University of Dayton
Department of ECE
Course Title: Image processing and Computer Vision with Deep Learning
Course Number: ECE 595-81
Quiz 1, 07/07/2023

Question 1.

The following figures show   *(5 marks)*
    (a) a 3-bit image of size 5-by-5 image in the square, with x and y coordinates specified,
    (b) a Laplacian filter and
    (c) a Gaussian low pass filter.

Image

Y\X	1	2	3	4	5
1	3	7	6	2	0
2	2	4	6	1	1
3	4	7	2	5	4
4	3	0	6	2	1
5	5	7	5	1	2

Laplacian mask

0	1	0
1	-4	1
0	1	0

Low pass filter

0.01	0.1	0.01
0.1	0.56	0.1
0.01	0.1	0.01

       (a)   (b)   (c)

Find the output pixel at location (3,3) if the image is filtered using the

    (i)   Gaussian low pass filter

    (ii)   Laplacian filter

    (iii)   How will you proceed if it is required to find the output at location (3,3) corresponding to a LOG (Laplacian of Gaussian) filter?

Question 2.

Find the 2-D DFT of the following matrix.   *(5 marks)*

$$x = \begin{bmatrix} 4 & 6 \\ 3 & 4 \end{bmatrix}$$

    Hint: You may use 1D- DFT for the above computation.