Abstract

Watermarking techniques are mainly used for protecting intellectual property right. This paper proposes a new hybrid nonblind video watermarking technique using wavelet contourlet transform and nonnegative matrix factorization. Wavelet transform processed images are losing edge information. The Contourlet transform has good approximation properties for smooth 2D functions and finds a direct discrete space construction. But its performance is considered to be redundant. There evolved wavelet based contourlet transform (WBCT), as a nonredundant version of the contourlet transform. WBCT is used for watermarking video frames. The nonnegative matrix factorization (NMF) is used as dimension reduction technique in watermarking. NMF is applied to low pass and directional high pass sub bands which results from WBCT of each original video frame and gray scale watermark images. Embedding action is performed in low pass sub-band of WBCT processed video frame. The hybrid scheme improves the performance of watermarking scheme. The experimental results shows that the proposed video watermarking scheme provides better video processing operations such as cropping, rotation, histogram equalization, compression, variety of noises, frame dropping, frame averaging and frame swapping and etc.
References

Adaptive Hybrid Video Watermarking using WBCT and NMF


Index Terms

Computer Science                Image Processing

Keywords

Contourlet Transform  Wavelet based Contourlet Transform  Nonnegative Matrix Factorization