

Digital Image Processing (ELL715)
Assignment 4

1. The pixels in an image are scanned from left to the right and from the top to the bottom. Each new pixel is predicted by the average of the pixel above and the one to the left. Let f and F represent the original and the predicted values, and $e = f - F$ is the prediction error. The prediction error is quantized to "0", "B", or "-B" according to:

$$\hat{e} = \begin{cases} -B & e < -T \\ 0 & -T \leq e \leq T \\ B & e > T \end{cases}$$

0	0	1	5	6
0	0	1	5	6
2	2	4	7	8
3	3	7	4	2
6	6	5	1	0

Find the optimum weights while predicting the image such that mean square error is minimal.

Repeat the process if you use all nearest neighbor to predict the pixel value.

Repeat the process on any image of your choice

2. Take a black & white typeset document, encode the document using Runlength encoding and G3 fax encoder, compare the results. (Details attached)
3. Compress the image used in Question 2 using
 - a. Huffman coding
 - b. DCT coding
 - c. KL transform based coding
 - d. use Haar wavelet and compress it

Compare the results in terms of compression

Instructions:

Please submit the pdf report only, with code, results, and conclusion.