Abstract

The authors propose a new hybrid watermarking scheme for copyright protection of color images using contourlet transform and singular value decomposition. The host color image and color watermark images are decomposed into directional sub-bands using contourlet transform and then applied Singular value decomposition to mid frequency sub-band.
coefficients. The singular values of mid frequency sub-band coefficients of color watermark image are embedded into singular values of mid frequency sub-band coefficients of host color image in Red, Green and Blue color spaces simultaneously based on spread spectrum technique. The experimental results shows that the proposed hybrid watermarking scheme is robust against common image processing operations such as, JPEG, JPEG 2000 compression, cropping, Rotation, histogram equalization, low pass filtering, median filtering, sharpening, shearing, salt & Pepper noise, Gaussian noise, grayscale conversion etc. It has also been shown the variation of visual quality of watermarked image for different scaling factors. The comparative analysis reveals that the proposed watermarking scheme out performs the color image watermarking schemes reported recently.

Reference

- Vikas Saxena, J.P.Gupta, "collision attack resistant watermarking scheme for colored images using DCT" International journal of computer sciences 34:2,IJCS_34_2_02.
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- Matlab 7.6 version, Image Processing Tool Box.

**Index Terms**

Computer Science  
Security

**Key words**

Color image watermarking  
Contourlet Transform

Singular value decomposition

Peak signal to noise ratio

normalized Correlation coefficient
A New SVD based Hybrid Color Image Watermarking for Copyright Protection using Contourlet Transform