

# Object-based Classification using WorldView-2 Imagery for Forest Types Mapping in Subtropical Forest

Chinsu Lin<sup>1</sup>, Chien-I Chang<sup>2</sup>, Chao-Cheng Wu<sup>3</sup>, Hsuan Ren<sup>4</sup>, Jie-Hua Chen<sup>1</sup> and Chien-Yu Lin<sup>5</sup>

1. Department of Forestry and Natural Resources, National Chiayi University. 300 University Road, Chiayi 60004, Taiwan. E-mail: chinsu@mail.ncyu.edu.tw
2. Department of Computer Science and Electrical Engineering, University of Maryland, Baltimore County. USA
3. Department of Electrical Engineering, University of Taipei University of Technology.
4. Center for Space and Remote Sensing Research, National Central University.
5. Department of Electrical Engineering, National Cheng Kung University

**Abstract:** Sustainable ecosystem management is the major political strategy for international forest management. To achieve such a high environmental friendly objective, forest managers have to make suitable plans for the determination of forest management goals, such as wood production, biodiversity conservation, carbon management, water conservation, and environment protection. In particular, reduction of emission from deforestation and forest degradation has recently become a worldwide issue for combating global warming. To gather accurate forest information is thus critical as guides for forest planning. Some of the essential variables to meet such requirements are forest types, stand density, stand structure, stand volume, dynamic growth or competition and so on for both temporally and spatially. Tropical and subtropical regions cover a variety of forest vegetation or sub-ecosystems and support the needs for wildlife and biological diversity. A better understanding of forest components could be reached by the application of remote sensing techniques.

This paper tried to examine if the forest types in subtropical forest could be delineated accurately from remote sensed data with high spatial resolution such as WorldView-2 imagery. The techniques applied are object-based segmentation and classification. We conducted a couple of experiments to dealing with the spectral information and the spatial texture of the selected objects in the subtropical forest in Taiwan. The selected objects are wetland, grassland, bamboo, conifer, broadleaf, bamboo-conifer mixed, bamboo-broadleaf mixed, bamboo-conifer-broadleaf mixed, orchard, cropland, betel palm, shrub, bareland, building, and road. Accuracy indices, kappa and true skill statistics will be applied to evaluate the accuracy of the forest type classification. A suitable framework that integrates spectral and spatial features for deriving better mapping accuracy is suggested.

**Keywords:** object-based classification, image segmentation, forest inventory, WorldView-2, subtropical forest.