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Final Project Abstract

JPEG is a commonly used loosely image compression algorithm used to save images. It uses 2D Discrete Cosine Transform (2D-DCT) along with the quantization table to remove the high frequency component inside of an image which is insensitive to human eye, and used run-length encoding combined with Huffman encoding for efficient data storage. As a result, it will be an ideal final project for digital signal processing since the theory and application of DCT is embodied in the project.

For this final project, we will first develop a typical routine by using 2D DCT upon 8x8 blocks of a grayscale image, and then multiply it with the standard 50% quality quantization matrix and finally use inverse DCT to illustrate the result. Once this general pipeline is realized, more advanced features of user specific quality factor, run-length encoding, and compression ratio calculation will be done for further understanding of the JPEG compression algorithm. If time permitted more exploration toward the colored image compression will be investigated.