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15CS753

Seventh Semester B.E. Degree Examination, June/July 2023 Digital Image Processing

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. With a neat block diagram, explain the fundamental steps in image processing. (10 Marks)
b. List applications of image processing. Briefly explain any three applications. (06 Marks)

OR

- 2 a. Briefly explain the following terms :
(i) Neighbours
(ii) Connectivity of pixels
(iii) Euclidean distance
(iv) City block distance (08 Marks)
b. Explain the process of image sampling and quantization. (08 Marks)

Module-2

- 3 a. With necessary graph, explain the following spatial image enhancement operation :
(i) Image negative
(ii) Log transformation
(iii) Power-law transformation
(iv) Contrast stretching
(v) Bit-plane slicing (10 Marks)
b. Explain image subtraction and image averaging operation with example. (06 Marks)

OR

- 4 a. Explain image smoothing and sharpening in spatial domain. (10 Marks)
b. Explain the Laplacian second derivative for spatial enhancement. (06 Marks)

Module-3

- 5 a. Explain any four properties of two dimensional discrete fourier transform. (08 Marks)
b. Obtain the equation for DFT from the continuous transform of sampled function of the variable. (08 Marks)

OR

- 6 a. Explain the image filtering in frequency domain. (08 Marks)
b. Derive the fourier transform of a unit impulse located at the origin and impulse located at $t = t_0$. (08 Marks)

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-4

- 7 a. Explain isolated point detection and live detection algorithm. Mention the masks used in detection. (08 Marks)
- b. Briefly explain the different phases of Canny edge detector. (08 Marks)

OR

- 8 a. Explain edge linking by Hough transform. (08 Marks)
- b. Explain region splitting merging scheme of region based segmentation. (08 Marks)

Module-5

- 9 a. With neat block diagram, explain image compression model. (08 Marks)
- b. Explain :
- (i) Data redundancy.
 - (ii) Compression ratio.
 - (iii) Coding redundancy
 - (iv) Spatial redundancy
- (08 Marks)

OR

- 10 a. Explain Huffman coding with an example. (08 Marks)
- b. With neat block diagram, explain block transform coding. (08 Marks)
