Image Processing Lab
Sem 1
Lab 4: Image Transforms
30/08/2018

1.Try to complete the lab questions during the lab time (in lab submission)
2.Please do not copy programs.
3.Please find the cameraman,horizontal and vertical images in the Resources folder

1. **Discrete Fourier Transform**
   (use cameraman,horizontal,vertical images)
   Display the Fourier Transform of given images. Analyze how the image is getting transformed into frequency domain and display the Fourier kernels also.
   Steps:

   (a) Read a image, im

   (b) Use the package fftpack from scipy to get FFT

   (c) If necessary , scale the real part of obtained FFT and plot

2. **Discrete Cosine Transform**
   (use cameraman,horizontal,vertical images)
   Obtain the DCT of given images. Analyze them. Plot the DCT kernels also.

3. **Haar Transform**
   Show the different stages of the Haar transform of the image with different basis:

$$A = \begin{bmatrix} 255 & 255 & 255 & 255 & 255 & 255 & 255 & 255 \\ 255 & 255 & 255 & 100 & 100 & 100 & 255 & 255 \\ 255 & 255 & 100 & 150 & 150 & 150 & 100 & 255 \\ 255 & 255 & 100 & 150 & 200 & 150 & 100 & 255 \\ 255 & 255 & 100 & 150 & 150 & 150 & 100 & 255 \\ 255 & 255 & 255 & 100 & 100 & 100 & 255 & 255 \\ 255 & 255 & 255 & 255 & 50 & 255 & 255 & 255 \\ 50 & 50 & 50 & 50 & 255 & 255 & 255 & 255 \end{bmatrix}$$

4. **Walsh/Hadamard Transform**

   Show the different stages of the Walsh/hadamard transform of the image with different basis :

$$A = \begin{bmatrix} 255 & 255 & 255 & 255 & 255 & 255 & 255 & 255 \\ 255 & 255 & 255 & 100 & 100 & 100 & 255 & 255 \\ 255 & 255 & 100 & 150 & 150 & 150 & 100 & 255 \\ 255 & 255 & 100 & 150 & 200 & 150 & 100 & 255 \\ 255 & 255 & 100 & 150 & 150 & 150 & 100 & 255 \\ 255 & 255 & 255 & 100 & 100 & 100 & 255 & 255 \\ 255 & 255 & 255 & 255 & 50 & 255 & 255 & 255 \\ 50 & 50 & 50 & 50 & 255 & 255 & 255 & 255 \end{bmatrix}$$

   (Note: Refer the textbook Image processing :The Fundamentals by Maria Petrou Pg no: 89-92 for more details on Questions 3 and 4)