ABSTRACT

Nowadays network technology and data compression techniques are growing. But along with the development of technology the more easily also piracy and dissemination of illegally digital content on the internet. The development of digital information technology and the internet caused copyright protection to be a big problem. Watermarking technique is considered as a solution to solve this problem. Watermarking is a security technique by inserting information into image, audio, or video content that hard to see by the human eye or hearing.

In this research, the audio watermarking technique is used by inserting image information into audio files through the incorporation of three transformation methods, Lifting Wavelet Transform (LWT), Discrete Sine Transform (DST) and QR Factorization. In time domain, LWT process produces lower frequency sub-band then DST transforms from time domain to frequency domain. Each frame of the DST is made in a matrix form and then composed into an orthogonal matrix and a triangular matrix by QR. The Quantization Index Modulation (QIM) method is used as the insertion method. Compressive sampling is used so that the inserted information bits are compressed very small without losing the original information so as to produce a better SNR.

The output on the design of this watermarking system can produce a value of BER <0.1 in LPF 6k attack, LPF 9k, 128k MP3 Compression, 192k MP3, Stereo mono, Resampling and Linear Speed Change. SNR>30dB and average MOS 3.98.

Keywords : *Audio Watermarking, LWT, DST, QR, Compressive Sampling, Quantization Index Modulation*