Abstract

This paper presents an optimization-based audio watermarking scheme using group amplitude quantization. In order to improve the robustness, the watermark is embedded in the lowest discrete wavelet transform frequency coefficients. The performance of this watermarking scheme is analyzed in terms of audio quality (signal-to-noise ratio) and robustness (bit error rate). As there is a trade off relationship between the audio quality and robustness, this study
Audio Watermarking using Group Amplitude Quantization

presents an optimization-based group amplitude quantization scheme for audio watermarking. First, SNR is rewritten as a watermarking cost function in matrix form. Then an equation connecting the watermarking cost function and the group amplitude quantization equation is proposed. Second, the Lagrange principle is used to derive the optimization solution. The optimal results are then applied to embed the watermark. Finally, the performance of the proposed scheme is tested. As per the experimental results, the SNR (audio quality) of the proposed scheme is 25.21 dB and the BER (robustness) is 0.4720. The hidden data are robust against most common attacks, such as re-sampling, low-pass filtering and amplitude scaling.

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Index Terms

Computer Science

Signal Processing
Keywords
Audio Watermarking  Dwt  Group Amplitude Quantization  Snr  Ber