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THRESHOLD SELECTION FOR LINE DETECTION ALGORITHMS

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A line detector has been derived which combines the advantages of existing 'non-linear' and 'semi-linear' methods. It has been tested on Landsat data of S.E. England where linear features are typically less than one pixel in width. Improved results have been obtained in comparison with alternative methods.

Specification of an accurate threshold value is essential for deciding whether a pixel contains a linear feature or not. This may be achieved using a model which attempts to determine the threshold value from the following properties:

1. The width of the linear feature
2. The spectral response of the linear feature
3. The spectral response of the background cover type
4. The configuration of the line with respect to the pixel boundaries
5. Pixel overlap
6. Spatial autocorrelation in the pixel window used by the linear feature detector.

Results show that at any one threshold, sections of very narrow lines may be detected while sections of much wider lines may be missed. Typically, in the area studied, rivers as narrow as 10 m wide may be detected under optimum conditions whereas, using the same threshold, sections of rivers as wide as 60 m were not detected. Noise will therefore be introduced into any detection process. However, it is shown that this noise may be reduced by post-processing and examples are given which demonstrate that this is most effective when information is combined from line detectors applied at different thresholds.