CBCS SCHEME

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15TE655

Sixth Semester B.E. Degree Examination, June/July 2019
Image Processing

Time: 3 hrs. Max. Marks: 80

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. With the help of a neat block diagram, explain the components of a general purpose image processing system. **(10 Marks)**

b. Explain briefly the following terms:
i) Brightness adaptation
ii) Mach bands
iii) Weber's ratio. **(06 Marks)**

OR

2 a. Explain the concept of Image Acquisition using a single sensor. **(06 Marks)**

b. Consider the image segment shown. Let V = {0, 1}. Compute the lengths of the shortest 4-, 8- and m-path between p and q. If a particular path does not exist between these two points, explain why? **(06 Marks)**

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

c. Explain briefly the concept of distance measure of a pixel. **(04 Marks)**

Module-2

3 a. Explain the following gray level slicing. Intensity slicing and bit plane slicing. **(06 Marks)**

b. For a 3-bit image of size 64 × 64 pixels, the intensity distribution is shown in Table Q.3(b). Where intensity levels are integers in the range [0, L-1] = [0, 7]. Obtain the histogram graph before and after equations. **(10 Marks)**

Table Q.3(b)

r_k	n_k
$r_0 = 0$	790
$r_1 = 1$	1023
$r_2 = 2$	850
$r_3 = 3$	656
$r_4 = 4$	329
$r_5 = 5$	245
$r_6 = 6$	122
$r_7 = 7$	81

OR

4 a. Consider the following 2-bit image of size 5 × 5. Compute mean value of the intensities in the image using histogram and compare mean value when computed directly from the sample values. **(06 Marks)**

0	0	1	1	2
1	2	3	0	1
3	3	2	2	0
2	3	1	0	0
1	1	3	2	2

b. Explain the basic concepts of spatial filtering in image enhancement and hence explain the importance of soothing filter. **(10 Marks)**

Module-3

5 a. Explain any four properties of 2-D discrete Fourier transform. **(10 Marks)**

b. Explain image interpolation, resampling and Moire patterns. **(06 Marks)**

OR

6 a. Explain any four types of mean filters. **(08 Marks)**

b. Explain with neat diagrams, Gaussian noise, Rayleigh noise Erlang noise and Impulse noise. **(08 Marks)**

Module-4

7 a. Explain three principal ways to estimate the degradation function to be used in image restoration. **(06 Marks)**

b. Describe the process of image restoration by inverse filtering. **(04 Marks)**

c. Explain briefly Erosion and dilation. **(06 Marks)**

OR

8 a. Explain Hit or miss transformation. **(06 Marks)**

b. Explain the following Morphological algorithms, boundary extraction. Hole-filling, extraction of connected components convex hull, thinning. **(10 Marks)**

Module-5

9 a. Explain region based segmentation techniques. **(08 Marks)**

b. Explain chain codes. **(08 Marks)**

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OR

10 a. Explain Minimum Perimeter Polygon (MPP) algorithm. **(10 Marks)**

b. Explain the following: Signatures, Boundary segments and skeletons. **(06 Marks)**

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