TRAINING SITE SELECTION BASED ON UNCERTAINTY ESTIMATION FOR OPTICAL SATELLITE IMAGE CLASSIFICATION

Yi-Shiang SHIU
Assistant Professor, Department of Urban Planning and Spatial Information, Feng-Chia University
No. 100, Wenhwa Rd., Seatwen, Taichung, 40724 Taiwan
(R.O.C.)/+886-4-24517250#3355/ysshiu@fcu.edu.tw

KEY WORDS: Weights of Evidence, Maximum Likelihood Classifier, Support Vector Machine Classifier, Pure Pixel Index, Gray-Level Co-occurrence Matrices

ABSTRACT: For image classification, it is crucial to derive a classifier from a limited training data which can be useful to classify other testing samples without over-fitting. In this study, we applied weights of evidence model to locate possible training areas which can be used to optimize the classification results. Agricultural area in Chiayi, Taiwan is chosen as the study area. We used FORMOSAT-2 images and maximum likelihood and support vector machine classifier to classify the land cover into six dominant classes in the study area: water, vegetation, bare soil, shadow, concrete built-up area, and asphalt road. Gray-level co-occurrence matrices (GLCM) and pure pixel index (PPI) are assumed as the key spatial factors for uncertainty estimation and can help indicate the possible training areas. The weights of evidence model was used to combine the spatial factors to map the uncertainty estimation results. The receiver operating characteristics (ROC) with area under curve (AUC) calculation was used to evaluate the proposed model. The model also indicates the two most significant factors are PPI and homogeneity texture index. Future applications include providing the best and minimum training sites and maximizing the accuracy of image classification.

Suggested topics: Data Processing: Automatic Classification
Proposed presenter: Yi-Shiang SHIU
Presenters' preference: Oral presentation