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17EC72

Seventh Semester B.E. Degree Examination, July/August 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. Explain the fundamental steps in digital image processing. (10 Marks)
- b. Explain various image sensing and acquisition methods. (10 Marks)

OR

- 2 a. Explain the process of image sampling and quantization in digital image processing. (08 Marks)
- b. Explain the significance of isoference curve in an image processing. (06 Marks)
- c. Consider the image segment shown in Fig.Q2(c). Let $V = \{1, 2\}$ and compute the length of the shortest 4-, 8- and m-path between p and q. If particular path does not exist between these two points, explain why?



Fig.Q2(c)

(06 Marks)

Module-2

- 3 a. Explain the widely used gray level transformations. (10 Marks)
- b. Perform histogram equalization of the image shown in Fig.Q3(b), where the intensity levels are integers in the range [0, 9].

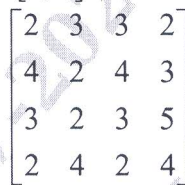


Fig.Q3(b)

(10 Marks)

OR

- 4 a. Explain the development of digital Laplacian method used for image enhancement. (10 Marks)
- b. Explain the procedure used in frequency domain for simultaneous gray level range compression and contrast enhancement. (10 Marks)

Module-3

- 5 a. Discuss how periodic noise can be reduced by frequency domain filtering. (10 Marks)
- b. Explain the ordered statistic filter's used for image restoration. (10 Marks)

OR

- 6 a. Explain the following methods to estimate the degradation function used in image restoration:
(i) Estimation by image observation.
(ii) Estimation by experiment (10 Marks)
b. Explain the Wiener filtering method of restoring images in presence of noise and blur. (10 Marks)

Module-4

- 7 a. Explain the procedure in converting colors from HSI to RGB. (10 Marks)
b. Explain the relationship between scaling and wavelet function spaces. (10 Marks)

OR

- 8 a. Explain in brief the techniques used for pseudocolour image processing. (10 Marks)
b. Describe in brief the following terms:
(i) Morphological hit-or-miss transform
(ii) Morphological opening and closing. (10 Marks)

Module-5

- 9 a. Discuss various masks used to compute the gradient of an image. (10 Marks)
b. Explain region splitting and merging. (10 Marks)

OR

- 10 a. Explain the following image representation techniques:
(i) Signatures
(ii) Skeletons (10 Marks)
b. Discuss segmentation using morphological watersheds. (10 Marks)
