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AN UNSUPERVISED PROCEDURE USING MULTI-DIMENSIONAL HISTOGRAM INFORMATION

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Data obtained by Multispectral Scanner (MSS) or multiband photography for resources information extraction is usually very large. If this data has to be processed operationally, some fast processing techniques should be available. In this paper an unsupervised classification technique for processing MSS data is discussed.

The technique uses multidimensional histogram information (frequency) from multispectral digital data. The multi-dimensional histogram in this case may be considered as the summation of all the frequencies. A frequency may be considered to correspond to a class if it is greater than a predefined minimum number of population for a class. By comparing all the frequencies it is possible to get information about the probably classes existing in the area. Let there be N classes. Out of these N classes, some may not be distinct. The distinct classes can be obtained by defining a distance function and by specifying the tolerable distance between two classes. Once the distinct classes are known, the class centre is obtained by the weighted average. In this process class centres for M distinct classes are obtained. The whole area is classified into M classes and the classification is done on the basis of nearest neighbourhood criterion.

The above method is tested using ISRO-MSS five channel data for an area of 4.2 Kms x 4.2 Kms. The Bands used are 0.5 - 0.6 um, 0.6 - 0.7 um, 0.7 - 0.8 um and 0.8 - 1.1 um. The multidimensional histogram is obtained by quantizing the 0-255 grey levels to 0-15 levels and using look-up-table. An absolute distance function is used both for the combining of two classes and for classification. By appropriately defining the threshold for minimum population, a total of 19 probable classes are obtained. Further by specifying a threshold for inter-class distance, 9 classes are found to be distinct. The results are presented in the form of tables and photo-thematic map. The classes obtained by the above method are verified by field checks.

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