

DEPARTMENT OF ECE

SRM Nagar, Kattankulathur - 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-2023 (ODD)

Test: CLAT- 2

Date: 11-10-2023

Course Code & Title: 18ECE340T – Machine Perception with Cognition

Duration: 100 minutes

Year & Sem: IV/VII

Max. Marks: 50

Course Articulation Matrix:

	18ECS301J – Applied Programming	PROGRAM OUTCOMES												PROGRAM STUDENT OUTCOMES		
C O	COURSE OUTCOMES	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Understand the fundamentals of image Processing, camera and color models	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Analyze the binary shapes, region and boundary- based image modeling	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-
3	Illustrate the various filter banks, shape and textures for image synthesis	-	-	-	2	-	-	-	-	-	-	-	3	-	-	-
4	Express the objects, frames based on template relations	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-
5	Apply the concept of 2D and 3D face recognition	-	-	3	-	2	-	-	-	-	-	-	-	-	-	1
6	Implement the concept of image processing and machine vision in real time applications	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-

Part – A (10 x 1 = 10 marks)

Answer all the Questions

Q. No	Question	Marks	BL	CO	PO									
1	_____ boundary descriptor is defined as the line perpendicular to the major axis. a) Equilateral axis c) Minor axis b) Equidistant axis d) Median axis	1	1	2	1									
2	The term, Curvature is defined as: a) Rate of change of area c) Rate of change of slope b) Rate of change of diameter d) Slope	1	1	2	1									
3	Which of the following is the useful descriptor of a boundary, whose value is given by the ratio of the length of the major axis to the minor axis? a) Radius b) Perimeter c) Area d) Eccentricity	1	1	2	1									
4	Statistical moments are used to describe the shape of boundary segments a) precisely b) quantitatively c) closely d) qualitatively	1	1	2	1									
5	For the pixel $p(x_1, y_1)$, $q(x_2, y_2)$, the chessboard distance between p & q is defined as a) $d = \max(x_1 - x_2 , y_1 - y_2)$ c) $d = \min(x_1 - x_2 , y_1 - y_2)$ b) $d = \max(y_1 - y_2 , x_1 - x_2)$ d) $d = \min(y_1 - y_2 , x_1 - x_2)$	1	2	2	1									
6	Compute the local binary pattern for the following matrix use 5 as reference value. <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>3</td><td>4</td><td>6</td></tr><tr><td>1</td><td>5</td><td>4</td></tr><tr><td>7</td><td>6</td><td>2</td></tr></table> a) 01110110 b) 00100110 c) 00110110 d) 10011100	3	4	6	1	5	4	7	6	2	1	2	3	4
3	4	6												
1	5	4												
7	6	2												
7	_____ is the primary method to sharpen an image a) Blurring c) Highlighting the fine details b) Increasing the brightness d) Decreasing the brightness	1	1	3	4									
8	Sharpening is analogous to _____. a) spatial integration c) spatial differentiation c) frequency integration d) frequency interpretation	1	1	3	4									
9	The M_{00} of the given 3 x 3 binary image is _____. <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td></tr><tr><td>0</td><td>0</td><td>1</td></tr></table> a) 5 b) 7 c) 0 d) 3	1	0	0	1	1	1	0	0	1	1	2	3	4
1	0	0												
1	1	1												
0	0	1												

10	Box filter is a type of _____ filter	1	1	3	4
	a) Linear b) Gabor c) Gaussian d) Laplacian				

PART B

Section B1 (2 x 4 = 8 marks)

Answer ANY 2 Questions

11	What are Connected Components? With relevant examples, specify 4 – Connectedness and 8 – Connectedness.	4	2	2	1
12	Calculate the Centroid of the given binary image	4	3	2	1

13	With suitable example, define the region descriptors based on eccentricity and elongation.	4	2	2	1
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Section B2 (2 x 4 = 8 Marks)

Answer ANY 2 Questions

14	Write short notes on Texture Analysis of an Image and enumerate the challenges in Texture analysis.	4	2	3	4
15	What is the use of histogram in image processing?	4	2	3	4
16	Find the filtered image using 3 x 3 Weight Median non-linear filter for the given 3 x 3 image.	4	3	3	4
	3 x 3 filter				

PART C (2 x 12 = 24 marks)

17 (a)	For the given binary image, considering four connectedness modify the image to skeletal image through thinning process.	12	2	2	1

OR

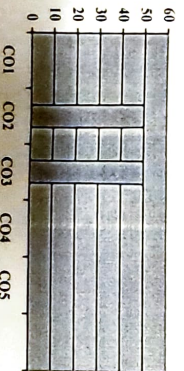
17 (b)	Explain the Connected Component Labelling Algorithm with suitable example.	12	2	2	1
18 (a)	Explain with relevant example, how the testing and training model in feature extraction method is used for categorizing textures in a given image.	12	3	2	4

OR

18 (b)	Compute the filtered image, by applying 3x3 median filter for the given 5x5 input image.	12	3	2	4

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions

☐ CO Coverage (%)



☐ 8 ☐ Column 2 ☐

