Solution of VTU Examination Dec-2018

"Digital Image Processing" – 15EC72

CBCS SCHEME

USN | 1 | C | R | 1 | 5 | E | C | 0 | 4 | 8 |

15EC72

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019

Digital Image Processing

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. What is digital image? Explain the fundamental steps of digital image processing. (08 Marks)

b. Explain the concept of sampling and quantization of an image. (06 Marks)

c. Mention any four fields that use digital image processing. (02 Marks)

OR

2 a. Explain with neat diagram, how image is acquired using sensor strips? (08 Marks)

b. Define 4-, 8- and m-adjacency. Compute the lengths of the shortest 4-, 8- and m-path between p and q in the image segment shown in Fig. Q2 (b) by considering V = {2, 3, 4} (06 Marks)

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	

Fig. Q2 (b)

c. A common measure of transmission for digital data is the baud rate defined as the number of bits transmitted per second. Generally, transmission is accomplished in packets consisting of a start bit, a byte (8 bits) of information and a stop bit. Using these facts find how many minutes would it take to transmit a 2048 x 2048 image with 256 intensity levels using a 33.6 K baud modem? (02 Marks)

Module-2

3 a. For a given 4×4 image having gray scales between [0,9] perform histogram equalization and draw the histogram of image before and after equalization. 4×4 image is shown in Fig. Q3 (a). (08 Marks)

$$\begin{bmatrix} 2 & 3 & 3 & 2 \\ 4 & 2 & 4 & 3 \\ 3 & 2 & 3 & 5 \\ 2 & 4 & 2 & 4 \end{bmatrix}$$

Fig. Q3 (a)

b. Explain smoothing of images in frequency domain using ideal, Butterworth and Gaussian Low pass filter. (08 Marks)

OR

4 a. Define 2D DFT- with respect to 2D DFT of an image and state the following properties: (i) Translation (ii) Rotation (iii) Periodicity (iv) Convolution theorem. (08 Marks)

b. With necessary graphs, explain the log and power law transformation used for spatial image enhancement. (06 Marks)

c. Explain image sharpening in spatial domain using second order Laplacian derivative. (06 Marks)

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