Paper / Subject Code: 42401 / Image & Video Processing

Time: 3 Hours   **Marks: 80**

Note:

1. Question No.1 is compulsory.
2. Solve any three from the remaining questions.
3. Assume suitable data wherever it is necessary.

1. Answer any four   20

   (a) Can two different images have the same histogram? Justify your answer.
   (b) What are the advantages of wiener filer over an inverse filter and when will wiener filter reduce to inverse filter.
   (c) What is hit-or-miss transformation? Explain in brief.
   (d) Justify Discrete Cosine Transform is real and orthogonal.
   (e) Explain the basics of sampling the video signals.

2 (a) Explain averaging filter used for enhancement of images? Filter the following image using a 3x3 neighborhood averaging by assuming (a) zero padding and (b) pixel replication.   10

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

   (b) Discuss the different filters used in frequency domain filtering. Explain the ringing effect in ideal low pass and high pass filters.   10

3 (a) Prove the separable and spatial shift property of Fourier transform.   10
   (b) Compute the 2D DFT and IDFT of the 4x4 gray scale image f(m, n) given below .   10

1	2	3	4
5	6	7	8
1	2	3	4
5	6	7	8

58572

C28C28176A2B47929207B57DD90F2004

4 (a) Explain opening and closing operations used for morphological image processing. Apply opening and closing operations the following image using the given structuring element.   10

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

0	1	0
1	1	1
0	1	0

(b) Find the minimum cost path for edge linking using graph theoretical technique for the given image. Show the cost of all the paths on the graph.   10

5	6	1
6	7	0
7	1	3

5 (a) Explain the wiener filter used for restoration of degraded images.   10

(b) Explain in detail block based motion estimation techniques for video signals.   10

6. Write short notes on (Any three)   20

(a) Adaptive median filter

(b) Discrete Cosine Transform

(c) Adjacency, connectivity of pixels

(d) Region filling