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Set Partitioning in Hierarchal Trees (SPIHT) Algorithm
in MATLAB Program Language

Non-recursive version 1.0 2/12/2008

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- recursive conventional
- vectorized SPIHT - fast and slow versions
- blockwise –breadth-first search and depth-first search

There are also versions of SPIHT in C/C++ source code, which are likewise not covered by this public license.

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PROGRAM INFORMATION

The package of programs included in this distribution comprises a demonstration version of SPIHT written in MATLAB source language. As written, a single runtime command compresses the input image, writes it to a file (*.sp), decompresses the image and writes it to a file, and displays a figure with four images, the input image, the decompressed image (*Rec*.raw), the compressed wavelet transform, and the error image. The PSNR and MSE (mean squared error) are also calculated and displayed in the figure. The compressed file and reconstructed image are written to the directory of the input image. The input image must be 1-byte per pixel grayscale (monochrome). The wavelet transform is produced by recursive filtering with the 9/7 biorthogonal filters. The

raw bits put out by the SPIHT algorithm acting on the wavelet coefficients are sent directly to the code stream without entropy coding.

Usage: Compress “image_name.raw” , 1-byte pixels, r rows, c columns to CR bits/pel.
> mSphit_n('image_name', [r, c], CR <, 'aspectratio-colormap'>)

Quantities enclosed with braces < > are optional
r : number of image rows (height)
c : number of image columns (width) (default = r)
CR : compression rate in bits per pixel
aspectratio-colormap (optional): default aspect ratio is fixed to the image size, and the default colormap is the original gray. Different view colors are provided. To change the color in a view mode just enter a number from 1 (gray) to 5 (orange-red). Default is 1 (gray).
For stretched view enter 'n', and (optional) with colormode 'nN', N is a number.

Examples:
Compress gray 8-bit image named ‘goldy.raw’, dimensions 512x 720 (height x width) to 0.50 bpp.

> mSpiht_n('goldy', [512,720],0.5) % normal view with gray colors
> mSpiht_n('bike', [512,720],0.5, ‘n3’) % stretched view with warmer colors