CE 597D Water Resources Seminar

Friday February 20, 2004

Stavely Conference Room —202 Hammond Building

12:00-12:15 REFRESHMENTS

12:15-1:15 SEMINAR PRESENTATION

Feature Selection for Classification of Hyperspectral Remotely Sensed Image

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Remotely sensed images are widely used for thematic map generation. Thematic maps can delineate the spatial distribution of static model parameters (e.g. permeability, porosity etc. which are supplemented by soil cover maps) and of other hydrologic measurements (e.g. evapotranspiration which are supplemented by land use maps). These maps are produced through the process of digital image classification of spectral bands. Advances in sensor technology for earth observation make it possible to collect a large number of spectral bands. For example, the NASA/JPL airborne visible/infrared spectrometer (AVIRIS) generates data in 224 bands simultaneously. The cost and complexity of classification of these bands depend on the number of features (image bands at different frequencies) and size of scene being classified, while classification accuracy depends on factors like type of classifier used, noise in the bands and information carried by each band. So, processing large amount of data for image classification requires demanding computational resources. This talk discusses the theory, implementation and performance of a new algorithm to pick a subset of features such that the resulting class distribution, given only the selected features, is as close as possible to the original class distribution, given all features without significant decrease in the accuracy of classification. The proposed methodology is a two step process – first a feature subset is selected with optimum mutual information content (quantified by Shannon's entropy measure) and then this subset is searched to find a smaller subset out of it which has best separability between classes (quantified by average Jeffries-Matusita Distance). The search strategy used in the implementation of this effort is the Simple Genetic algorithm, though the efficiency of the proposed methodology holds good even for other search strategies. Also discussed will be the strengths and weaknesses of this algorithm with respect to other classical methods.

Moderator: Josh Kollat
Refreshments: Paul Shaefer

STUDENTS ENROLLED IN CE597D SEE SUGGESTED READING ON ANGEL