

BITS, PILANI - K.K. BIRLA GOA CAMPUS

F 435 Digital Image Processing

Assignment I

Date of submission : 15th February 2021

Date: 05/02/2021 (5 % Weightage)

• Instructions

- Create a unique image. Take an image of a person, or an object or a pet. Load to Matlab. Convert to grayscale. Save this image as YourRollno with appropriate extension. (.jpg, .tif, or .png).
 - Use 'replicate' padding.
 - Save codes by question names, for example answer to question 1 as "Q1.m". Include a word doc titled 'YourName_Assignment_1' containing question numbers, codes and output images. Zip all together as YourName.Rollnum.
 - Please follow the honor code
1. Plot image histogram of "YourRollno image" and equalize the image histogram.
 2. Obtain an image where "YourRollno image" is superimposed on 'moon.tif' (demo image in Matlab)
 3. Create 5 random noise images (Gnoise1. to Gnoise5) and add to the "YourRollno image" creating 5 corrupted images (CorruptedImage1 to CorruptedImage5). Try to obtain the original image without the information of the image noise matrices. [Hint : imnoise]
 4. Unsharpen "YourRollno image" image by filter kernel given below and by custom Matlab command imsharpen. Compare the two results.

$$h = \begin{bmatrix} -1 & -1 & -1 \\ -1 & 9 & -1 \\ -1 & -1 & -1 \end{bmatrix}$$

5. From Matlab fspecial filters, apply Gaussian filter on the "YourRollno image" to smooth the image. Print output.
6. Extract edges from the output image from previous question. Use $H = \text{fspecial}('laplacian', \alpha)$. Choose $0 < \alpha < 1$, adjust α to enhance edges.
7. Extract edges of the "YourRollno image" by Matlab's "edge" command using options "prewitt", "sobel" and "canny". Compare the three output images.
8. Use the following embossing filter on "YourRollno image". What does this look like ?

$$h_{emb} = \begin{bmatrix} -1 & -1 & -1 & -1 & 0 \\ -1 & -1 & -1 & 0 & 1 \\ -1 & -1 & 0 & 1 & 1 \\ -1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 \end{bmatrix}$$