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1701E1181

Candidate's Seat No :_____

MSc AIML (Rep) Sem.-2 Examination

Computer Vision

Time : 3-00 Hours] **January-2025** **[Max. Marks : 100**

SECTION I

Q1.(a) Define the following (ANY SIX): [09]

i. Image
ii. Quantisation
iii. Spatial resolution
iv. Segmentation
v. Local features
vi. Histogram
vii. Structural element
viii. Gradient

Q1.(b) Explain: [09]

i. Image negation
ii. Power law transformation
iii. Gamma Transformation

Q2.(a) Explain image smoothing. Write effects and convolution masks for following filters: [08]

i. Mean
ii. Weighted mean
iii. Median
iv. Max
v. Min

Q2(b) Explain histogram of image. What is its interpretation. How does histogram equalisation enhances an image? [08]

OR

Q2. Explain edge detection. Write effects and convolution masks for following filters: [08]

i. Robert
ii. Prewitt
iii. Sobel
iv. Canny

Q2. What are different types of arithmetic and logical operations that can b performed on images. Give applications [08]

(P.T.O)

Q3. Define segmentation. Explain **any four** with examples: [16]

i. Region based and boundary based segmentation
ii. Region based and boundary based approach
iii. Structural and stochastic segmentation
iv. Simple and adaptive thresholding
v. Region growing and region splitting and merging

OR

Q3. [16]

What are local features? Give advantage of local features over global features. List some important local feature extraction algorithms. What are feature detectors and feature descriptors?

SECTION II

Q4.(a) [18]

Define morphological image processing. Explain using the following:

i. Structuring element
ii. Types with examples of structuring elements
iii. Hits and fits

Give difference between dilation and erosion . What effects do they have on image? For the given image and structuring element S, find the erosion and dilation image

0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	1	0
0	0	1	1	1	0	0	0	0	0	0	0
0	0	0	1	1	1	0	0	0	0	0	0
0	0	1	1	1	1	1	0	0	0	0	0
0	0	0	1	0	1	1	1	1	0	0	0
0	0	1	1	1	1	1	1	1	0	0	0
0	0	1	1	1	1	1	0	0	0	0	0
0	0	1	1	1	1	1	0	0	0	0	0
0	0	1	0	1	1	1	0	0	0	0	0
0	0	0	0	0	0	1	1	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

1	1	1
1	1	1
1	1	1

Q5. Explain simple , adaptive and global thrasholding [16]

OR

Q5. Expalin computer vision system and list down applications of vision in different bands [16]

Q6. How k-means clustering can be used for image segmentation? What is advantage of using bitplane slicing? [16]

OR

Q6. Explain image transformations. Write the 3-D matrices and effects of rotation, translation, scaling and perspective transformation. [16]