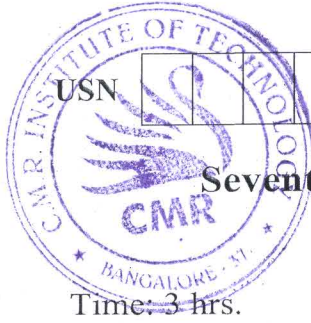


CBCS SCHEME

15EC72



USN

Seventh Semester B.E. Degree Examination, June/July 2024 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. Mention thematic bands in NASA's LANDSAT satellite, its wavelength and uses. (05 Marks)
b. Consider the image segment shown in Table. Q1(b), compute the length of the shortest 4, 8 and m-path between P and Q for (i) $V = \{2, 3, 4\}$. (06 Marks)

	3	4	1	2	0	
	0	1	0	4	②	Q
	2	2	3	1	4	
P	③	0	4	2	1	

- c. Explain the process of image acquisition using single sensor with motion to generate a 2 – D image. (05 Marks)

OR

- 2 a. Explain with neat diagram, how image is acquired using sensor strips? (08 Marks)
b. Define 4-, 8- and m-adjacency. Compute the lengths of the shortest 4-, 8- and m-path Between p and q in the image segment shown in Fig. Q2 (b) by considering $V = \{2, 3, 4\}$

	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	

- c. A common measure of transmission for digital data is the baud rate defined as the number of bits transmitted per second. Generally, transmission is accomplished in packets consisting of a start bit, a byte (8 bits) of information and a stop bit. Using these facts find how many minutes would it take to transmit a 2048×2048 image with 256 intensity levels using a 33.6 K baud modem? (02 Marks)

Module-2

- 3 Explain the following intensity transformation functions :
a. Image negatives (05 Marks)
b. Log transformation (05 Marks)
c. Power – law transformation. (06 Marks)

OR

- 4 a. Define 2D DFT- with respect to 2D DFT of an image and state the following properties:
(i) Translation (ii) Rotation (iii) Periodicity (iv) Convolution theorem. (08 Marks)
- b. With necessary graphs, explain the log and power law transformation used for spatial image Enhancement. (08 Marks)

Module-3

- 5 a. What are the most commonly used probability density functions in image processing applications and explain it with the help of plot. (08 Marks)
- b. With the mathematical equations, discuss the minimum Mean Square Error Filtering. (08 Marks)

OR

- 6 a. Explain how image degradation is estimated using,
(i) Observation (ii) Mathematical modeling. (08 Marks)
- b. Explain the order statistics filters used for restoring images in the presence of noise. (08 Marks)

Module-4

- 7 a. Explain the process of generating RGB image. (08 Marks)
- b. Write the formulas used for converting RGB to HSI. Using these formula find the value of HSI for the given RGB = (0.683, 0.1608, 0.1922). (08 Marks)

OR

- 8 a. What is Pseudo color image processing? Explain intensity slicing as applied to pseudo color image processing. (07 Marks)
- b. Explain Erosion and Dilation operations used for morphological processing. (07 Marks)
- c. Define wavelet function. (02 Marks)

Module-5

- 9 a. Explain Marr-Wildreth edge detector in image processing. (08 Marks)
- b. Explain MPP algorithm in image representation (MPP – Minimum Perimeter Polygon). (08 Marks)

OR

- 10 a. Explain basic global thresholding with iterative algorithm. (08 Marks)
- b. Explain simple descriptors and Fourier descriptors. (08 Marks)

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