EVALUATION OF DIGITAL CORRECTION TECHNIQUES FOR ERTS IMAGES

BIMONTHLY PROGRESS REPORT

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TRW SYSTEMS GROUP

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1.0 TITLE: Evaluation of Digital Correction Techniques for ERTS Images
Principal Investigator Identification Number: P520

2.0 PROGRESS DURING REPORTING PERIOD

2.1 Statistical Analyses

Utilizing a portion of image 1062-15190-4 error statistics were compiled for a number of interpolation algorithms. Interpolated values midway (in one dimension) between pixels in the bulk image were referenced to values derived from a 30-point truncated sin x/x interpolation. That is, statistics were compiled from the image each of whose values (pixel by pixel) represents the difference of pixel values computed from the reference (30-point sin x/x) and considered interpolation algorithms. The results are shown in Table I.

Note that out of a range of 64 possible gray levels, the worst case nearest neighbor error is 18 levels, compared to 6 for bilinear and 4 for cubic convolution (as well as 10-point truncated sin x/x). On the other hand, the rms error for cubic convolution interpolation is less than half that for nearest neighbor interpolation, with bilinear and 10-point sin x/x intermediate.

3.0 PROBLEMS

None

4.0 PUBLISHED ARTICLES

A paper was presented to the Symposium on Management and Utilization of Remote Sensing Data (29 October-1 November 1973, in Sious Falls, South Dakota), which contained material discussed in previous periodic reports.

TABLE I. ERROR STATISTICS FOR IMAGERY SHIFTED 1/2 PIXEL*

INTERPOLATION	MEAN ABSOLUTE	MEAN	STD DEV	RMS	MAX
NEAREST NEIGHBOR	1.29	-0.54	1.78	1.86	18
BILINEAR	0.60	-0.36	0.83	0.90	6
CUBIC	0.52	-0.47	0.58	0.75	4
SIN x/x (± 5)	0.84	0.84	0.61	1.04	4

* Referred to sin x/x (± 15). Six bit data (64 gray levels) has been used.

5.0 RECOMMENDATIONS

None

6.0 CHANGES IN PRODUCT ORDERS

None

7.0 CHANGES IN PERSONNEL

None

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