ABSTRACT

Technological developments make the exchange of medical images quick and efficient. However, the digital exchange of medical images is very susceptible to criminal cases such as theft, modification, and duplication of data. To handle this, it is necessary to secure and authentication medical images with watermarking techniques. The watermarking technique is a data security technique by embedding special information into medical images that aim to verify ownership. The quality of the watermarking scheme that is important in medical images is that it can restore medical images perfectly and is resistant to attacks.

The watermarking system of this project is carried out in two processes, the first process is inserting the watermark and the second process is the extraction of medical images and watermarks. In the medical image embedding process, the IWT stage is carried out first to determine the subband frequency after which it is processed with DCT and SVD techniques. As for the watermark, the DCT and SVD techniques were used. The proposed watermarking scheme has a reversible classification. The system that has been designed is tested against JPEG compression, filtering, noise addition, geometric, and signal processing attacks

The result of this final project is a watermarking technique using the IWT-DCT-SVD method. The quality of watermarking is reviewed with four parameters, namely Peak Signal to Noise Ratio (PSNR), Structural Similarity Index Metric (SSIM), Normalized Correlation (NC), and Bit Error Rate (BER). From the proposed scheme, the highest PSNR is 64.4 dB, maximumt SSIM 1, NC 1 and BER 0 which means the proposed scheme is reversible and has good robustness. The proposed watermarking system is resistant to attacks such as salt & pepper noise, noise speckle, sharpening, and blurring.

Key words: *Discrete Cosine Transform* (DCT), *Watermark*, *Integer Wavelet Transform* (IWT), *Medical Image*, *Singular Value Decomposition* (SVD)