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10EC763

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016
Image Processing

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. With a block diagram, explain the fundamental steps involved in Digital Image Processing. **(10 Marks)**

b. With a neat diagram of the eye, explain the human visual system working. **(10 Marks)**

2 a. What is meant by path? Give the formula for calculating D_4 and D_8 distances. What is the difference between D_8 distance and D_m distance? **(10 Marks)**

b. For V = {2, 3, 4}, compute the lengths of shortest 4, 8 and m path between p and q in the following image. **(06 Marks)**

Fig.Q2(b)

	3	4	1	2	0	
	0	1	0	4	2	(q)
	2	2	3	1	4	
(p)	3	0	4	2	1	
	1	2	0	3	4	

c. Explain spatial resolution and gray level resolution. **(04 Marks)**

3 a. Given $A = \frac{1}{2}\begin{bmatrix} \sqrt{3} & 1 \\ -1 & \sqrt{3} \end{bmatrix}$ and image $u = \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$, calculate the transformed image V and the basis images. **(08 Marks)**

b. What are the properties of Unitary Transforms? **(04 Marks)**

c. Construct 4 × 4 DFT matrix and show that it is unitary. **(08 Marks)**

4 a. Write the recursive definition of Hadamard Transform and using this, construct Hadamard transform for N = 8. **(10 Marks)**

b. Determine 4 × 4 slant transform matrix. List its properties. **(10 Marks)**

PART – B

5 a. Perform histogram equalization of an image whose pixel intensity distribution is given in Table :

Gray levels	0	1	2	3	4	5	6	7
Number of Pixels	790	1023	850	656	329	245	122	81

Construct the histogram of the images before and after equalization. **(10 Marks)**

b. What is meant by Laplacian filter? Using the second derivative, develop a Laplacian mask for image sharpening. **(10 Marks)**

6 a. With the help of a block diagram, explain the steps involved in frequency domain filtering. **(10 Marks)**

b. With the help of a block diagram, explain the Homomorphic filtering approach for image enhancement. What are the advantages of these filters? **(10 Marks)**

7 a. Explain the model of image degradation / restoration. **(08 Marks)**

b. What are the three methods of estimating the degradation function? Explain each of them. **(12 Marks)**

8 a. Describe RGB color model with the help of neat diagram. Write equations to convert RGB to CMY. **(10 Marks)**

b. What is Pseudo colour? Explain any one type of pseudo colour processing with a neat functional block diagram. **(10 Marks)**

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