

ABSTRACT

In the embedding process there are three tradeoffs to achieve efficient watermark parameters, which maximize embedding resistance, minimize distortion between host signals and composite signals, and maximize the embedding rate of information. This combination of techniques serves to combine the advantages and reduce the weaknesses of each method.

In this final project, the writer will design audio watermarking based on Quantization Index Modulation (QIM) method with combined technique of Stationary Wavelet Transform (SWT), Discrete Sine Transform (DST), QR Decomposition and Cartesian Polar Transform (CPT). In this method, synchronization bit will be inserted to detect beginning location of watermark. Audio will be processed using SWT as subband selection, DST is used to convert time domain to frequency domain, QR Decomposition to convert component into triangular matrix and orthogonal matrix, CPT to convert component into cartesian and polar coordinates. Audio will be embedded and extracted using QIM by taking the largest Δ value. Then, the audio will be rated quality based on predefined parameters, such as ODG, BER, SNR and payload (capacity).

The final result of this final project is MATLAB application watermarking scheme has an average value of SNR of 32.718 dB and has a BER value (robustness) of 0.2058. In addition, the combined method is used to reduce the BER value and increase the robustness from several attacks that performed during the test.

Keyword : Audio Watermarking, Synchronization, Quantization Index Modulation (QIM), Stationary Wavelet Transform (SWT), Discrete Sine Transform (DST), QR Decomposition, Cartesian Polar Transform (CPT), Spread Spectrum (SS).