Assign 2 (Deadline 16th)

Q1. Perform $f(x) * w(x)$, where $f(x) = \{\mathbf{1}, 3, 4, 2\}, w(x) = \{-1, \mathbf{2}, -1\}$. Bold numbers indicate the origin. Show the calculations. [5]

Q2. a. Perform $(x, y) * w(x, y)$ $f(x, y) = \begin{bmatrix} \mathbf{1} & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}, w(x, y) = \begin{bmatrix} 1 & 2 & 3 \\ 4 & \mathbf{5} & 6 \\ 7 & 8 & 9 \end{bmatrix}$.

Show the calculations. Bold numbers indicate the origin. [15]

b. Express this in terms of impulse function and using the obtained expression write a matlab code to compute the convolution without using conv command. Verify both the outputs. For expressing in impulse function, $g(x, y) = f(x, y) * \delta(x, y) + other\ terms$. You will have to first express *w* in terms of impulse function, for example in Q1, $w(x) = -\delta(x + 1) + 2\delta(x) - \delta(x + 1)$. [15]

c. Finally verify using conv2. Be careful to use 'same','full', the default is 'full'. [5]

Q3. Write a matlab code for histogram matching. [15]

Q4. Perform, image blurring using 3x3 box kernel, sharpening using Laplacian mask of 3x3 (only horizontal and vertical) and unsharp mask without using conv2 and inbuilt filter commands. Verify using fspecial and imfilter commands. [30]

Q5. Prob 4.17, 4.18 and 4.19 [15]