K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2024
(B.Tech) Program: EXTC Scheme II
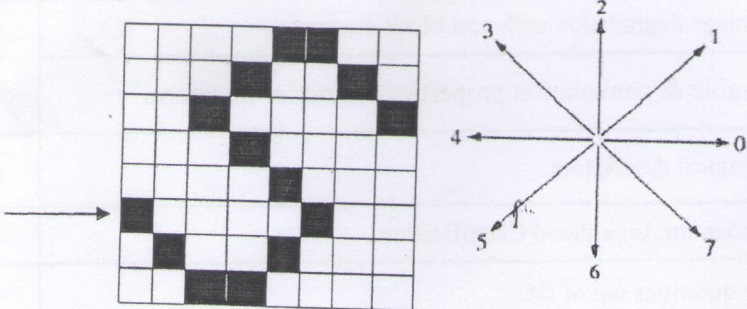~~Regular~~ Examination: TY Semester: VI
Course Code: EXC603 and Course Name: Image Processing and Machine Vision

Date of Exam: 02/08/24   Duration: 2.5 Hours   Max. Marks: 60

Supplementary Exam Aug. 2024

Instructions:
(1) All questions are compulsory
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	Explain different types of adjacency with respect to neighboring pixels.	2	1,2	U
ii)	How Hough transform is used in linking the edges of the image.	2	2,3	U
iii)	Demonstrate how Laplacian operators are invariant to rotation.	2	2,3	U
iv)	Compare low pass and high pass Butterworth filter.	2	4	U
v)	Demonstrate image degradation with neat block diagram	2	4	U
vi)	Explain separable & convolution properties of Fourier transform.	2	2	U
vii)	Describe topological descriptors.	2	5	U
viii)	Explain the Maximum Likelihood Classification.	2	6	U
Q.2	Solve any four questions out of six.	16		
i)	Plot original and equalized histogram for the given 4X4 image shown below with gray scale [0-9]. 2 3 3 2 4 2 4 3 3 2 3 5 2 4 2 4	4	1	AP
ii)	Explain point processing techniques as Contrast stretching, Log transformation and Power law transformation with examples.	4	2	U
iii)	Discuss the regional descriptors of the image.	4	5	U
iv)	Explain the different techniques of knowledge representation	4	6	U
v)	What is thresholding? How it is used in image segmentation.	4	4	U
vi)	Explain Hit-Miss Transform.	4	3	U

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Q.3	Solve any two questions out of three.	16		
i)	Filter the following image using 3 X 3 mask, find out weighted averaging by replicating the border | 2	2	3	4
4	2	5	1
3	2	6	4
2	4	6	7		8	2	AP
ii)	Find chain code, first derivative, circular first shift shape number for given image using 8 connectivity clockwise direction. (Arrow shows starting point) 	8	5	AP
iii)	What is Support Vector Machine, Explain the SVM classifier.	8	6	U
Q.4	Solve any two questions out of three.	16		

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i)	Apply region splitting on following image. Assume the threshold value <=3. Show the final segmented image with different colors/ STYLES and also represent the segmentation using flow graph. 	8	3	AP

1	1	1	1	1	1	1	2
1	1	1	1	1	1	1	0
3	1	4	9	9	8	1	0
1	1	8	8	8	4	1	0
1	1	6	6	6	3	1	0
1	1	5	6	6	3	1	0
1	1	5	6	6	2	1	0
1	1	1	1	1	1	0	0

ii)	Discuss about different mean filters that are used in the presence of noise for image restoration in spatial domain	8	4	U
iii)	Let V={1,2} . Compute De,D4 D8 and Dm distances between 2 pixels p and q shown in figure.	8	1	A

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

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