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**Image Compression Using Wavelet Image Coding**

The objective of our project was to implement a subband image coder in MATLAB that would perform subband decomposition, scalar quantization and entropy encoding to a typical input image, and produce a coded bit stream stored as a data file. The group also aimed to develop a decoder that would reconstruct the image into the same format but with a smaller file size than the original; additionally, the peak noise to signal ratio would also be calculated in order to further judge the effectiveness of the program. Overall, the group was mostly successful in implementing all of these requirements. The main shortcoming was in the writing to a data file mainly because we could not find a way to efficiently store the binary data in a file that MATLAB could also read from. This led to data file sizes that were larger than the original images but the rest of the image compression software worked as expected.

Our MATLAB image compression script works in the following order: the image is decomposed, quanititized, Huffman encoded, written to a data file, read from the data file, decoded, reformed to original dimensions, and then recomposed. The script produced output images that were between 60% and 80% the size of the input image at the lowest compression level (highest quality) and between 7% and 15% size of the input image for the highest compression level (lowest quality). The highest quality images had varying level of distortion depending on the input image but most of the output images were visually acceptable. We noticed that the larger the image got the more it was prone to distortion in the output image. None of the lower quality compression levels were visually acceptable despite their high levels of file size reduction. In terms of Peak Signal to Noise Ratio all images run through the script had a value between 6dB and 30dB depending on the image and what level of quantization was used. It should be noted that the higher the PSNR the better the quality of the output is.