⊙SRM

SRM Institute of Science and Technology

College of Engineering and Technology

DEPARTMENT OF ECE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-2023 (ODD)

Test: CLAT- 2

Course Code & Title: 18ECL1401 – Machine Perception with Cognition

Year & Sem: IV/VII

Course Articulation Matrix:

Duration: 100 minutes
Max. Marks: 50

18ECS101J Applied Programming		PROGRAM OUTCOMES												PROGRAM STUDENT OUTCOMES		
CO	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	Identify the zero representation in binary image a. background b. foreground c. true value d. false value	1	1	2	1
2	Identify the required minimum of passes over the image space in Object counting and Labeling routine. a. 2N b. 2N+2 c. 2N-1 d. 2N+1	1	1	2	1
3	The small objects may be eliminated by applying a _____ of _____ a. series, shrink b. parallel, shrink c. series, stretch d. parallel, stretch	1	1	2	1
4	Select the chess board distance measurement a. $d= \max(\lvert x1+x2 \rvert, \lvert y1+y2 \rvert)$ b. $d= \min(\lvert x1+x2 \rvert, \lvert y1+y2 \rvert)$ c. $d= \min(\lvert x1-x2 \rvert, \lvert y1-y2 \rvert)$ d. $d= \max(\lvert x1-x2 \rvert, \lvert y1-y2 \rvert)$	1	1	2	1
5	For pixels $p(x, y)$, $q(s, t)$, the Euclidean distance between p and q is defined as: a) $D(p, q) = [(x - s)2 + (y - t)2]1/2$ b) $D(p, q) = \lvert x - s \rvert + \lvert y - t \rvert$ c) $D(p, q) = \max(\lvert x - s \rvert + \lvert y - t \rvert)$ d) $D(p, q) = [(x - s)2 + (y - t)2]$	1	2	2	1
6	The _____ is defined as number of pixels in a shape a. area b. perimeter c. elongation d. compactness	1	2	3	4
7	The minor axis length is used to predict the _____ of the object a. width b. height c. length d. perimeter	1	1	3	4
8	Predict the two version of LM filter banks a. LMV&LMS b. LMS&LMM c. LMS &LML d. LMV& LML	1	1	3	4
9	The M_{00} of the given 3 x 3 binary image is _____ 1 1 0	1	2	3	4

	1	1	1				
	1	0	1				

a) 5   b) 7   c) 6   d) 3

| 10 | Texture analysis methods are grouped into _____ broad categories
a.2   b.3
c.4   d.5 | 1 | 1 | 3 | 4 |

PART B
Section B1 (2x 4 = 8 marks)
Answer ANY 2 Questions

11	With suitable example, define the boundary descriptors based on shape number and curvature	4	2	2	1
12	Calculate the Centroid of the given binary image	4	3	2	1

1	1	1	0	0	1
1	1	0	1	0	1
0	1	1	0	1	0
1	0	1	1	1	0

13	Find the distance between two-pixels P (4,2) and Q (4,3) using city block distance measurement method List out different types of texture representation.	4	2	2	1

Section B2 (2x 4 = 8 marks)
Answer ANY 2 Questions

14	Write short notes on approaches used in Texture analysis	4	2	3	4
15	Write an algorithm for LM filter bank	4	2	3	4
16	Compute the co-occurrence matrix for the following and symmetric GLCM	4	3	3	4

0	0	1	1
0	0	1	1
0	2	2	2
2	2	3	3

PART C (2 x 12 = 24 marks)

17 (a)	Explain the procedure to have skeleton image through thinning process with example.	12	2	2	1
	(or)				
17 (b)	With suitable example, explain the regional descriptors in detail	12	2	2	1
18 (a)	Explain with relevant example how the Gaussian and Laplacian pyramid is applied to an image to obtain an sharpened and a smoothened image	12	3	3	4
	(or)				
(b)	Determine the filtered image for the shaded portion using convolution process, given the 5 x 5 image and 3 x 3 mask	12	3	3	4

0	1/6	0
1/6	1/3	1/6
0	1/6	0

3×3 mask

30	40	50	70	90
40	50	80	60	100
35	255	70	0	120
30	45	80	100	130
40	50	90	125	140

5×5 image