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CBCS SCHEME

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20SCS251

Second Semester M.Tech. Degree Examination, July/August 2022
Image Processing and Machine Vision

Time: 3 hrs. Max. Marks: 100

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

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-1

1 a. List out applications of Digital Image Processing. Mention 2 major applications which motivates Digital Image Processing. **(07 Marks)**

b. Explain components of a general – purpose image processing system with suitable diagram. **(07 Marks)**

c. With suitable diagram simple image formation model. **(06 Marks)**

OR

2 a. What are the steps involved in Digital image processing. Explain them with appropriate diagram. **(08 Marks)**

b. Write all types of relationship and explain briefly any 2 relationship. **(06 Marks)**

c. Consider the following image segment, shown in Fig.Q2(c).

	3	4	1	2	0	
	0	1	0	4	2	(q)
	2	2	3	1	4	
(p)	3	0	4	2	1	

Fig.Q2(c)

Let V = {0, 1, 2} compute the length of shortest 4, 8, m paths between p and q. **(06 Marks)**

Module-2

3 a. Name 3 basic gray–level transformation functions. Given brief explanation with suitable diagram for any one function. **(08 Marks)**

b. Define Histogram Equalization. Draw histogram diagram for the following image. Apply histogram equalization and draw diagram for output image.

Input image

2	3	3	2
4	2	4	3
3	2	3	5
2	4	2	4

Fig.Q3(b) **(08 Marks)**

c. Explain Prewitt operator. **(04 Marks)**

OR

4 a. Explain briefly procedure for histogram specification. **(08 Marks)**

b. Explain 2 ways of zooming with appropriate example. **(08 Marks)**

c. Draw and explain frequency domain filter. **(04 Marks)**

Module-3

5 a. Explain model of the image degradation/restoration process. **(05 Marks)**

b. Explain Harmonic mean filter with appropriate example. **(05 Marks)**

c. Show the effect of 3 × 3 mean filter on the following image. Refer Fig.Q5(c).

0	0	0	0	0
0	0	0	1	1
0	0	1	1	1
0	0	1	20	1
0	0	1	1	1

Fig.Q5(c) **(05 Marks)**

d. Explain general compression system model briefly with suitable diagram. **(05 Marks)**

OR

6 a. Differentiate between Lossy and lossless compression. **(07 Marks)**

b. Illustrate human coding techniques for the following data and compute entropy and efficiency.

Data	S1	S2	S3	S4	S5	S6
Probability	0.1	0.4	0.06	0.1	0.04	0.3

(08 Marks)

c. Define order – statistics filters. List all types of order statistics filters. **(05 Marks)**

Module-4

7 a. Discuss the process of region splitting and merging for region based segmentation. **(10 Marks)**

b. Explain Erosion operations used for morphological processing with detailed example. **(10 Marks)**

OR

8 a. What is structuring element. Explain Dialation operator used for morphological processing with detailed example. **(10 Marks)**

b. Explain edge linking and boundary detection methods briefly. **(10 Marks)**

Module-5

9 a. Explain Thining and thickening with suitable example. **(10 Marks)**

b. Explain the following boundary descriptors.

i) Shapes numbers

ii) Fourier descriptors. **(10 Marks)**

OR

10 a. Explain chain codes for boundary representation. **(10 Marks)**

b. List any 7 applications of computer vision. **(10 Marks)**

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