U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**

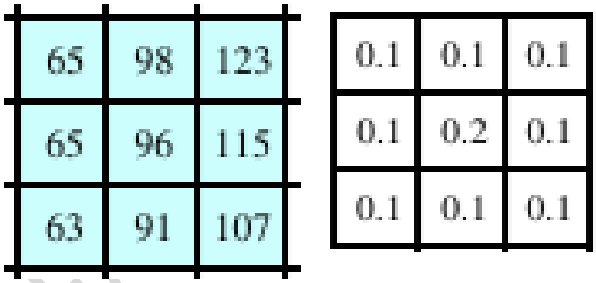
Branch: Electronics and Instrumentation Engineering **Duration: 3 hrs.**

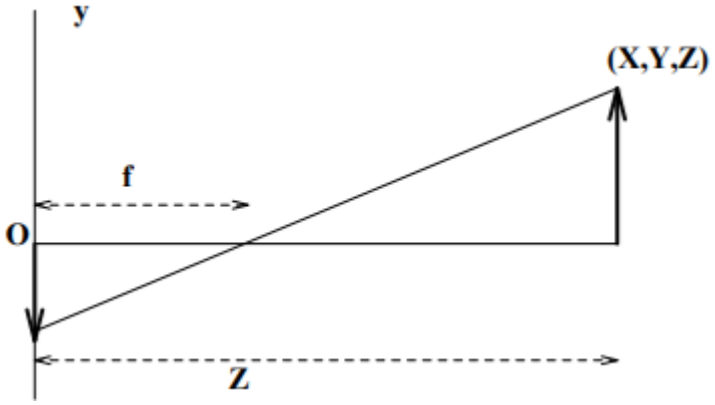
Course Code: 22EI7PE3CV **Max Marks: 100**

Course: Computer Vision

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		MODULE - I	*CO*	*PO*	Marks
1	a)	What are the three transformations that an object can go through when dealing with object identification in computer vision? Discuss in detail.	*CO1*	*PO1*	**06**
	b)	 Fig(1.a) Fig(1.b) Figure (1.a) and Figure (1.b) indicate a small segment of an image matrix and 2D mask respectively. Perform the operation of both convolution and correlation on these two matrices and indicate the difference between the two.	*CO1*	*PO1*	**06**
	c)	What do you mean by noise removal in image enhancement, and why is it important? What are the methods for noise reduction? Explain.	-		**08**
		OR			

	2	a)	 Show that the Perspective transform which relates the world coordinate system with camera coordinate system can represent 2D image in terms of typical camera parameters, as shown in the above figure	-		**06**
		b)	What are the different filtering techniques that can differentiate noise cancellation in image. Discuss	*CO1*	*PO1*	**06**
		c)	What are Affine Transforms? How is it useful in computer vision.Explain in detail.	*CO1*	*PO1*	**08**
			MODULE - II			
	3	a)	What are the three stages of image processing in Edge detection? Elaborate on Gradient direction and magnitude with respect to edge detection.	*CO2*	*PO1*	**10**
		b)	Compare the Scale Invariant Feature Transform (SIFT) with SURF (Speeded-Up Robust Features) algorithm and thereby discuss the application of these algorithm in feature extraction	*CO2*	*PO2*	**10**
			OR			
	4	a)	Discuss the Canny's Edge detection algorithm in detail and highlight the superiority of this algorithm with other edge detection algorithms.	*CO2*	*PO2*	**10**
		b)	What do you mean by Hough Transform? How can it be used in extracting visual information among consecutive images? Discuss.	*CO2*	*PO2*	**10**
			MODULE - III			
	5	a)	How does multiresolution images help in extracting vision information? Discuss.	*CO2*	*PO2*	**07**
		b)	Differentiate Edge based object detection from image segmentation	*CO2*	*PO2*	**05**
		c)	List different segmentation techniques for object identification. Discuss Connected component algorithm in detail.	*CO2*	*PO2*	**08**
			OR			

	6	a)	Explain Split-Merge technique for image segmentation towards object detection	*CO2*	*PO2*	**07**
		b)	How are Graph Cuts and Energy based segmentation methods used in image segmentation? Explain	*CO2*	*PO2*	**07**
		c)	Explain the procedure of boundary tracking in images. Discuss the key steps involved, including edge detection, thresholding, boundary tracing, and boundary representation.	*CO2*	*PO2*	**06**
			MODULE- IV			
	7	a)	How do you estimate the motion using multiple frames? Show that features can be used to know the motion of an object or multiple objects in a video.	*CO3*	*PO2*	**10**
		b)	With relevant mathematical model explain in detail the optical flow detection using Lucas Kanade algorithm. Discuss its applications.	*CO3*	*PO2*	**10**
			OR			
	8	a)	What are the limitations of Background subtraction method in frame differencing technique to estimate the motion? Explain. What alternate solution can be used to overcome these limitations? Discuss	*CO3*	*PO2*	**10**
		b)	Differentiate Sum of Absolute Difference (SAD) technique different from correlation technique, while estimating the frame alignment? Discuss in detail.	*CO3*	*PO2*	**10**
			MODULE - V			
	9	a)	Explain the concept of computational photography and how it differs from traditional photography? Discuss.	*CO3*	*PO2*	**10**
		b)	What is Content-Based Video Retrieval (CBVR), and how does it extend the principles of CBIR to video data?Discuss	*CO3*	*PO2*	**10**
			OR			
	10	a)	What do you mean by image stitching? How are the models developed ?Explain different applications of computer vision using image stitching .	*CO3*	*PO2*	**10**
		b)	Define activity recognition in computer vision. Discuss how machine learning models can be used to classify and recognize human activities in videos.	*CO3*	*PO2*	**10**

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