

ABSTRACT

The rapid development of technology makes it easier to distribute medical images so that they can be accessed easily, and poses various threats such as manipulation and data theft. Therefore, it is necessary to increase the security of medical images. Authentication on medical images also needs to be done so that medical images are not confused with each other. If there is an error in the medical image, this will cause a diagnostic deviation and can seriously endanger the patient's condition. Watermarking technique is one of the solutions to provide security and authentication for medical images.

This Final Project is designing a watermarking scheme on medical images using Redundant Discrete Wavelet Transform (RDWT), Discrete Cosine Transform (DCT), and Singular Value Decomposition (SVD) methods. Arnold Transform is applied to watermark images to increase watermark security. The system to be designed consists of two processes, the first is watermark insertion and the second is watermark extraction. Watermark are inserted into medical images by applying RDWT level 3 on medical images and watermark, then converted into DCT. Then the singular value of watermark is entered into the singular value of medical images using SVD.

The results of the simulation and analysis are the scheme watermarking using the RDWT-DCT-SVD and Arnold Transform methods can provide security to medical images by obtained an average PSNR value of 65.4733 dB, SSIM 1, BER 0, NC 1, and capacity 0,0020 which means this scheme has good quality in terms of imperceptibility and robustness. This scheme is also resistant to several attacks, namely JPEG compression with quality 10, 20, and 30, speckle noise with variance 0.05, salt & pepper noise with variance 0.01, Gaussian noise with variance below 0.03, median filter, mean filter, gaussian LPF, motion blur, image sharpening, histogram equalization, rotation, flipping, resizing, and cropping.

Keywords: *Watermarking, Medical Image, RDWT, DCT, SVD, Arnold Transform*