

Image Processing assignment - 5

- 1) a) Perform image degradation using motion blur. Multiply the transform by $H(u, v)$ given by:

$$H(u, v) = \frac{T}{\pi(ua + vb)} \sin(\pi(ua + vb)) e^{-j\pi(ua + vb)}$$

Where $a=b=0.1$ and $T=1$.

- b) Perform image restoration on the motion blurred image obtained from question 1a, using inverse filtering.

$$F(u, v) = \frac{G(u, v)}{H(u, v)}$$

where $H(u, v)$ is degradation function from question 1a and $G(u, v)$ is the Fourier transform of degraded(input) image.

- 2) Perform image restoration on the motion blurred image obtained from question 1, using Wiener filtering.
- 3) Perform restoration on the motion blurred image obtained from question 1, using constrained matrix inversion.
- 4) Calculate the Haar transform of image:

$$g = \begin{pmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{pmatrix}$$

- 5) Reconstruct the image of question 4 using an approximation of its Haar transform by setting its bottom right element equal to 0
- 6) Reconstruct morphologically image f , shown in the following figure, using a structuring element of size 3×3 . Start by creating mask g by subtracting 1 from all pixels of the original image f .

15	16	16	15	14	14	15	14	15	15	15	14	14	15	15	15	16
15	15	16	16	15	14	14	14	14	15	15	16	16	16	15	15	15
14	16	16	15	14	14	15	14	15	15	16	14	16	15	14	14	14
14	15	16	16	17	16	16	18	17	16	13	14	15	16	15	15	14
13	15	15	15	26	26	27	29	28	17	15	14	14	15	15	15	16
13	16	15	16	27	27	27	26	26	16	14	15	13	13	14	16	
14	15	14	15	26	28	31	28	27	17	14	15	13	14	13	14	
14	14	16	15	28	29	26	27	27	18	16	15	14	14	15	16	
15	16	15	16	28	27	27	28	29	17	16	16	14	15	15	15	
15	16	15	14	15	14	15	15	14	13	16	15	15	15	14	14	
16	17	18	15	16	18	17	17	14	23	22	23	14	15	13	14	
17	17	18	29	25	23	18	16	15	24	24	22	13	14	13	13	
17	18	17	18	31	22	17	16	16	23	21	22	16	15	14	13	
16	17	17	18	19	20	16	16	15	16	15	14	15	13	15	14	
16	18	18	17	17	18	17	17	16	16	14	14	14	13	14	15	
17	17	16	16	16	17	16	16	15	16	15	15	14	14	15	15	