CBCS SCHEME

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18MT744

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Digital Image Processing

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is digital image processing and explain the use of DIP in any four application. **(10 Marks)**

b. Explain the fundamental steps involved in digital image processing with neat sketch. **(10 Marks)**

OR

2 a. With the necessary sketch explain the concept of brightness adaptation and discrimination. **(10 Marks)**

b. With a neat sketch, explain the components of an image processing system. **(10 Marks)**

Module-2

3 a. With a neat sketch, interpret the working of different image sensing and acquisition system used in a digital image processing. **(10 Marks)**

b. Consider an image segment:

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

Calculate the shortest 4 path, 8 path and m path distance between the pixels p and q if v = {0, 1, 2}. **(10 Marks)**

OR

4 a. Explain the following relationship between pixels with a suitable examples:
(i) Neighbors (ii) Adjacency (iii) Connectivity, region and boundary **(12 Marks)**

b. Illustrate different distance measures with a help of neat sketch. Also calculate these distance between the pixels P(120, 50) and Q(90, 200) **(08 Marks)**

Module-3

5 a. Discuss the properties of 2 dimensional DFT. **(10 Marks)**

b. For the 2 × 2 orthogonal matrix A and image u obtain the transformed image and basis images and inverse transformation.

$$A = \frac{1}{\sqrt{2}}\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \qquad u = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$ **(10 Marks)**

OR

6 a. Generate Haar basis for N = 2. **(12 Marks)**

b. Discuss the properties of discrete cosine transform. **(08 Marks)**

Module-4

7 a. With a neat sketch illustrate Piecewise –Linear transformation functions. **(12 Marks)**

b. With the sketch, explain the contrast stretching and thresholding function. **(08 Marks)**

OR

8 a. A 64 × 64, 3 bit image with the intensity distribution as shown in Table.Q8(a)(i). It is desired to transform this histogram so that it will have the values specified in Table.Q8(a)(ii). Sketch: (i) Transformation function of specified histogram (ii) Result of performing specified histogram.

rK	0	1	2	3	4	5	6	7
nK	790	1023	850	656	329	245	122	81

Table.Q8(a)(i)

zq	0	1	2	3	4	5	6	7
$p_z(zq)$	0.00	0.00	0.00	0.15	0.20	0.30	0.20	0.15

Table.Q8(a)(ii) **(12 Marks)**

b. Explain any two basic intensity transformation with neat sketch. **(08 Marks)**

Module-5

9 a. Discuss the model of image degradation/restoration with neat sketch. **(04 Marks)**

b. Explain different noise probability density functions with necessary equations and graphs. **(16 Marks)**

OR

10 a. Explain any two color models. **(12 Marks)**

b. Discuss about pseudo color image processing and intensity slicing as applied to pseudo color image processing. **(08 Marks)**

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