

ABSTRACT

Shannon Nyquist sampling theorem tells that if we sample the signal densely (on Nyquist rate), we can reconstruct analog data completely. In sensing with sampling, the presented opinion to obtain digital data is to sample data fairly on Nyquist rate (2 times wider than Fourier bandwidth) and then do the data compression. In many applications including digital image and video camera, Nyquist rate can be very high in collected samples and it has to be compressed again due to transmission needs or storage.

Compression is done to digital data which when the collecting time (captured or recorded) results in an amount of data that will be wasted in the compression process. To avoid this inefficient thing, it is used the newest technique called compressive sensing.

In this final project, it is used discrete Haar wavelet transform (DHWT) as a sparsity transform, where the image will be measured. The measurement is done using projection transform based on Gaussian distribution. Then, the image will be reconstructed using basis pursuit, after added by AWGN channel before.

From the research result, it is known that DHWT can be used as sparsity transform to make the image sparse. Besides, from the system experiment, it is obtained the PSNR value for grayscale image about 1.284587 dB – 8.519067 dB and for black white image about 51.52418 dB – 58.49029 dB.

Keyword: compressive sensing, discrete Haar wavelet transform, sparsity, basis pursuit.