

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

07/03/24

Feb-March 2024
(B.Tech.) Program: Artificial Intelligence and Data Science
Supplementary Examination: TY Semester: V
Course Code: AIDLC5052 and Course Name: Digital Image and Video Processing
Duration: 2.5 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)	What do you understand by neighborhood processing? Mention their application.	02	1	2									
ii)	What is histogram? Explain its significance in image enhancement.	02	2	2									
iii)	What are the different redundancies in an image?	02	4	2									
iv)	Explain Dilation and Erosion operation on an image	02	3	2									
v)	Explain shot boundary in a video? Explain types of it.	02	5	2									
vi)	Compare Lossy and Lossless compression	02	4	2									
vii)	Apply median filtering on the given 3x3 image <table border="1" style="margin-left: 20px;"> <tr><td>5</td><td>4</td><td>0</td></tr> <tr><td>4</td><td>5</td><td>4</td></tr> <tr><td>3</td><td>2</td><td>3</td></tr> </table>	5	4	0	4	5	4	3	2	3	02	2	3
5	4	0											
4	5	4											
3	2	3											
viii)	What do you understand by pixel based motion estimation?	02	5	2									
Q.2	Solve any four questions out of six.	16											
i)	Explain the color models with a neat diagram	04	1	2									
ii)	Explain how the Logical operators used in Image enhancement.	04	2	2									
iii)	Explain region splitting with an example	04	3	2									

DEVP

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iv)	For the given image and structuring element, find the erosion of image <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </table> <table border="1" style="display: inline-table; vertical-align: middle; margin-left: 20px;"> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> </table>	1	1	1	1	1	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	04	4	3																																																																																																					
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v)	Explain polygon approximation for image representation	04	3	2																																																																																																																									
vi)	Explain Connectivity and Adjacency with respect to neighbors of the pixel.	04	5	2																																																																																																																									
Q.3	Solve any two questions out of three.	16																																																																																																																											
i)	Given the image, apply the histogram equalization and generate equalized image. Plot the original and equalized histogram. Also provide the pixel distribution of the equalized image <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>Gray Levels</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>No. of Pixels</td><td>80</td><td>16</td><td>8</td><td>16</td><td>20</td><td>50</td><td>40</td><td>20</td></tr> </table>	Gray Levels	0	1	2	3	4	5	6	7	No. of Pixels	80	16	8	16	20	50	40	20	08	2	3																																																																																																							
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ii)	Explain simple image model. How sampling and quantization is applied to obtain digital image.	08	1	2																																																																																																																									
iii)	Discuss block matching algorithm used in motion estimation	08	5	2																																																																																																																									
Q.4	Solve any two questions out of three.	16																																																																																																																											
i)	Apply the dilation and erosion on the image using the given structuring element <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> <table border="1" style="display: inline-table; vertical-align: middle; margin-left: 20px;"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table>																																																																																																																										08	4	3
ii)	Explain the edge based image segmentation with example.	08	4	2																																																																																																																									
iii)	.Explain Inter pixel redundancy with an example.	08	3	2																																																																																																																									
