School of Engineering and Physical Sciences
Electrical Electronic and Computer Engineering

B31XM – Matlab Lab 2
Image Compression/Quantization

(10 Marks for the final grading).

1. Objectives:

We will experiment DCT and DWT and the effects of quantization in compression algorithms

1) Software development for 2D Haar Wavelet Transformation and Inverse Wavelet Transformation: In this Lab you will create functions for computing the 2-D Haar wavelet transformation and the inverse Haar wavelet transformation.

2) Load an image (for instance `circuit.tif`) and apply your algorithm to this image and visualize the results in the screen. Comment

3) Apply two iteration of Haar wavelet transform on the images. Comment on your observations.

Image Compression using DCT and Haar/ Daubechies Wavelets

1) Using DCT

As we now know, the DCT and DWT of an image can be used compress images. Compression algorithms tend to quantize the image in the transformed domain (for example Discrete Cosine Transform for JPEG).

In this lab, we will investigate how quantization affects the image. Write a Matlab program to transform the image using DCT and DWT and quantize the transformed image using naïve or optimal (the quantization to minimize the mean square error) quantization method(s).

Load an image (for instance `circuit.tif`) and apply your algorithm to this image by varying the parameters (quantization ranges and levels). For example, play with the number of levels on which you quantify the transformed image.

Calculate the mean square error and Peak Signal to Noise Ratio.

Repeat the above using Iterative Haar wavelet transform and Daubechies length 4 and 6 wavelets.

Compare your results.

Submit the report (by October 26th) in Vision.
Your report may include Matlab codes – results and brief answers.