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Term End Examination 2024-2025
Programme – B.Tech.(CSE)-AIML-2022
Course Name – Computer Vision
Course Code - PEC-CSM602A
(Semester VI)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select criterion that is NOT a commonly used in Region Growing techniques.
a) Pixel intensity similarity b) Texture uniformity
c) Frequency domain filtering d) Color similarity

(ii) Select edge detection method is known for using double thresholding and edge tracking by hysteresis.
a) Sobel b) Prewitt
c) Roberts d) Canny

(iii) Select major drawback of edge-based segmentation techniques.
a) They require high memory b) They may produce broken or incomplete boundaries
c) They cannot detect texture d) They are insensitive to noise

(iv) Select correct option:Linear Discriminant Analysis (LDA) is different from PCA because it:
a) Ignores class labels b) Is used only for clustering
c) Maximizes class separability d) Uses nonlinear mapping

(v) Choose correct option:Background subtraction is primarily used to:
a) Enhance brightness b) Identify moving objects in a video sequence
c) Segment textures d) Filter noise in images

(vi) Choose the commonly used method for background modeling.
a) Gaussian Mixture Models (GMM) b) PCA
c) Canny Edge Detector d) K-Means Clustering

(vii) Identify from the following the primary goal of computer vision?
a) To develop algorithms for image generation b) To understand and interpret visual information from the world
c) To create 3D images from 2D data d) To replace human vision completely

(viii) Deep learning-based methods in computer vision are mainly used for:

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a) Image classification
b) Feature extraction
c) Object detection and segmentation
d) All of the above

(ix) Identify from following that is not a challenge in computer vision?
a) Illumination variations
b) High-level scene interpretation
c) Real-time processing
d) Mathematical modeling of human brain structure

(x) Relate the method that is primarily used for depth estimation in the stereo vision setup?
a) Canny edge detection
b) Epipolar geometry
c) Histogram equalization
d) Fourier transform

(xi) In a multi-camera setup, the depth of a point in the scene can be estimated using:
a) Only the left camera image
b) The disparity between images from two cameras
c) The color difference between images
d) A single image

(xii) The key concept of epipolar geometry is:
a) It defines the relation between corresponding points in two images
b) It applies to monocular vision only
c) It helps in color enhancement of images
d) It is used to detect edges in images

(xiii) The main idea behind using Gaussian derivative filters in image analysis is to:
a) Detect high-frequency components
b) Find edges at different scales
c) Compress the image
d) Remove noise from the image

(xiv) Classify from following that is used in scale-space analysis to represent images at multiple resolutions?
a) Gaussian pyramids
b) Canny edge detector
c) Harris corner detector
d) Fourier Transform

(xv) Infer from following that is a common use case for HOG (Histogram of Oriented Gradients)?
a) Edge detection
b) Pedestrian detection in images
c) Corner detection
d) Image compression

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Describe the working of convolution in image processing? (3)
3. Determine the key components of epipolar geometry? (3)
4. Indicate the Histogram of Oriented Gradients (HOG) used for? (3)
5. Explain the Region Growing technique used in image segmentation. (3)
6. Explain Linear Discriminant Analysis (LDA). (3)

OR

Explain Mixture of Gaussians (MoG) model in clustering. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Illustrate the common Edge Detection Techniques (5)
8. Evaluate different background modeling techniques. (5)
9. Illustrate the role of image segmentation in low-level processing? Describe some popular segmentation techniques. (5)
10. Illustrate the reason for the importance of depth estimation in multi-camera systems? (5)
11. Discuss the concept of image analysis, and how is it used in computer vision? (5)
12. Explain various clustering techniques used in pattern analysis. (5)

OR

Differentiate between supervised, unsupervised, and semi-supervised learning with examples. (5)

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