

Time: 3 Hrs

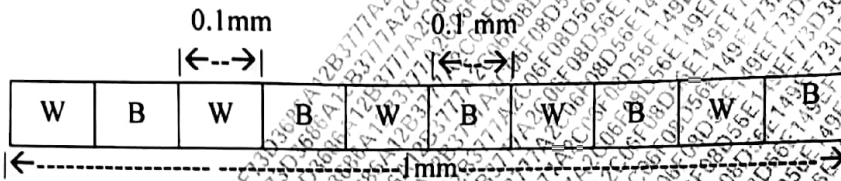
Total marks: 80

Instructions

1. Q1 is compulsory
2. Solve any three from remaining
3. Assume suitable data if necessary

Q1 Answer the following

1. Image resulting from poor illumination could be difficult to segment. State true or false. Justify your answer **4M**
2. For given figure, Improve and reduce the spatial resolution; consider, W = White line, B = Black line, Size of each white and black line is 0.1 mm, total length is 1 mm. **4M**



3. Two images have same histogram which of the following properties must they have in common 1) same total power 2) same entropy 3) same inter-pixel covariance function Justify your answer **4M**
4. Compare 2-D motion and optical flow **4M**
5. Draw and explain the model of image degradation/restoration process **4M**

Q2

1. For given image find and equalize histogram. **8M**

1	2	3	4
5	5	6	6
6	7	6	6
6	7	2	3

2. Explain 1) Contrast stretching 2) Log Transformation with neat diagrams **6M**
3. Prove Periodicity and symmetry properties of DFT **6M**

Q3

1. Apply 1) Averaging filter 2) Median filter on following image. Use pixel replication for padding. No marks if procedure not followed **8M**

4	8	9
12	15	18
30	32	46

2. Explain 1) Sharpening using 2nd order derivative 2) Unsharp masking and high boost filtering
3. Let $V = \{0,1\}$. Compute 1) Euclidean distance 2) City block distance 3) Chess board distance between pixels p and q

0	1	1	1
1	0	0	1 (q)
1	1	1	1
1 (p)	1	1	1

Q4

1. Draw PDF and write equation for following noise models
 - a. Gaussian Noise
 - b. Rayleigh noise
 - c. Erlang noise
2. Apply bit plane slicing on following image

5	7	5
4	6	3
1	3	2

3. Find the border for image F given below using two different structural elements A and B respectively

F =

0	0	1	1	1	1	0	1	1	1	0
0	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1
0	0	0	0	0	1	1	1	0	0	0

A =

0	1	0
1	1	1
0	1	0

B =

1	1	1
1	1	1
1	1	1

Q5

1. Classify video frames? What is GOP?
2. Which are the digital quality measures? Explain any 2
3. Find DCT of given image by finding kernel function

6M
6M
8M

4	2	2	1
2	5	8	9
2	4	5	2
2	3	2	2

Q6

1. Explain motion estimation criterion based on optical flow equation
2. Write Short Notes on **any two**
 1. Exhaustive block matching algorithms
 2. Binary Feature Matching
 3. Motion Representation

10M
10M