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STATISTICAL TESTS AND INTERACTIVE DISPLAYS
OF LANDSAT CLASSIFICATION ACCURACIES

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In a teaching and research environment where Landsat digital data are employed on a day-to-day basis, it is often necessary to assess thematic classification accuracies in a rapid and efficient manner. While such assessments can be made by manually counting the correctly and incorrectly classified pixels in each of several test sites, this procedure is often too slow and tedious to be of effective use. Consequently, a set of inter-active computer programs have been developed for use with a graphics terminal (e.g. Tektronix 4014) which determine the classification accuracies of pixels in pre-selected test sites. Results are displayed in both two and three dimensional formats.

Three programs are employed, which, in sequence: 1) plot the boundaries of the study area and the location of the test sites within the study area; 2) display as three dimensional prisms (or columns) the most prominent land use categories represented in each test site--with the height of the prisms determined by the number of classified pixels in the categories; and 3) compute the accuracy of the land use/cover classifications according to binomial probability distribution function statistics. In the third program, a two dimensional graph is presented to the user in which map accuracy is plotted as a function of the number of misclassified pixels for a specified level of confidence. Thus, the terminal operator can immediately determine whether the entire data set or a particular category has been classified with sufficient accuracy to meet his specifications.

If the operator is dissatisfied with the classification accuracy, it is possible with the aid of the display provided by the second program to identify those test sites with the most significant errors. Training sites then can be redefined and the process from classification through accuracy assessment repeated.

At present, the programs are written in Fortran and are designed to work in conjunction with Tektronix PLOT 10 software operational on IBM 370/158 and CDC Cyber 74 computer systems. As these programs are independent of the classification algorithms, they conceivably can be employed by users with access to a variety of classification routines. Operating costs are nominal, averaging from $2.00 to $5.00 per run.

Roy A. Welch received his Ph. D. degree from the University of Glasgow in 1968. He was a photo-analyst with the U.S. Government from 1962 to 1964 and served as Manager, Earth Sciences Department, Itek Corporation from 1968 to 1969. In 1969, he accepted an NRC-NAS Postdoctoral Research Associateship, in conjunction with the U.S. Geological Survey, to evaluate factors influencing the image quality of hyperaltitude photography. Since 1971, Dr. Welch has been on the faculty, University of Georgia. He is a Research Professor responsible for courses in photogrammetry, photointerpretation, and remote sensing, and for research in these fields. Dr. Welch has served on various panels of the ASP, ISP, and AAG, and is the author of numerous technical papers on photogrammetry, image quality, and remote sensing.

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