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A LAYERED CLASSIFICATION TECHNIQUE

FOR WATER RESOURCES APPLICATIONS

Luis A. Bartolucci, Roger M. Hoffer
and Stephen G. Luther

LARS/Purdue University
West Lafayette, Indiana

ABSTRACT

The use of computer-aided analysis techniques (CAAT) and multispectral scanner data from aircraft and satellite altitudes has shown considerable promise for water resources applications. Two areas of particular interest are: (1) temperature mapping of surface water to study the environmental impact of thermal effluents and (2) snow-cover mapping in mountainous regions to improve water yield predictions. The conventional LARSYS classifier has proven to be inadequate for these purposes. Therefore, a layered classification approach was utilized to overcome the limitations of the conventional LARSYS classifier.

If the primary objective is to map the thermal characteristics of water bodies only, the ability to discriminate between water and all other earth surface features becomes important. In some cases however, the radiant temperatures given off by vegetation and soils are the same as those given off by the water bodies. Therefore, such discrimination cannot be accomplished using only a thermal band.

A new procedure involving a layered classification was developed to separate water from all other cover types by utilizing a near or middle infrared band, and then to calibrate the thermal data of only those elements classified as water. Thus, the result is a temperature map of water only.

In a second water resources study, the areal extent of snow cover in a mountainous region of Colorado was mapped by using LANDSAT-1 and SKYLAB S-192 multispectral data. The results indicated that it was not possible to obtain a multispectral classification of the snow covered area through the conventional LARSYS classifier because several of the wavelength bands on the LANDSAT and SKYLAB data saturated whenever the scanner was collecting data over the snowpack. The saturated detectors produced a singular covariance matrix which precluded classification. However, a layered classifier approach was developed which could be effectively utilized to obtain a snow cover map.

MAPPING WETLANDS FROM THEIR SPECTRAL

PROPERTIES RECORDED BY ERTS SYSTEM

S. J. Kristof, R. A. Weismiller

LARS

A STUDY UTILIZING

AUTOMATICALLY PROCESSED MULTISPECTRAL

DATA TO DELINEATE A FLOOD PLAIN

George R. Harker
Western Illinois University
Macomb, Illinois

ABSTRACT

The delineation of flood plains using current techniques is both costly and time-consuming. This paper explores the application of a remote sensing technique that may permit the determination of flood plain areas without the extensive work associated with existing techniques.

In this study multispectral scanner data were simulated utilizing the density differences in a color infrared transparency for a section of the Navasota River in Texas. The simulated data were processed by an automatic classification technique previously developed in the remote sensing field.

The technique used involves the application of the maximum likelihood rule to categorize the data being processed. An attempt was made to distinguish between areas known to be in the flood plain and those without. A reasonable correlation was found between boundaries based on computer processed multispectral data and those produced by established techniques currently in use.