

Assignment-4

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1)

Here, I used wiener deconvolution to remove the motion blur in the image, I used point spread function to generate the motion blur, where length and theta of spread are obtained manually. Noise to signal ratio is also given manually.

Image-1:

For length is 32 ,theta is 0 and NSR is 0.0001.

Given Image



Restored Image



For length is 32 ,theta is 0 and NSR is 0.001.

Given Image



Restored Image



Image-2:

For length is 32 ,theta is 10 and NSR is 0.05.

Given Image



Restored Image

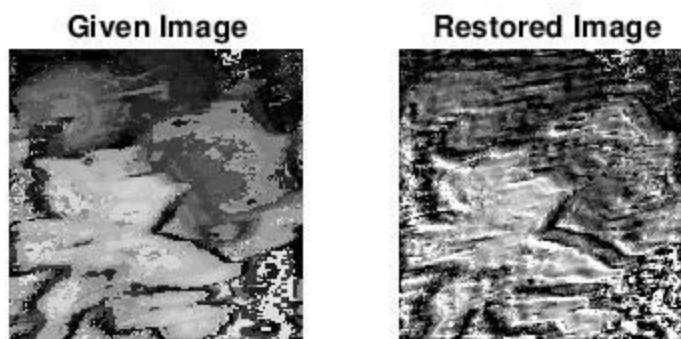


For length is 27 ,theta is 5 and NSR is 0.04.



Image-3:

For length = 23 , theta = 35 and NSR = 0.03



For Length = 22, theta = 30 and NSR = 0.04

Given Image



Restored Image



Image-4:

For length = 25, theta = -20 , NSR = 0.03

Given Image



Restored Image



For Length = 27, theta = -25 and NSR = 0.04

Given Image



Restored Image



For length = 20, theta = -22 and NSR = 0.04

Given Image



Restored Image



2)

Here, I applied magic matrix for quantization and c is a variable which is a multiplier for quantization matrix

If $C = 1$,

Actual Image



Image From DCT



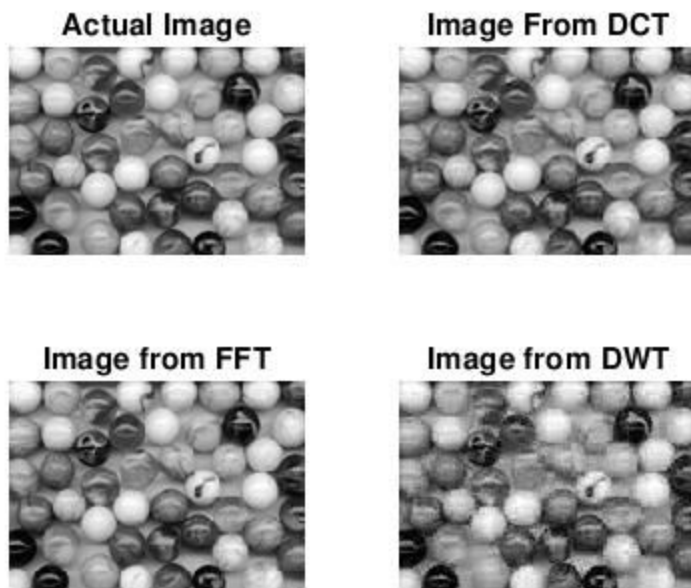
Image from FFT



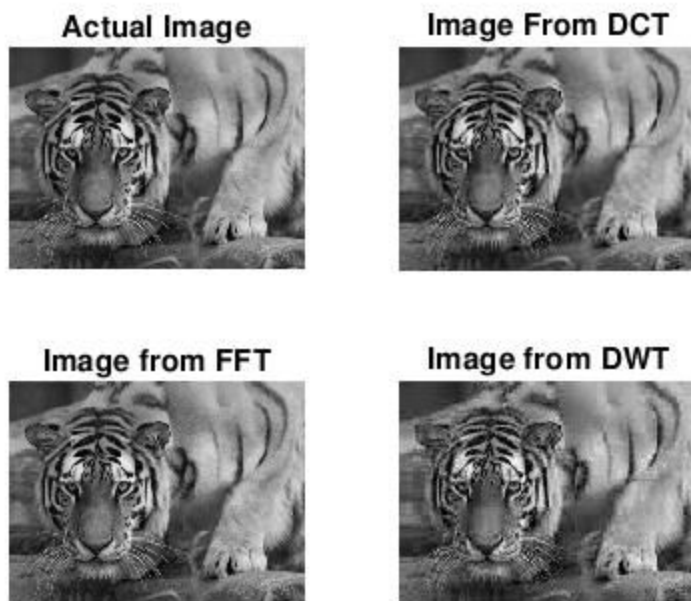
Image from DWT



Here, RMSE for DCT is 5.2240 and RMSE for DFT is 3.6439 and RMSE for wavelet transform is 8.7966.



Here, RMSE for DCT is 6.4877 and RMSE for DFT is 3.2987 and RMSE for wavelet transform is 11.4063.



Here, RMSE for DCT is 10.0108 and RMSE for DFT is 3.2226 and RMSE for wavelet transform is 12.5406.

IF $C = 5$

Actual Image



Image From DCT



Image from FFT



Image from DWT



Here, RMSE for DCT is 10.1519 and RMSE for DFT is 21.5318 and RMSE for wavelet transform is 16.1677.

Actual Image

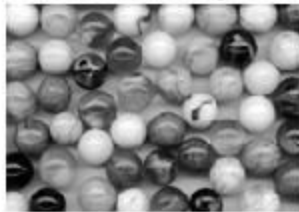


Image From DCT



Image from FFT

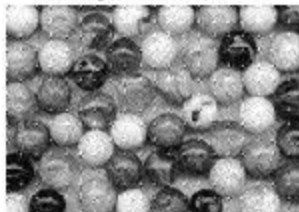


Image from DWT



Here, RMSE for DCT is 12.7910 and RMSE for DFT is 19.5360 and RMSE for wavelet transform is 20.9758.

Actual Image



Image From DCT



Image from FFT



Image from DWT



Here, RMSE for DCT is 16.8587 and RMSE for DFT is 19.4379 and RMSE for wavelet transform is 23.4217.

If $C = 10$,

Actual Image



Image From DCT



Image from FFT



Image from DWT



Here, RMSE for DCT is 14.1647 and RMSE for DFT is 42.0150 and RMSE for wavelet transform is 19.5937.

Actual Image

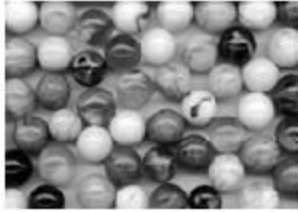


Image From DCT

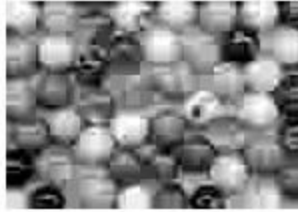


Image from FFT

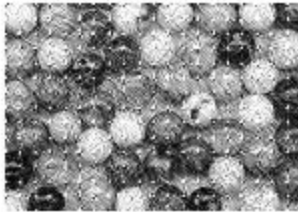
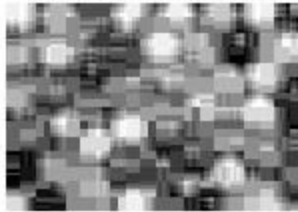


Image from DWT



Here, RMSE for DCT is 17.6107 and RMSE for DFT is 36.8293 and RMSE for wavelet transform is 25.1696.

Actual Image



Image From DCT



Image from FFT

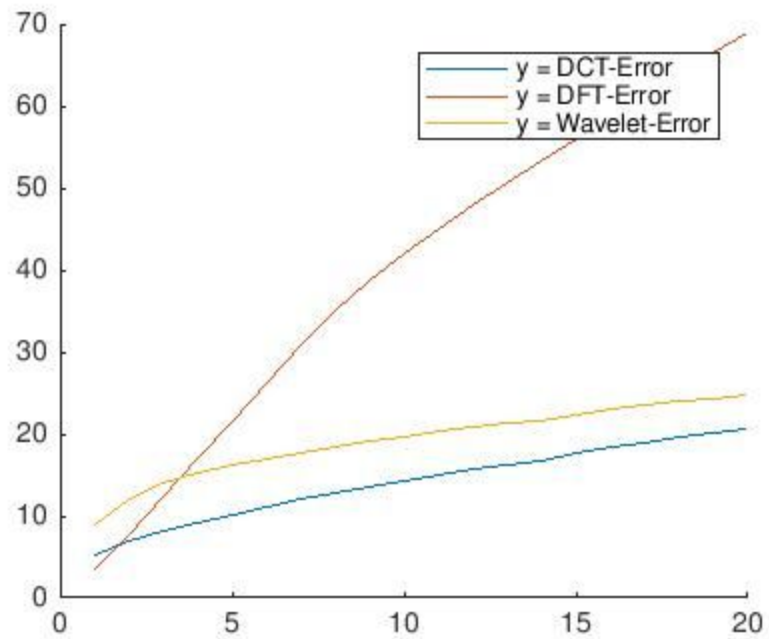


Image from DWT



Here, RMSE for DCT is 21.1240 and RMSE for DFT is 38.4330 and RMSE for wavelet transform is 27.4625.

With Respect to C , DCT,DFT and Wavelet RMSE varies as follows:



Here, we can observe that DCT is more effective wrt compression than Wavelet transform than DFT.