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MAXL4X - A LARGE AREA LANDSAT CLASSIFIER

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Program MAXL4X is a maximum likelihood classifier that classifies exclusively four-channel data. MAXL4X is a hybrid type of classifier in that it employs a table look-up technique in the region(s) of frequently occurring vectors. Though MAXL4X can classify any data set digitized at 128 levels or less, it was designed specifically for classifying large areas of LANDSAT data.

Presently, MAXL4X resides on a Varian mini-computer but is being adapted to the U-1108. Tests on the Varian mini-computer (32K core, 16-bit words) show that MAXL4X runs usually take less than half the time required by ELLTAB. MAXL4X is expected to run four times as fast as ELLTAB on the Univac 1108, although time is slightly data-dependent. According to Jones*, this equates to more than a fifty times speedup of LARSYSAA when classifying twenty or more classes.

The MAXL4X table is constructed on the basis of the following information: frequency of occurrence in band 7, means in band 6 for each occurring radiometric value in band 7, means in band 5 for each occurring radiometric value in band 6, and means in band 4 for each occurring radiometric value in band 5. The remaining ingredient required to build a relatively small table that includes a high percentage of occurring vectors is high correlation of successive bands. The presence of such correlation is hardly worth elaborating on for those who are familiar with the black and white images from LANDSAT.

The decision rule used to compute the classification of vectors not found in the table was extracted from MAXL4, a maximum likelihood classifier optimized for four-channel data that was developed by the same author. The author is currently developing a three module software package that completely processes a LANDSAT frame for under \$400 mini-computer cost. MAXL4X is the classifier used in this software package.

*Jones, Clay, "Implementation of an Advanced Table Look-up Classifier for Large Area Land-Use Classification," Proceedings of the Ninth International Symposium on

Remote Sensing of the Environment.
University of Michigan. Ann Arbor,
Michigan. April 1975. pp. 813-824.