Development and implementation of texture based feature extraction using GLCM and wavelet decomposition of high resolution satellite image

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Abstract: The inherent spatial information within a remotely sensed data makes a significant contribution to the classification of an image. Image texture is a complex visual perception. With the ever increasing spatial resolution of remotely sensed data, the role of image texture in image classification has increased. There are three methods by which the features in the satellite imagery can be extracted. These are: Manual extraction, semi automatic extraction and automatic extraction. Manual extraction may be tedious or impossible, especially, in well-developed urban areas. Automatic extraction of the features from the satellite imagery does not satisfy our expected accuracy demands and also the output is undesirable. So in order to improve the accuracy of the feature extraction manual assistance is required. This work describes methods based on the semi- automatic extraction that can be used to detect texture based features in order to discriminate urban spatial patterns under the circumstances of scene complexity observed in panchromatic 1-meter IKONOS imagery. For this purpose two methodologies are developed. One is based on "Grey Level Co-occurrence Matrix" technique and the other is based on "Tree Structured Wavelet Transform" technique. Comparison of the two techniques show that the wavelet provides a better feature discrimination in terms of computational time and memory space between classes than the Grey Level Co-occurrence Matrix based on visual assessment.