R20

Code No: R20A7305

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech I Semester Supplementary Examinations, April 2025

Computer Vision

(B.Tech-AIDS & B.Tech-AIML)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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			BCLL	CO(s)	Marks
		SECTION-I			
1	***A***	Explain the role of shading models (such as Phong and Lambertian shading) in inferring surface properties.	**L2**	**CO-I**	**[7M]**
	B	Discuss the role of color models (such as RGB, HSV, and CIELAB) in digital imaging and how they relate to human perception.	**L2**	**CO-I**	**[7M]**
		OR			
2	***A***	Compare linear and non-linear calibration approaches, discussing their methodologies, advantages, and limitations.	**L2**	**CO-I**	**[7M]**
	B	Explain specific examples of technologies that rely on geometric camera calibration and modeling for success.	**L2**	**CO-I**	**[7M]**
		SECTION-II			
3	***A***	Discuss how the Fourier Transform decomposes an image into its frequency components and the implications for filtering and image compression	**L2**	**CO-II**	**[7M]**
	B	Explain the concept of local texture representations and the role of filters in capturing texture information in images.	**L2**	**CO-II**	**[7M]**
		OR			
4	***A***	Analyze the applications of correlation in feature detection and template matching. Provide examples of practical applications where template matching is used effectively.	**L4**	**CO-II**	**[7M]**
	B	Describe the principles behind the shape-from-texture technique and how it utilizes texture gradients to infer 3D shape information from 2D images.	**L3**	**CO-II**	**[7M]**
		SECTION-III			
5	***A***	Discuss the fundamental principles of basic clustering methods used for image segmentation.	**L2**	**CO-III**	**[7M]**
	B	Explain the challenges associated with accurately modeling curves in images and the importance of these techniques in applications such as shape recognition and object tracking.	**L2**	**CO-III**	**[7M]**
		OR			
6	***A***	Discuss the impact of selecting the number of clusters (K) on segmentation results and explore strategies to determine the optimal K.	**L2**	**CO-III**	**[7M]**

	B	Analyze the fitting lines with Hough transform.	**L4**	**CO-III**	**[7M]**
		SECTION-IV			
7	***A***	List the key differences between registration techniques for rigid and deformable objects.	**L2**	**CO-IV**	**[6M]**
	B	Explain the methodologies behind object matching using interpretation trees and spin images. How do these techniques improve the robustness and accuracy of object recognition systems?	**L2**	**CO-IV**	**[8M]**
		OR			
8	***A***	What are the practical implications of Koenderink's Theorem in computer graphics and visual perception? Explain	**L2**	**CO-IV**	**[7M]**
	B	Discuss different approaches to minimize error and loss, including data augmentation and advanced training techniques.	**L2**	**CO-IV**	**[7M]**
		SECTION-V			
9	***A***	What are the challenges associated with face detection in different environments (e.g., varying lighting, occlusions)? Discuss the importance of accuracy and speed in real-time applications.	**L2**	**CO-V**	**[7M]**
	B	Discuss the detection of objects in images with algorithm The sliding window method.	**L2**	**CO-V**	**[7M]**
		OR			
10	***A***	Explain the methodologies for detecting humans in images, including background subtraction, pose estimation, and advanced deep learning models.	**L2**	**CO-V**	**[7M]**
	B	Describe the role of feature extraction and representation in enhancing recognition performance. Include real-world applications where accurate categorization is crucial.	**L3**	**CO-V**	**[7M]**

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