ABSTRACT

The development of technology facilitates the exchange of information quickly and efficiently, but this is accompanied by rampant duplication, manipulation, and data theft. One of them is a medical image, which contains information about the patient so that it is confidential. Medical images are very vulnerable to duplication, potential, and data theft because of the importance of applying digital watermarking techniques to medical images. The digital watermarking technique is a solution to improve security by inserting information needed for data protection from attacks from non-specialized parties. Reversible and robust technique in the watermarking scheme that is used to restore the perfect host image during extraction and defend the host image and watermark from various attacks.

In this final project, we will design a reversible and robust watermarking scheme using Slantlet Transform (SLT), Discrete Wavelet Transforms (DWT), Singular Value Decomposition (SVD) methods. The watermarking system will go through the process of embedding and extraction. The watermark in the form of a binary image is inserted into the medical image by performing SLT transformation on the host image than through the DWT and SVD processes, while the watermark is compressed using the Lempel-Ziv-Welch technique and then processed in the SVD technique. By using this output scheme, it will be reversible and have good quality in terms of imperceptibility and robustness.

The result of this final project is a watermarking system using the SLT-DWT-SVD technique with infinite PSNR, SSIM 1, NC 1, and BER 0 which means this scheme can be reversed and has good quality in terms of imperceptibility and robustness. This watermarking system is resistant to JPEG compression attacks with quality values of 40, 50, 60, 70, 80, and 90, speckle noise, salt & pepper noise, Gaussian noise, median filtering, mean filtering, gaussian LPF, blurring, sharpening.

Keywords: *Watermark, Slantlet Transform (SLT), Discrete Wavelet Transforms (DWT), Singular Value Decomposition (SVD).*