

1-1-1980

Relationship between Scene Characteristics and Landsat Classification Performance of Corn and Soybeans

Getulio T. Batista

Marilyn M. Hixson

Marvin E. Bauer

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

Batista, Getulio T.; Hixson, Marilyn M.; and Bauer, Marvin E., "Relationship between Scene Characteristics and Landsat Classification Performance of Corn and Soybeans" (1980). *LARS Symposia*. Paper 397.
http://docs.lib.purdue.edu/lars_symp/397

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
and
Soil Information Systems
and
Remote Sensing and Soil Survey**

June 3-6, 1980

Proceedings

The Laboratory for Applications of Remote Sensing

Purdue University
West Lafayette
Indiana 47907 USA

IEEE Catalog No.
80CH1533-9 MPRSD

Copyright © 1980 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.

RELATIONSHIP BETWEEN SCENE CHARACTERISTICS AND LANDSAT CLASSIFICATION PERFORMANCE OF CORN AND SOYBEANS

GETULIO T. BATISTA, MARILYN M. HIXSON
AND MARVIN E. BAUER
Purdue University/LARS

Accuracy of classification of Landsat MSS data depends on a number of parameters such as scene characteristics, training, classification, and area estimation procedures selected. The variability in accuracy that one may find using the same classification procedure applied at different locations is due primarily to scene variability. The understanding of the way that characteristics of a scene affect classifier performance is an important step to determine the amount of training, classification algorithm, and area estimation procedures that would be suitable to achieve an optimal accuracy.

The objective of this paper was to sample a variety of corn and soybean areas in the U.S. Corn Belt and classify them using fixed training and classification procedures in order to determine how agronomic parameters of a scene affect the classification accuracy. The classifications were based on multitemporally registered Landsat MSS data acquired during the 1978 crop year over LACIE-type sample segments in several regions of the U.S. Corn Belt. Digital "ground truth" consisted of both wall-to-wall field observations of all ground covers present throughout the growing season and agronomic observations acquired simultaneously with Landsat passes, including percent ground cover, height and growth stage for several corn and soybean fields within each segment. Color IR aerial photographs were available for all segments. The classifications were performed using the per point maximum likelihood classifier implemented in LARSYS, based on one visible and one near infrared channel from acquisitions at planting and after tasseling of corn. Segments selected for analysis had similar Landsat data acquisition histories. A modified supervised training approach was used in a consistent fashion for all segments. Several characteristics of the scenes studied

involving aspects of crops, soils and weather conditions were compared to classification performances.

Analysis conducted in this investigation to date reveals that segment-to-segment variability has a significant effect on classification performance. Although high overall performances have been achieved for most of the segments, individual class performances have varied considerably from segment-to-segment. For example, accuracy for corn varied from 71 to 99 percent; for soybeans, it varied from 82 to 93 percent. Preliminary results have shown that units of the size of a segment are too large for comparisons with many of the important agronomic characteristics of a scene. Therefore, qualitative and quantitative comparisons between scene characteristics and classification performance of smaller units (1 nm square) are currently underway.

In our presentation we will discuss several specific characteristics of the scenes involving particular aspects of crops, soils properties, and weather parameters that affect classification performances on a segment basis and within a segment based on smaller units.