

Nov-Dec 2023

Program: B.Tech Scheme:II (Information Technology)

Examination: LY Semester: VII

Course Code: ITDLC7043 and Course Name: Computer Vision

Date of Exam: December 10, 2023

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.

Ques. No.	Question	Max. Marks	CO	BT Level																									
Q 1.	Solve any six questions out of eight:	12																											
i)	Explain the term Texture Analysis.	2	CO1	U																									
ii)	Discuss the size filtering with respect to shapes and regions.	2	CO2	U																									
iii)	Describe Boundary Descriptors.	2	CO2	U																									
iv)	Explain Generalized Hough Transform (GHT) Method with regards to Computer Vision.	2	CO3	U																									
v)	Discuss the concept of Photometric Stereo.	2	CO4	U																									
vi)	List various steps in SIFT algorithm regarding 3D Reconstruction.	2	CO4	U																									
vii)	State the term Bundle adjustment method in motion.	2	CO5	U																									
viii)	Summarize some of the methods used in Road sign identification.	2	CO6	U																									
Q 2.	Solve any four questions out of six.	16																											
i)	Discuss the Texture and Co-Occurance Matrics with respect to the following image. Shaw all the intermediate steps. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>3</td><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>2</td><td>2</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>2</td><td>1</td></tr> <tr><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>3</td><td>1</td></tr> </table>	3	1	1	0	1	0	1	2	2	1	1	0	1	2	1	3	1	3	1	3	0	1	1	3	1	4	CO1	U
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ii)	Compare and Contrast Boundary Descriptors, Fourier Descriptors and Region Descriptors.	4	CO2	AN																									

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

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iii)	Using a polar representation, explain the main concept of the Hough transform for line detection. Draw several lines in the image space and sketch the corresponding Hough transforms in the parameter space. Label all important points, lines, and axes.	4	CO3	A																																																																
iv)	Explain the methods for 3D vision and hence explain Photometric Stereo method in brief.	4	CO4	U																																																																
v)	Describe two approaches that increase optical flow computation robustness when the optical flow assumptions are not valid.	4	CO5	U																																																																
vi)	Discuss an application of computer vision that can be applied to Human Tracking and Image and Video Occlusion.	4	CO6	U																																																																
Q 3.	Solve any two questions out of three.	16																																																																		
i)	Explain the mathematical model used in Harris corner point and Interest point detection and provide the algorithm citation for it.	8	CO1	U																																																																
ii)	Test Connected Component Analysis for the following binary image. Use the two-scan labeling algorithm and represent the result after each scan by using letters (A, B, C...) as labels. Assume 4-Connectivity and 8-Connectivity.	8	CO2	AN																																																																
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iii)	Apply the Hough Transform technique for the given input Image to form the main edges: A(1,4), B(2,3), C(3,1), D(4,1), E(5,0)	8	CO3	A																																																																
Q 4.	Solve any two questions out of three.	16																																																																		
i)	Briefly describe the principle of shape from Shading and Shape from Texture along with discuss how they can be of practical use, and give some examples.	8	CO4	U																																																																
ii)	Explain the Spline-Based Motion algorithm with respect to Computer Vision real life application for medical image registration in detail.	8	CO5	U																																																																
iii)	Describe the term "Face Recognition" a real-world application of computer vision in brief.	8	CO6	U																																																																
