ABSTRACT

In this current digital era, information or digital data such as a text, images, audio, and video can be easily accessed by the public. It has a negative impact on some parties, some informations are easier to be downloaded and to be modified by others without the agreement of property rights. To avoid misuse of information or digital data, a copyright is needed on the data created, namely watermarking.

This final project uses several methods, Discrete Wavelet Transform (DWT) to separate audio hosts based on frequency into high and low-frequency subbands. Furthermore, the author use Discrete Cosinus Transform (DCT) to change the audio host from the time domain to the frequency domain. The audio host is decomposed based on its amplitude using the Singular Value Decomposition (SVD) method. The result of SVD decomposition is transformed using Cartesian Polar Transform (CPT) to convert data from the Cartesian coordinate system to the polar coordinate system. The embedding process was carried out using the Quantization Index Modulation (QIM) technique in the low-frequency subband and Statistical Mean Manipulation (SMM) on the high-frequency subband. The QIM technique uses the time domain very often in the insertion process so that it can distort weak attacks on the signal, while the SMM technique is used to add the watermark bit into the audio host.

The result show that the design of audio watermarking has a good quality with the range values of SNR $\geq$ 25dB, ODG $<$ -3.5, MOS $>$ 4.1, BER $<$ 0.1, and Capacity 5.3665. Furthermore, the design of audio watermarking is resist to some attacks such as kompresi MP4, kompresi AC3, and delay attacks which is showed by the BER $<$ 0.1.

Keywords: *Audio Watermarking, Discrete Wavelet Transform, Discrete Cosinus Transform, Singular Value Decomposition, Cartesian-Polar Transform, Quantizaion Index Modulation, Statitiscal Mean Manipulation.*