PRESIDENCY UNIVERSITY
BENGALURU

School Of Computer Science and Engineering & Information Science

End-Term Examinations, Aug 2024

Odd Semester: 2023 - 24
Course Code: CSE3081
Course Name: Digital Image Processing
Department: CSE (Lateral Entry)

Date: 08.08.2024
Time: 9.30am -12.30pm
Max Marks: 100
Weightage: 50%

Instructions:

(i) Read the all questions carefully and answer accordingly.
(ii) Do not write any matter on the question paper other than roll number.

Q. No	Questions	Marks	CO	RBT
1	a. List and explain the components of digital image processing.	4	CO1	L1
	b. Write a mean filter for eight neighbor hood. Explain working of your filter with suitable example.	6	CO1	L2
	c. Prepare image negative. Determine the negative of a 4 bit image shown below.	10	CO1	L3

10	12	8	10
12	15	13	7
7	15	9	7
12	7	15	10

OR

Q. No	Questions	Marks	CO	RBT
2	a. Define each parameters in an equation for finding negative of an image	4	CO1	L1
	b. Write the general form of representation of log transformation in digital image processing	6	CO1	L2
	c. Explain the fundamental steps in Digital Image Processing with a neat block diagram ?	10	CO1	L3

Q. No	Questions	Marks	CO	RBT
3	a. What are filters in image processing. List out various image processing filters for smoothening and sharpening the images.	4	CO2	L1
	b. Derive Laplacian filter with four neighbors.	6	CO2	L2

	c.	Prepare filtered image from given image shown below using laplace filter of eight neighbours.	10	CO2	L3

210	12	8	10
112	115	213	127
77	15	29	117
212	78	15	210

d.

<div align="center">OR</div>

4	a.	Explain Basic Filtering operation in the Frequency Domain with suitable diagram	4	CO2	L1
	b.	Represent all possible gray level images for the given image for four bit pic]xel representation	6	CO2	L2

10	12	8	14
12	15	13	5
11	15	9	2
4	6	15	1

	c.	Prepare filtered image from given image shown below using mean filter of eight neighbours.	10	CO2	L3

10	12	8	10
12	15	13	7
7	15	9	7
12	7	15	10

d.

5	a.	Illustrate working of any two denoising mean filters	4	CO3	L1
	b.	Explain any three order static filters with appropriate mathematical modeling	6	CO3	L2
	c.	Elaborate any three noise models with suitable diagram	10	CO3	L3

<div align="center">OR</div>

6	a.	Show the importance of standard deviation in adaptive filtering process	4	CO3	L1
	b.	What you mean by restoration of images. Explain the restoration process in frequency domain with suitable diagram.	6	CO3	L2
	c.	Describe band pass and band reject filters in frequency domain. How butter worth and notch filters do the filtering action?	10	CO3	L3

7	a.	Explain similarity and discontinuity principle in image segmentation	4	CO4	L1

	b. Write line detection masks for horizontal, vertical and inclined lines	6	CO4	L2
	c. Convert given RGB image into CMY representation. What will be saturation and intensity values for each pixels here in RGB representation?	10	CO4	L3

(210,240,160)	(112,135,156)	(228,124,213)	(110,210,10)
(212,12,234)	(15,21,245)	(13,34,213)	(217,127,221)
(7,4,7)	(15,43,56)	(9,6,3)	(217,33,137)
(222,243,255)	(127,217,78)	(15,23,43)	(120,23,45)

<div align="center">OR</div>

8	a. What is HSI model in color image representation. Give significance of each term in this model	4	CO4	L1
	b. Compare Region -Based and Edge-Based segmentation methods . Give at least one example for each.	6	CO4	L2
	c. Apply split and merge segmentation for the given image with a threshold of 3. Show all regions with separate labels	10	CO4	L3

6	5	6	6	7	7	6	6
6	7	6	7	5	5	4	7
6	6	4	4	3	2	5	6
5	4	5	4	2	3	4	6
0	3	2	3	3	2	4	7
0	0	0	0	2	2	5	6
1	1	0	1	0	3	4	4
1	0	1	0	2	3	5	4

9	a. Explain any three distance calculation methods used in digital image processing	4	CO1	L1
	b. Prepare image negative. Determine the negative of a 4 bit image shown below.	6	CO1	L2

1	12	8	14
12	11	13	3
7	15	9	7
12	4	15	10

	c. Compute the lengths of the shortest 4,8 and M path between P and Q in the image segment shown below by considering V= {2,3,4}	10	CO1	L3

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

<div align="center">OR</div>

10	a. Explain working of Ideal High pass and Ideal Low pass filters in frequency domain with help of mathematical modeling	4	CO2	L1
	b. Elaborate working of homomorphic filters and operations involved in each step with suitable diagram	6	CO2	L2
	(table below)	10	CO2	L3

10	12	8	10
12	15	13	7
7	15	9	7
12	7	15	10

c. Calculate histogram equalization for the given image