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18CS741

Seventh Semester B.E. Degree Examination, June/July 2023
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. Define an image. With block diagram, explain the fundamental steps in digital image processing. **(12 Marks)**
    b. Explain 4-connectivity, 8-connectivity and m-connectivity with suitable example. **(08 Marks)**

OR

2   a. With necessary diagrams, discuss image digitization process. **(10 Marks)**
    b. Discuss any four applications of digital image processing. **(10 Marks)**

Module-2

3   a. Define histogram equalization. Develop an algorithm to enhance image quality using this method. **(12 Marks)**
    b. Discuss any three gray level transformation techniques with suitable graph plots. **(08 Marks)**

OR

4   a. Explain the importance of Sobel and Prewitt operators in image processing. **(08 Marks)**
    b. Discuss Laplacian and Log Edge detectors with suitable mathematical model. **(12 Marks)**

Module-3

5   a. List the properties of DFT. Explain Discrete Fourier Transform Process along with its computational complexity. **(12 Marks)**
    b. Discuss steps in frequency domain based filtering techniques. **(08 Marks)**

OR

6   a. Discuss the filters used to smooth an image in frequency domain. **(10 Marks)**
    b. Explain the significance of homomorphic filters with a block diagram. **(10 Marks)**

Module-4

7   a. Define image segmentation. What are the properties of segmentation? **(10 Marks)**
    b. Explain 'Region Growing' and 'Split and Merge' approach used in image segmentation. **(10 Marks)**

OR

8   a. Explain how Hough Transform helps in extracting line segments from an image. **(10 Marks)**
    b. Define thresholding. Explain Global thresholding technique with an example. **(10 Marks)**

Module-5

9 a. Define image compression. Explain general image compression model with a block diagram. **(10 Marks)**

   b. Develop an algorithm that encodes data using Huffman coding technique. Illustrate Huffman coding for the following data:

Data	S_1	S_2	S_3	S_4	S_5	S_6
Probability	0.1	0.4	0.06	0.1	0.04	0.3

   (10 Marks)

OR

10 a. Discuss LZW encoding and decoding technique with an example. **(12 Marks)**

   b. With a block, discuss transform coding technique. **(08 Marks)**

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