# Application of Texture analysis to Object Classification in coast of the Bohai Sea Bay Region

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Texture feature of image is one of the most important factors in the processing of information extraction from satellite scene image. Texture feature shows the structure of image texture and the degree of coarseness of the objects' surface, so it is an important characteristic and usually shows some important information of satellite image which are useful to image information extraction.

A . Gray Level Co-occurrence Matrix

Visual texture contains variations of intensities, which form certain repeated patterns. Those patterns can be caused by physical surface properties, such as roughness, or they could result from reflectance differences, such as the color on a surface. Differences observed by visual inspection are difficult to define in quantitative manner, which leads to demand of defining texture by using some features. Stochastic nature coastal textures can be characterized by statistical means. Gray level co-occurrence matrix (GLCM), one of the most known texture analysis methods, estimates image properties related to second-order statistics.

In order to estimate the similarity between different gray level co-occurrence matrices, Haralick proposed 14 statistical features extracted from them. To reduce the computational complexity, only some of these features were selected.

B. Texture Features Filter

Because ETM+ image has 6 bands and texture features can be calculated from 4 directions, if select different bands and different directions to compound, there will be 24 group of Gray level co-occurrence matrix. With eight statistical features for each matrix, 192 texture parameters can be derived correspondingly from 24 matrices. These texture parameters will extend more parameters, along with the changes of texture calculating window size. Excessive texture parameters will lead to a substantial increase of computation. Usually, we expect that the dimensions of texture features are low, so the calculation of the information extraction is little, and the object texture can be classified correctly. During the texture analysis process, how to extract effectively the texture features which can distinguish sea, beach and land preferably is the key factor. With the features selection method of step-by-step discriminance presented by this paper, five values were chosen as the representatives to classify the object texture feature. So only the most useful five dimensions need to be calculated and subsequently evaluated by the classifier.

By means of the neural networks the object classification mode based on the texture features was defined and the object classifications of the southern coast of Laizhou Bay were carried out. Results show the step-by-step discriminance not only can decrease the dimension of the texture feature database, but also ensure and improve the accuracy of the classification, and the classification accuracy was up to 83.4%. The neural networks mode is the most effective method to account for the classification of the typical objects in coastal zone.