CBCS SCHEME

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18EC733

Seventh Semester B.E. Degree Examination, June/July 2024
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. With the help of a neat figure, explain the main elements of the human eye. **(10 Marks)**

b. Consider the image segment shown in Fig.Q1(b). Let V = {1, 2, 3, 4}, compute the lengths of the shortest 4, 8 and m-path between p and q. If a particular path does not exist between the two points, explain why.

(p) 4 1 2 6 8 3 5
8 6 5 1 4 6 3
4 6 5 2 5 8 7
2 3 4 8 3 7 2
4 5 3 2 3 8 7
2 2 5 4 3 2 1 (q)

Fig.Q1(b) **(10 Marks)**

OR

2 a. Explain D_m distance with example. **(08 Marks)**

b. What is image sampling and quantization? What are the different parameters which will decide the number of storage bits of the image in the discrete domain? **(12 Marks)**

Module-2

3 a. Write a short note on unsharp masking and high boost filtering. **(08 Marks)**

b. Perform histogram equalization for the 8-level 64 × 64 image. The histogram of which is given as:

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

(12 Marks)

OR

4 a. Explain some basic gray level transformation used for image enhancement. **(10 Marks)**

b. Explain image sharpening in spatial domain using second order Laplacian derivative. **(10 Marks)**

Module-3

5 a. Briefly explain any four properties of 2D-DFT. **(08 Marks)**

b. List and explain any three high pass filters in frequency domain and comment on ringing effect. **(12 Marks)**

OR

6 a. Briefly explain ideal lowpass filtering in frequency domain. **(08 Marks)**

b. Explain homomorphic filtering in image processing with neat block diagram. **(12 Marks)**

Module-4

7 a. Comment on various methods used in estimation of degradation model. (10 Marks)

b. Write a short note on inverse filtering and its drawbacks. (10 Marks)

OR

8 a. With neat block diagram explain image degradation and restoration model. (10 Marks)

b. Explain the need for adaptive median filters and its working. (10 Marks)

Module-5

9 a. With necessary diagram explain the RGB and CMY colour models. (08 Marks)

b. Explain and illustrate Erosion and dilation operations used in morphological image processing. (12 Marks)

OR

10 a. Explain with necessary diagram the HSI colour model. (08 Marks)

b. Explain and illustrate opening and closing operations used in morphological image processing. (12 Marks)

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