

Geography 38/42:353
Remote Sensing: Airphoto Interpretation
Laboratory Exercise #8

Digital Image Analysis and Classification Using MultiSpec
Part 2: Evaluating Training Fields and Class Separability

(20 pts)

In Lab 7, (part one of the image analysis project) you developed an appropriate land cover classification scheme and did a preliminary assessment of your training fields and classes by evaluating the class statistics and discussing how the means and standard deviations compared to expected values. You also generated histograms for all classes and training fields and described how the class histograms were separable, or not, and how the training field histograms overlapped, or not. These techniques are useful for conducting a rough assessment of the quality of your classes and training fields, however, they are somewhat subjective. Fortunately, other more objective tools are available. In this lab you will use two other methods of evaluating training field and class statistics then, based on these results, you will edit and revise your training fields and classes accordingly, and perform the analysis again.

The first is referred to as separability analysis and is used to evaluate how separable each class is from all the other classes. This tool also enables the analyst to evaluate which bands are most useful for differentiating between selected classes; however, we will be using it only to evaluate class separability, since we are only using three bands.

The second method is to assess how effectively the training field statistics classify the training fields themselves. Theoretically, if the training fields produced perfect class statistics all pixels within each training field would be classified 100% accurately; however, this is rarely the case. This technique produces a table called an error or confusion matrix that indicates the number of pixels in each training field that have actually been placed into the class they represent or, if not classified correctly, which class or classes they have been mistakenly placed into. There are two types of errors that may occur: errors of omission (pixels that are omitted from a class in which they actually belong) and errors of commission (pixels that are included in a class to which they do not belong).

Procedure: The following steps and analysis of results will be demonstrated; take notes.

1. Use the transformed divergence algorithm (Processor -> Feature Selection) to evaluate class separability. See figure 1 for specific settings to be used. Copy the results from the text output window into a document and describe the separability between classes for the various band combinations.
2. Classify (Processor -> Classify) the training areas using the maximum likelihood algorithm with a 2% threshold. You will not classify the entire image at this point, just the pixels in the training fields. See figure 2 for specific setting used.
3. Copy the results from the text output window into your document. Interpret and describe the training field and class performance. Note training field classification accuracy. Describe training field performance in terms of errors of omission and commission. Describe training class performance in terms of errors of omission and commission, the number of thresholded pixels, and discuss the producer vs. user accuracy and overall vs. kappa adjusted accuracies. Do the results suggest that any training areas should be deleted or at least revised?
4. If necessary, edit and revise your classification scheme and/or training fields accordingly and document these changes. Repeat steps 2 and 3 above and describe how your training and class separability has changed and how the training field classification has improved.

Part 2 is due by 4 pm, Thursday, April 2nd.

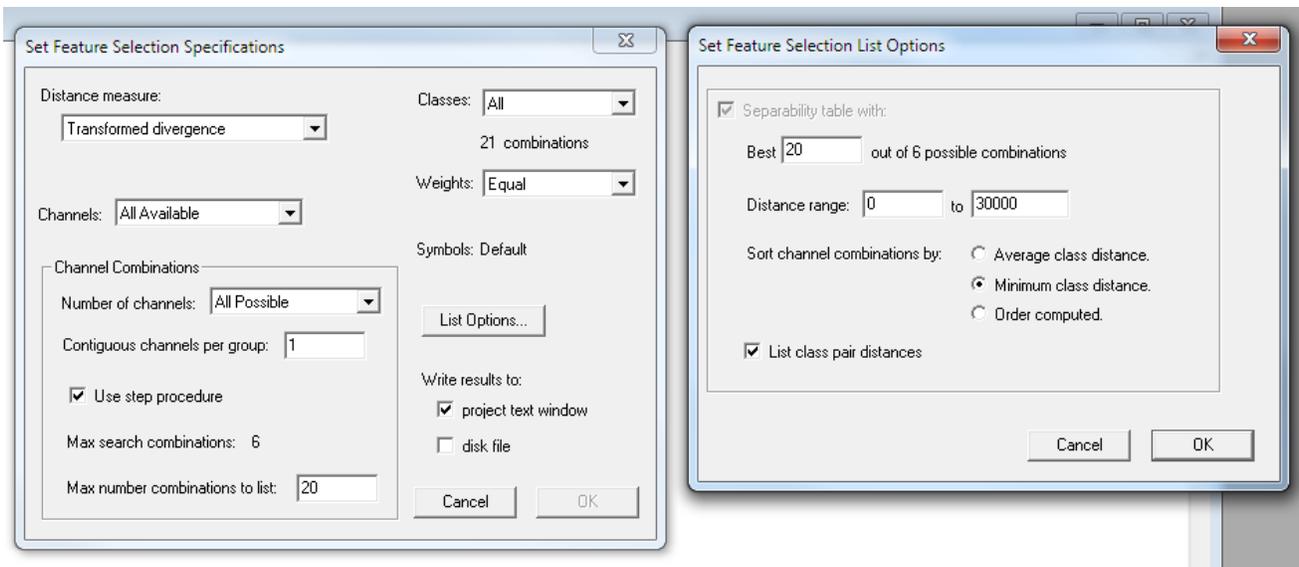


Figure 1: Example of transformed divergence settings.

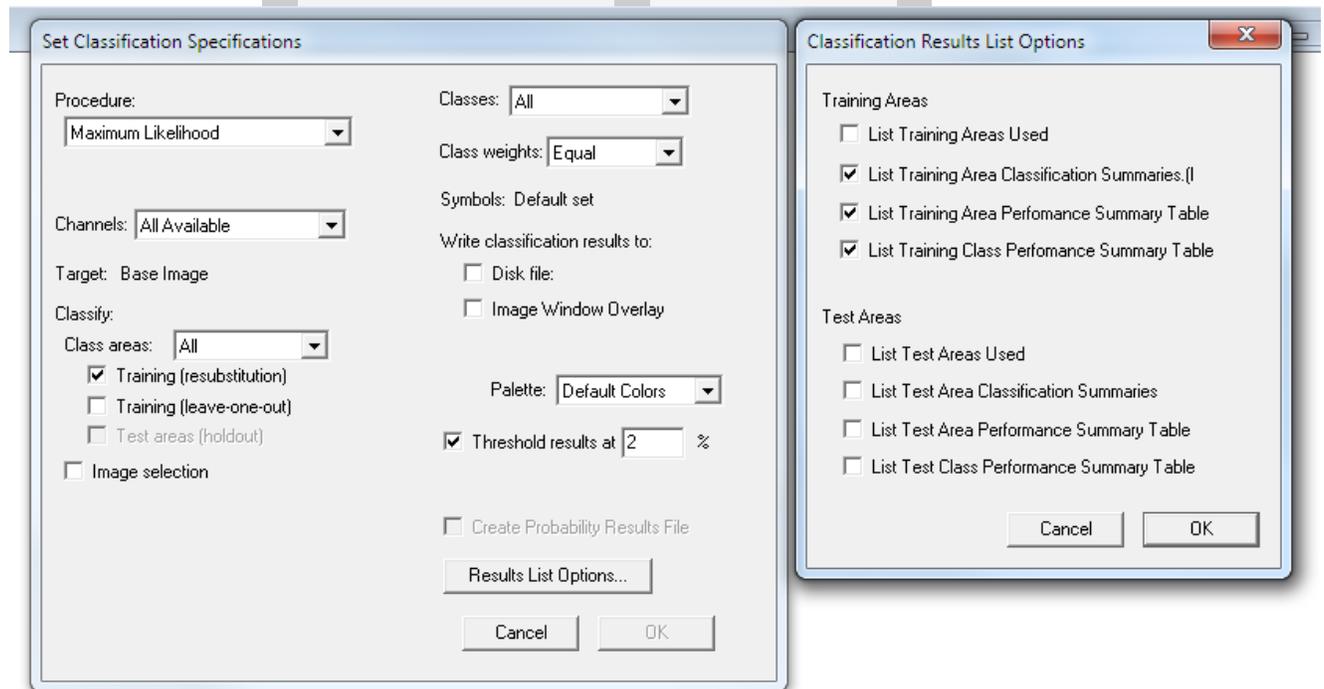


Figure 2: Example of classification of training fields using maximum likelihood.