Abstract

Digital audio watermarking performs the process of embedding a perceptually transparent digital signature carrying a message about the host signal into a host audio signal. A technique of digital audio watermarking using lifting based wavelet transform (LWT) and singular value decomposition (SVD) is applied to watermark Indian classical songs. In order to confirm the security and improve the robustness of the audio watermarking scheme, binary watermark image encrypted using Arnold transform is used. The encrypted watermark bits are embedded into the singular values of the coefficient matrix of LWT low frequency subband through quantization index modulation (QIM). In order to evaluate the performance of the LWT-SVD based audio watermarking method, subjective and objective quality tests are conducted. Investigations are performed using different wavelets and the performance parameters show that Daubechies (Db4) wavelet is more suited for watermarking of Indian classical songs. Robustness of the algorithm is analyzed by including additive white gaussian noise, denoising, and resampling.
Performance Analysis of Watermarking on Indian Classical Songs using Lifting Wavelet Transform and Singular Value Decomposition


Yang S., Tan W., Chen Y., and Ma W., 2010, Quantization-Based Digital Audio

**Index Terms**

Computer Science

Signal Processing

**Keywords**

Audio watermarking  lifting based wavelet transform  singular value decomposition

Arnold transform

quantization index modulation

Indian classical songs.