Question Paper Code | **13611**

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025
Fifth Semester

Artificial Intelligence and Data Science
20AIPC501 - COMPUTER VISION
Regulations - 2020

Duration: 3 Hours   Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)
Answer ALL Questions

		Marks	K-Level	CO
1.	Which component plays a key role in focusing light in imaging systems? (a) Sensor (b) Processor (c) Lens (d) Filter	1	K1	CO1
2.	What is the function of mathematical morphology in image processing? (a) Noise addition (b) Structural analysis of shapes (c) Image segmentation based on color (d) Contrast enhancement	1	K1	CO1
3.	Which transformation preserves both lengths and angles in an image? (a) Affine transformation (b) Orthogonal transformation (c) Projective transformation (d) Fourier transformation	1	K1	CO2
4.	What does edge detection primarily identify in an image? (a) Intensity regions (b) Object boundaries (c) Noise patterns (d) Color distributions	1	K1	CO2
5.	Which edge detection technique uses Gaussian smoothing to reduce noise before detecting edges? (a) Harris detector (b) Canny edge detector (c) Hough Transform (d) SURF	1	K1	CO3
6.	What does the Hough Transform detect in an image? (a) Curves and corners (b) Lines and shapes (c) Blobs (d) Intensity variations	1	K1	CO3
7.	Which segmentation technique works by merging neighboring pixels with similar properties? (a) Edge detection (b) Region growing (c) Graph-cut (d) Spline-based motion	1	K1	CO4
8.	What does Mean-Shift clustering aim to achieve in image segmentation? (a) Detect sharp edges (b) Identify moving objects (c) Locate dense regions in feature space (d) Reconstruct 3D models	1	K1	CO4
9.	Which clustering method minimizes the sum of squared distances between points and their cluster center? (a) K-Medoids (b) K-Means (c) Mixture of Gaussians (d) PCA	1	K1	CO5
10.	Which method is commonly used for locating human iris patterns? (a) K-Means clustering (b) Spatial matched filtering (c) Fourier transform (d) Gaussian smoothing	1	K1	CO6

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K-Level	CO
11.	What is the significance of image formation in computer vision?	2	K1	CO1
12.	Define mathematical morphology and its importance in binary image analysis.	2	K1	CO1
13.	What is the difference between Euclidean and Affine transformations?	2	K1	CO2
14.	Explain the role of Fourier Transform in image processing.	2	K2	CO2
15.	What is the purpose of the Harris corner detector?	2	K1	CO3
16.	Explain the role of image pyramids in feature extraction.	2	K2	CO3
17.	What is the purpose of parametric motion models in motion analysis?	2	K1	CO4
18.	How does texture segmentation differ from edge-based segmentation?	2	K2	CO4

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **13611**

19.	Explain the concept of semi-supervised learning.	2	K2	CO5
20.	List out the different filters used in Image Segmentation.	2	K1	CO5
21.	Define the term "Clustering" in terms of visual entity.	2	K1	CO6
22.	What is the role of spatial matched filtering in iris location?	2	K1	CO6

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Explain the role of pre-processing in computer vision systems.	11	K2	CO1
		OR			
	b)	Describe the key components of a computer imaging system.	11	K2	CO1
24.	a)	Describe the importance of edge detection and its performance metrics.	11	K2	CO2
		OR			
	b)	Explain how convolution and filtering improve image quality.	11	K2	CO2
25.	a)	Describe the HOG (Histogram of Oriented Gradients) and its application.	11	K2	CO3
		OR			
	b)	Explain the significance of Gabor filters and DWT in feature extraction.	11	K2	CO3
26.	a)	Explain hill climbing using Mean-Shift algorithm in detail.	11	K2	CO4
		OR			
	b)	Describe the importance of motion analysis and spline-based motion.	11	K2	CO4
27.	a)	Discuss about the advantages of ANN models over traditional classifiers.	11	K2	CO5
		OR			
	b)	Describe the difference between PCA and LDA in dimensionality reduction.	11	K2	CO5
28.	a)	Explain the role of 3D reconstruction in computer vision.	11	K2	CO6
		OR			
	b)	Describe the importance of space analysis in computer vision.	11	K2	CO6