DSAA - Assignment 4 Report

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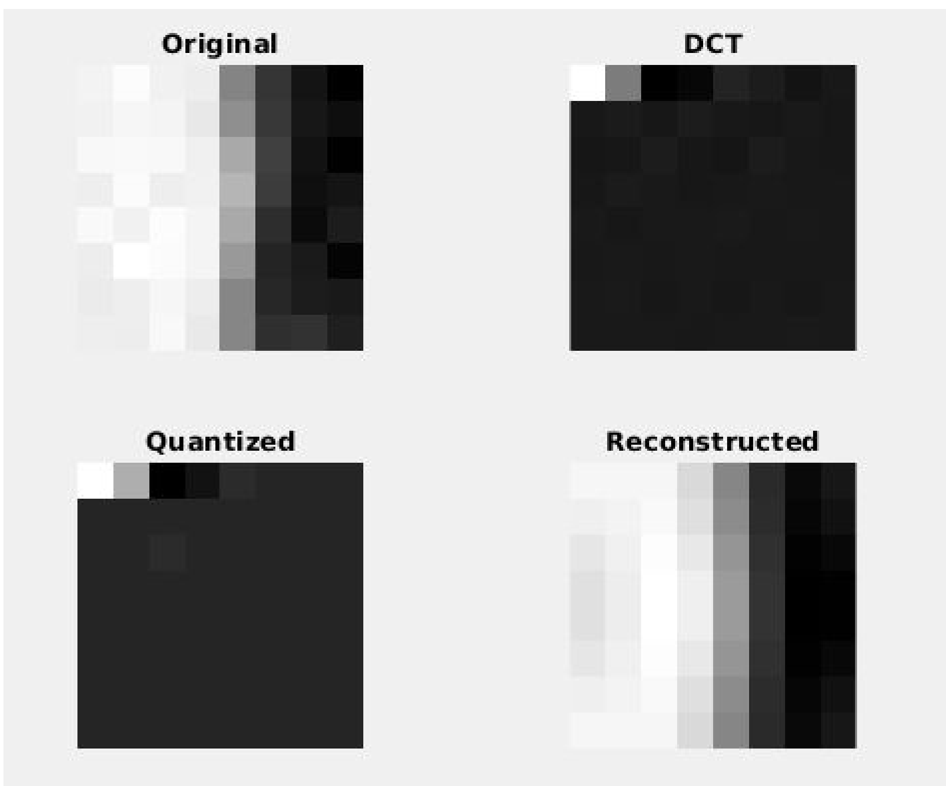
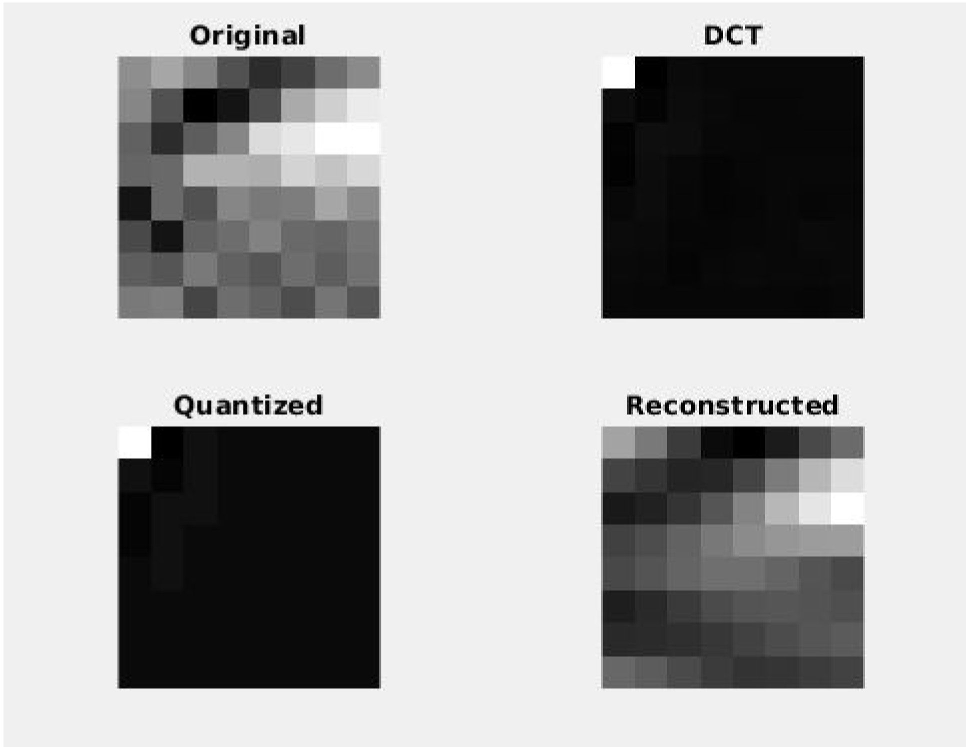
Q1. part2:

Image1 : (420:427,45:52)

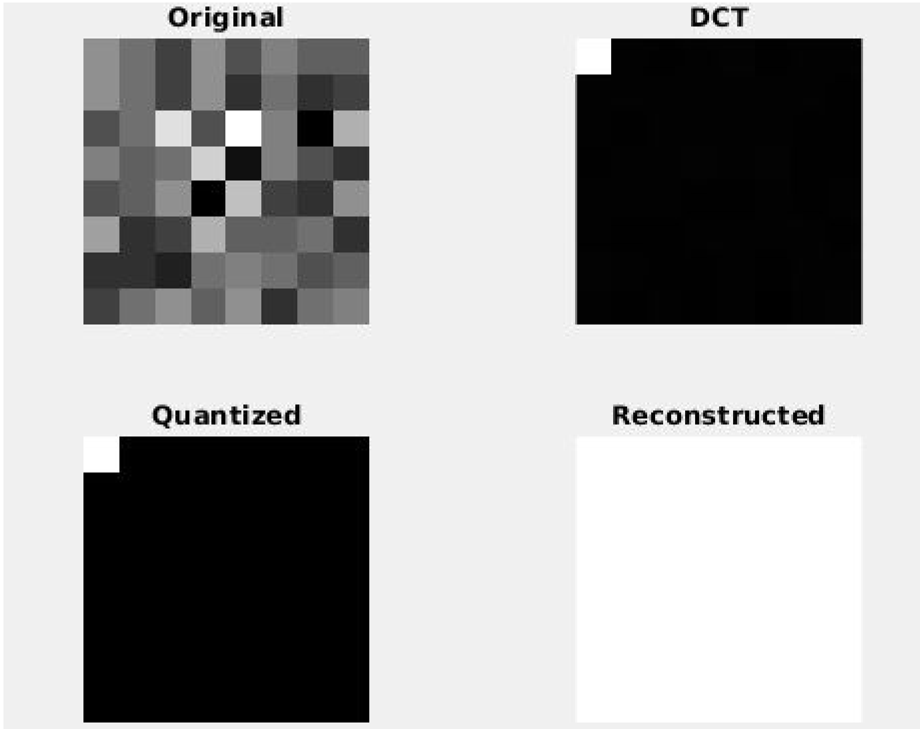


b) image: (427:434,298:305)



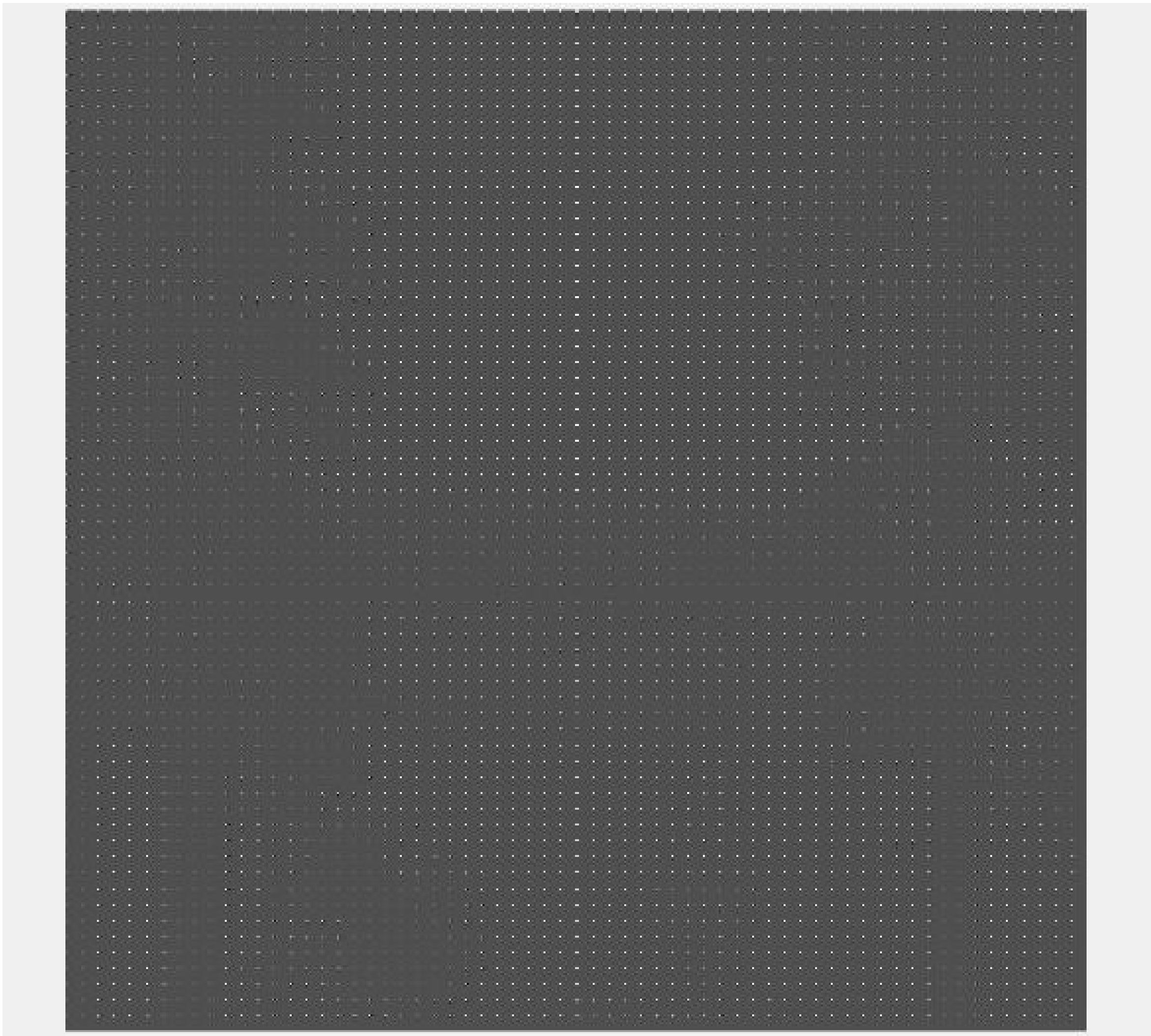
c) image: (30:37, 230:237)

Q2. part3:



Such behaviour is observed because when the quantization of the dct of the image has been done which results in values becoming small and that is the reason why the image appears almost black. When we are reconstructing the (8 * 8) image, we are doing the dequantization and then taking the inverse dct which reconstructs the image and the reconstructed image is 'similar' to the original image but not exactly same. The reason is obvious that we lose some information when we quantise our data. dequantization cannot yield back exact data, instead, it gives us back some approximation which is close enough to the original.

Q2. part3:



The resultant image is the whole black with faint white patches spread all over. Such an image is observed because after taking the DCT transform, quantization has been done therefore most of the values in the matrix have become very low which leads to the loss of data and that’s why we can see the black images of the small 8*8 sub-images.

Q1 part4):

- C = 1

  Root mean square error = 6.0175

  Entropy = 7.9846e-04

- C = 3

Root mean square error = 8.5218
Entropy = 0.0025

- C = 5
  Root mean square error = 10.3763
  Entropy = 0.0035

- C = 6
  Root mean square error = 11.1791
  Entropy = 0.0045

- C = 10
  Root mean square error = 14.0217
  Entropy = 0.0103

The entropy of the original image was 0. On reconstructing after compression with different compression factors the following observations were seen. The entropy and RMSE gradually increase with c increasing as evident from below. C decreases naturally as randomness in the image goes down with more and more pixels becoming zero or with the same values. RMSE increases as the image go more and more distorted. And hence error increases. The compression factor I found where distortions were just perceptible was C

= 6. When c is 10 then at the time of quantization we are dividing the matrix by c*qm now after dividing by combined qm and c the values in the matrix become very small which leads to a very high loss of data and that’s why the reconstructed image will not appear similar to the original image.