

Abstract

Transmission process and data storage (digital image) is influenced by the bandwidth and capacity. The larger of the size of the data to be transmitted the greater bandwidth needed for transmission time getting shorter. For bandwidth and storage capacity efficiency, digital image compression process was performed in order to minimize number of bits of the image

In this final project, image compression techniques are used, such as: contourlet transform, vector quantization and Huffman coding (Huffman's algorithm). Contourlet transformation is a transformation that is used to decompose the digital image into multiple *subband*. Then, *subband* is obtained from Laplacian Pyramid and Directional Filter Banks as well. Combined the two processes is called contourlet transform (discrete contourlet transform). Vector quantization is a quantization process performed on the input data by dividing the data into a set of input vectors. From these input vectors, formed codevector (codeword). The collection of this codevector will generate a codebook. Codebook is used as quantizer and dequantizer. Huffman coding is an algorithm to compress data based on statistical data and is lossless. The incorporation of these methods produces a lossy compression system. PSNR and compression ratio is calculated to determine performance of compression system.

Based on the results of testing, compression system using Huffman coding that based on contourlet transform has a less good performance on the compression ratio when compared with JPEG, which produces an average PSNR of 30.23 dB and the average compression ratio of 92.75% while the compression system Huffman coding using the contourlet transform yield based on average PSNR is 33.50 dB and the average compression ratio of 60.63%.

Keywords : *Huffman coding, Contourlet Transform, Vector Quantization, JPEG, Laplacian Pyramid, Directional Filter Banks*