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RESULTS FROM THE CROP IDENTIFICATION TECHNOLOGY ASSESSMENT FOR REMOTE SENSING (CITARS)

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ABSTRACT

CITARS was an experiment designed to quantitatively evaluate crop identification performance for corn and soybeans in various environments using a well-defined set of automatic data processing techniques. These techniques differed mainly by the procedure used to obtain signatures from training data (e.g., clustering) and by the method of classification employed (e.g., linear or quadratic decision boundaries and equal or unequal class weights).

Each technique was applied to LANDSAT-1 data acquired over six Indiana and Illinois test sites throughout the growing season in an attempt to recognize and estimate proportions of corn and soybeans using both local and non-local (i.e. extended) training statistics.

As a result of these analyses the significance of factors which contribute to classification performance was determined. In this paper the results of (1) the differences in different ADP procedures; (2) the linear vs. quadratic classifier; (3) the use in classification of prior probability information derived from historic data; (4) differences in local and non-local recognition and the associated use of preprocessing; (5) the use of multitemporal data; (6) the effects of classification bias and mixed pixels in proportion estimation; (7) the effects of site characteristics including crop, soil, and atmospheric effects; and (8) the effects of crop maturity are presented and discussed.

ESTIMATION OF A LARGE AREA CROP ACREAGE USING REMOTE SENSING TECHNOLOGY

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ABSTRACT

One problem in the estimation of crop acreages from classification results of remotely sensed data points (pixels) is that misclassification is likely to arise in recognizing the crops represented by these pixels. When the observed crop proportion in a sample data set is obtained by computing the frequency of classifications into a crop-type, a biased estimate of the true crop proportion in the agricultural area is, in general, obtained. To reduce bias, an adjustment is needed with respect to the amount of classification error present in the results. In our paper we discuss the problem of estimating the classification errors and define crop proportion estimates which are adjusted for the classification errors. Considering the particular case of a two-crop problem, we obtain asymptotically unbiased estimate of a crop proportion, derive an upper bound for its mean square error, and determine sample sizes that minimize the sampling cost but provide estimate with a specified precision.

MANUAL AND AUTOMATIC-COMPUTERIZED SYSTEMS OF SIDE-LOOKING RADAR IMAGERY ANALYSIS FOR CROP DISCRIMINATION

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