ABSTRACT

Illegal duplication is one of the deviant effects caused by technological developments that occur in digital images. One way to prevent image duplication is by applying watermarks techniques.

Watermarking is the process of permanently inserting information into a digital image without being noticed by an unauthorized party. The watermarking technique will insert information called a watermark into a digital data called a carrier or medium. Watermarks can be in the form of logos, images, serial numbers, owner IDs, names, or other information that indicates ownership of the carrier. Carriers can be in the form of images, audio, video, and 3D mesh. In this final project, watermarking on medical images is analyzed using Fast Discrete Curvelet Transform (FDCuT), Discrete Cosine Transform (DCT), and Singular Value Decomposition (SVD) methods that are tested by providing various types of attacks to produce robust medical image watermarking. The quality of the watermarking technique is viewed from four parameters, namely Structural Similarity Index Metric (SSIM), Normalized Correlation (NC), and Bit Error Rate (BER).

The results of this Final Project research in the form of a watermarking system on MATLAB with a maximum PSNR value of 64,6466 dB, a maximum SSIM value of 0,9983, a maximum NC value of 0,9579, and BER 0,0060. This watermarking system is resistant to JPEG compression attacks with quality values of 50, 60, 70, 80, and 90, speckle noise, salt & pepper noise, gaussian noise, median filtering, mean filtering, LPF gaussian, sharpening, and histogram equalization.

Keywords : *Watermarking, Medical Image, Fast Discrete Curvelet Transforms, Discrete Cosine Transform, Singular Value Decomposition.*