Abstract

A new adaptive multispectral image compression technique based on the regions identified is proposed. The algorithm is adaptive in the sense that according to the data type class of the region, appropriate encoding technique is chosen. The image is first segmented by means of Region splitting and merging procedure based on the statistical characteristic of the image. Then class adaptive hotelling transform or Karhunen Loeve transform (KLT) in the spectral domain and the shape adaptive wavelet transform in the spatial domain are adopted in the image by considering the spatial, spectral and statistical properties which are unique to the multispectral images. The quadtree is used for determining the transform block size and a single KLT matrix is used for the regions of same class i.e., class adaptive KLT is applied and the transformation is followed by shape adaptive wavelet transform (SAWT) incorporating the spatial and structural properties of the multispectral image. After transformation, based on the regions identified, if the region is relatively uniform or smooth, the SPIHT (Set Partitioning in Hierarchical Trees) algorithm is adopted. If not, that is, if the region is highly textured in nature, then object based wavelet method is used for compression. Thus the advantages of both SPIHT algorithm and object based wavelet encoding method, both in terms of visual quality and PSNR values, are incorporated in a single compression technique.

Reference


Adaptive Encoding Algorithm for Multispectral Images


Index Terms

Computer Science

Image Processing

Key words

class adaptive KL transform

Quadtree

shape adaptive WT

Adaptive encoding technique