ABSTRACT

CIRAMUDYA ADHA GAFAWIDJ. Digital Audio Watermarking Implementation using Mixed Region of Interest Audio and Binary Image as Watermark. Supervised by SHELVIE NIDYA NEYMAN.

The growth of networking technology and the growth of digital multimedia have made copyright protection as an important issue. Digital audio watermarking is proposed to overcome this issue. The use of mixed ROI audio and binary image as watermark is a method for copyright protection and tampering localization.

ROI audio is generated from host audio in certain length and binary image is encrypted using chaos logistic map. Both ROI audio and encrypted binary image are mixed to be hidden in host audio. Before they are hidden, the host audio has to be decomposed in several levels using LWT. The value of mixed ROI audio and encrypted binary image will replace the value which is generated by LWT to reconstruct the watermarked audio. The watermarks can be extracted from watermarked audio using independent component analysis and some inversed steps. The watermarked audio which is tampered can be localized after some stages of watermark extraction.

The quality of watermarked audio is measured using signal to noise ratio (SNR) and the values of SNR from some experiments are above 20 dB. It means that the quality of watermarked audio is good. The quality of extracted binary image is measured using peak signal to noise ratio (PSNR) and the result shows that there is not any difference between the original binary image and the extracted binary image. Signal processings on watermarked audio is implemented to analyze how robust this method is. They are resampling, requantizing, low-pass filter, and white noising. The experiments show good results.

Keywords: audio watermarking, tampering localization, independent component analysis (ICA), lifting wavelet transform (LWT), region of interest (ROI), signal to noise ratio (SNR), peak signal to noise ratio (PSNR).