACT:**

Remote sensing provides ground information efficiently. This useful information is suitable for land use management. The hyperspectral image provides more detail of spectral information and there is a great potential to identify species of vegetation using hyperspectral image. Moreover, lidar data provide 3-D surface to identify different objects on ground. Furthermore, The aim of this study is to integrate the hyperspectral imagery and lidar feature for object-based classification. The object-based classification use image segmentation to produce image objects. Different object’s features can be calculated from hypgerspectral and lidar data for image classification.

The proposed scheme includes image segmentation, feature selection, and image classification. At image segmentation step, the image is segmented into image objects from pixels. According to the characteristic of image objects, appropriate features are selected for analysis, at feature selection step. And maximum likelihood method is use to classify the image at image classification step. In the study, the airborne hyperspectral image and lidar point clouds are collected by ITRES CASI-1500 and Optech ALTM Pegasus. The confusion matrix is generated using by ground truth information. The verification includes the comparison between pixel-based and object-based classifications, comparison between multispectral and hypersepectral image classifications, and image classification with and without lidar features. The experimental results indicate that the fusion of hyperspectral image and lidar point clouds may improve the accuracy of image classification.

In summary, hyperspectral image provide useful spectral information while lidar data provide useful terrain information. The integration of these two data may separate different land covers from both spectrum and geometric information.