

16/12/2022

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22

(Autonomous College Affiliated to University of Mumbai)

End Semester Exam

Nov - Dec 2022

Program: B. Tech

Examination: TY Semester: VI

Course Code: IUEXC603 and Course Name: Image Processing and Machine Vision

Duration: 03 Hours

Max. Marks: 60

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)	An image of size 16X16 is resized to 64X64. Both the images have 32 grey levels in the interval [0-31]. Which image has better spatial resolution and which image has better intensity resolution?	2	1,2	U
ii)	What is point processing technique? Name two any two techniques of point processing.	2	1,2	U
iii)	Write the equations Forward and Inverse 2-D transform	2	2	U
iv)	What is morphology of an image? How it is useful in image processing?	2	3	U

v)	Write any two boundary descriptors.	2	5	U
vi)	How do you define a region in an image? What is the processing technique used to identify the region?	2	4	U
vii)	Draw the PDF of bipolar noise and explain in brief.	2	4	U
viii)	What is a Support Vector? Draw a suitable diagram to explain	2	6	U
Q.2	Answer any 4 out of 6			
i)	Find the Euclidean, Chess board and City block distance two pixels p(4,5) and q (2,3).	4	1	Ap
ii)	The PDF of an equalized image is not perfectly Uniform. Is this statement true or false? Justify your answer.	4	2	An
iii)	Explain the operation of median filter with an example	4	3	
iv)	Identify the edge or line in an image of 8x8 size with 32 grey levels with pixel values 8, 9, 11, 12, 15, 31, 29, 28.in a row. Justify your answer	4	4	An
v)	Discuss about different boundary descriptors	4	5	U
vi)	Explain the classification principle for Machine Learning.	4	6	U
Q.3	Answer any 2 questions			
i)	What do you mean by Gradient Operator and Laplacian operator? Derive the masks for both.	8	2	U
ii)	Compare the spatial domain filters and frequency domain filters used in Image Restoration	8	5	

iii)	<p>What is Dilation and Erosion? Apply the dilation and Erosion on the following image. Use the structuring element (SE). Circle shows the origin of SE.</p> <table border="1"> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> </table> <table border="1"> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td></tr> </table>	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	0	1	1	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	0	0	1	1	1	1	1	1	0	0	1	1	0	0	1	1	1	1	1	1	0	0	1	1	0	1	8	3	Ap
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Q.4	Answer any 2 questions																																																																															
i)	<p>Apply the Region splitting method of segmentation on the given 8x8 image and apply merging on result obtained. Compare the advantages and limitations of splitting method</p> <table border="1"> <tr><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> </table>	1	1	0	0	1	1	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	0	0	1	1	8	4													
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ii)	What is Supervised Classification? Explain with example. Which Supervised classification method is the best?	8	6																																																																													
iii)	Explain any 4 noise models used for image restoration and write their mean and variance	8	5																																																																													