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A Robust Zero-Watermarking for Audio Signal Using Supervised Learning

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Abstract

In traditional watermarking algorithms, the insertion of a binary watermark into the host signal causes the host signal to introduce some perceptible quality degradation. Another problem is the inherent conflict between imperceptibility and robustness. We proposed a zero-watermarking technique to solve these problems. The present study aims to represent a new audio zero-watermarking algorithm robust to audio signal processing attacks, especially MP3 compression, high-pass filtering, and re-sampling attacks. The proposed algorithm simulates the desired attacks and extracts the features from the simulated audio signals as the training data for a supervised learner. The present study compares two traditional audio watermarking algorithms and two audio zero-watermarking algorithms with the proposed method in terms of robustness. We simulated ten different attacks with four other audio software editors. The experiments show the superiority of the proposed method in terms of two evaluation criteria, bit error rate and normalized correlation coefficient.

Keywords Zero-watermarking · Robust watermarking · Audio signals · Supervised learning · Support vector machine

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