

1-1-1976

The Application of a Parallel Processing Computer in the Large Area Crop Inventory Experiment

Sherwin Ruben

John C. Lyon

Matthew J. Quinn

Follow this and additional works at: http://docs.lib.purdue.edu/lars_symp

Ruben, Sherwin; Lyon, John C.; and Quinn, Matthew J., "The Application of a Parallel Processing Computer in the Large Area Crop Inventory Experiment" (1976). *LARS Symposia*. Paper 105.
http://docs.lib.purdue.edu/lars_symp/105

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

Reprinted from

Symposium on

Machine Processing of

Remotely Sensed Data

June 29 - July 1, 1976

The Laboratory for Applications of
Remote Sensing

Purdue University
West Lafayette
Indiana

IEEE Catalog No.
76CH1103-1 MPRSD

Copyright © 1976 IEEE
The Institute of Electrical and Electronics Engineers, Inc.

Copyright © 2004 IEEE. This material is provided with permission of the IEEE. Such permission of the IEEE does not in any way imply IEEE endorsement of any of the products or services of the Purdue Research Foundation/University. Internal or personal use of this material is permitted. However, permission to reprint/republish this material for advertising or promotional purposes or for creating new collective works for resale or redistribution must be obtained from the IEEE by writing to pubs-permissions@ieee.org.

By choosing to view this document, you agree to all provisions of the copyright laws protecting it.

THE APPLICATION OF A PARALLEL PROCESSING
COMPUTER IN THE LARGE AREA
CROP INVENTORY EXPERIMENT

Sherwin Ruben
Goodyear Aerospace Corporation
Akron, Ohio 44315

John C. Lyon and Matthew J. Quinn, Jr.
NASA/JSC
Houston, Texas 77058

The addition of the parallel processing capability has resulted in execution time improvements as high as 60:1.

During this program, the Adaptive Clustering module was re-structured to take advantage of the STARAN's parallelism. The result was a significant improvement to this algorithm in execution speed, improved stability, and accurate convergence to true cluster centers.

This program has proved, operationally, that a parallel processing computer is of significant utility in the LACIE image processing application in enabling rapid and efficient processing of high-volume repetitive tasks.

ABSTRACT

The Large Area Crop Inventory Experiment (LACIE) is a joint investigation by NASA, USDA, and NOAA to determine the practicality and utility of computer analyzed remotely sensed data in crop forecasting. LANDSAT imagery combined with NOAA-supplied meteorological data and ground truth history are the principal sources of LACIE information. The LACIE responsibility of NASA-Johnson Space Center (JSC) includes a Classification and Mensuration Subsystem (CAMS) which is tailored to the production problem presented by LACIE requirements to classify large numbers of fundamentally similar regions in the same manner. In short, LACIE and CAMS represent an essential change from research and development to a production environment.

Goodyear Aerospace Corporation's STARAN parallel processing computer has been successfully interfaced to the host IBM 360/75 computers at JSC to enable NASA to efficiently process the large LACIE data base.

The algorithms executed by the parallel processor, under supervision of the host, include:

Statistics - Training field means and covariances

Iterative Clustering - Cluster means and covariances, cluster maps and probability assignments

Adaptive Clustering - Cluster centers

Maximum Likelihood and Mixture Density Classifications - Classification maps and probability assignments