A Comparative Study between Two Hybrid Medical Image Compression Methods

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ABSTRACT

In the medical community, it is still discussion whether to apply lossy or lossless compression methods since each has its own advantages and weaknesses. Then the idea of combining both methods arises to achieve higher compression rate for transmission and storage efficiency without discarding important medical information. This combination is called hybrid method. This research aimed to compare two hybrid medical image compression methods by applying them into the same data set. The hybrid medical image compression methods were vector quantization with variable block sizes in wavelet domain (VQ-wavelet) and DCT-based subband decomposition and modified SPIHT data organization (DCT-SPIHT). Seven metrics were used to objectively evaluate the compressed images; entropy, computation time, mean square error (MSE), peak signal to noise ratio (PSNR), structural similarity (MSSIM), normalized cross correlation (NCC), and image quality index. Simulation results showed that DCT-SPIHT is the best method which is supported by fast computation time, lower MSE, higher PSNR, and almost perfect value of MSSIM, NCC, and image quality index.

Index terms: hybrid medical image compression method, discrete cosine transform (DCT), set partitioning in hierarchical trees (SPIHT), vector quantization (VQ), wavelet transform

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