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Conclusions and recommendations of the working groups
Working Group 1: Visible and infrared data

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Working Group I conducted one plenary session with 4 papers, a business meeting and participated with 18 papers in two poster sessions. Influence of preprocessing on classification results, image segmentation, efficient interactive procedures and map production from Thematic Mapper data were some of the main topics.

Topographic maps at a scale 1:50,000 were produced in Canada based only on Landsat TM data. In The Netherlands geocoded Thematic Mapper images at a scale 1:25,000 proved useful for extracting thematic land use information --especially in combination with topographic maps-- and for updating existing maps. Landsat data were also used for cartographic control in the production of airphoto mosaics in developing countries and proved superior to the slotted template method mainly due to savings in time and a more consistent accuracy.

Studies of the influence of various preprocessing techniques on classification accuracies indicate, that for some applications bilinear resampling or smoothing algorithms can improve the accuracies. The use of topographic information and multitemporal data improved classification accuracies in forestry. Advantages and disadvantages of image enhancement and classification techniques and their complimentary character were also demonstrated.

A highly interactive environment was presented combining the display of image data and two dimensional histograms of training areas with a topomap attached to a digitizer. This system was used to display the actual distribution of data for training areas, to interactively modify the class definition in the feature space or the image space and to add features to the classification using photointerpretation methods.

Classification of a multiple data set with airborne and spaceborne multispectral data, a digital elevation model and geological, soil and vegetation maps was performed in Austria. The sometimes strong discrepancies between maps and the classification results can be attributed --among other reasons-- to cartographic generalization, differences in class definition and spectral subclasses within mapping units.

Available spatial information was used in different ways. In one case polygon files with field boundaries from a Geographic Information System were overlaid with satellite data and only one sample point per field was used for the classification of that field. In another approach edge preserving smoothing, edge detection and tracking using predefined filters was employed for image segmentation. Then spectral properties, form and position of the segments were determined and used for a per field classification. In an attempt to better characterize the different structures of the landscape a basis for stratified sampling the size, compactness and orientation of land use fields in Belgium were compared.

To extract subpixel linear features, e.g. hedgerows in England, in satellite data, differences between the right, center and left parts of 13 x 3 elements windows were determined and successfully used with simulated SPOT data.

A new approach to generate digital elevation data from contour lines which are digitized with a vidicon camera was presented. The new Vertical Measurement Module for the stereo Zoom Transferscope to measure spot and object heights and terrain elevation was shown.

To clarify the goals and the activities of the Working Group, a name change to "Spatial Information Extraction" was recommended. The Working Group will concentrate on techniques to extract spatial information from remote sensing data using e.g. texture and context in addition to spectral information. To facilitate the evaluation of remote sensing data the development of an expert system shell to guide the evaluation was also recommended.

To improve the comparison and test of evaluation techniques and procedures, a common test data set was recommended. This set might consist of TM and SPOT data, a Digital Elevation Model and available landuse and other ground truth information in the Freiburg area in West Germany.

An additional meeting of the WG is planned in the fall of 1987 in Sweden with an emphasis on evaluation techniques for high resolution spaceborne (TM and SPOT) and airborne data, e.g. the use of context and texture in the evaluation. A tutorial on expert systems during that meeting is under consideration.

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