ABSTRACT

Telemedicine is a term for the use of information technology in the medical world. Medical data is used to perform medical services for patients. The ease of manipulating and duplicating data is a concern for the medical world. Safeguarding medical data is needed to protect the authenticity and ownership of medical records.

This research investigates image watermarking in medical images. Watermarking in medical images is carried out to protect ownership rights and authenticity of a medical image. Four medical images of brain MRI are used as host images. The embedding and extraction process was designed using Stationary wavelet transform (SWT) and Statistical Mean Manipulation (SMM) methods to convert the host image into a sparse signal and then enter the watermarking process. The watermark image is optimized using the Compressive Sensing (CS) method of the Orthogonal Matching Pursuit (OMP) algorithm. With this method, it is expected to improve the quality of watermarked images seen from the results of robustness, embedding capacity and transparency. In previous studies, the SWT method on watermarking techniques showed an increase in the Peak Signal to Noise Ratio (PSNR) value and the capacity of a large watermark. The SMM method in previous studies makes watermarking more resistant to attack.

The final result of this final project is the simulation of Image Watermarking in the MATLAB program with the BER approaches zero, SSIM approaches one and PSNR is greater than 40 dB, without being given an attack. The application of the Compressive Sensing algorithm Orthogonal Matching Pursuit will cause the PSNR and embedding capacity value to be better, but the BER value and resistance to attacks from the watermarked image become less good.

Keywords: Image watermarking, Medical Image, Telemedicine, Stationary wavelet transform (SWT), Statistical Mean Manipulation (SMM), Compressive Sensing, Orthogonal Matching Pursuit (OMP).