

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 .

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| 14 | 15 | 16 | 16 | 17 | 16 | 16 | 18 | 17 | 16 | 13 | 14 | 15 | 16 | 15 | 14 |
| 13 | 15 | 15 | 15 | 26 | 26 | 27 | 29 | 28 | 17 | 15 | 14 | 14 | 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 |
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