ABSTRACT

Image watermarking is a process that embeds certain information into digital image. The embedded information called watermark which could be text, image, or a sequence of bits. Image watermarking is carried out to protect authenticity and ownership rights of a digital data.

This thesis designs an image watermarking system using Compressive Sampling (CS) method based on Singular Value Decomposition (SVD) which can compress image size during the data transmission process. CS allows data compression without losing the original information of the data. The embedding process is carried out using CS acquisition to produce Y by multiplying matrix S_r from SVD process with watermark matrix A obtained by modulating the watermark image with Pseudo Noise (PN) codes using Multi-bit Spread Spectrum (SS) technique. The results of watermarking in this system are in the form of compressed data. Therefore, the watermarking robustness is only tested using noise attacks.

This thesis has successfully designed a novel scheme for CS-based image using multi-bit SS modulation. This thesis found that the system produces Peak Signal to Noise Power Ratio (PSNR) $\gamma > 30$ dB and Bit Error Rate (BER) Pb = 0 even only using 25% samples of host signal. This thesis also confirmed robustness for Signal to Noise Power Ratio (SNR) $\zeta > 20$ dB.

Keywords: *Image watermarking, Compressive Sampling (CS), Multi-bit spread spectrum.*