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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

(Dundigal-500043, Hyderabad)

B.Tech V SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2022

Regulation:UG20

IMAGE PROCESSING

Time: 3 Hours

(Common to CSE | CSIT)

Max Marks: 70

Answer ALL questions in Module I and II

Answer ONE out of two questions in Modules III, IV and V

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

MODULE – I

- (a) Explain the phenomena of zooming and shrinking and illustrate how it affects the resolution of an image? [BL: Understand| CO: 1|Marks: 7]
- (b) Summarize in detail the fundamental steps involved in digital image processing. List out applications of digital image processing in various fields. [BL: Understand| CO: 1|Marks: 7]

MODULE – II

- (a) Demonstrate the process of smoothing and sharpening filtering process in the spatial domain. [BL: Understand| CO: 2|Marks: 7]
- (b) State and prove convolution and correlation properties of 2D-Fourier transform. Illustrate various point processing techniques with a neat sketch. [BL: Understand| CO: 2|Marks: 7]

MODULE – III

- (a) Discuss about alpha trimmed mean filtering process and demonstrate how it reduces to median filtering? [BL: Understand| CO: 3|Marks: 7]
- (b) Classify the types of mean filters with relevant expressions. Compare constrained least square filtering and weiner filtering process. [BL: Understand| CO: 3|Marks: 7]
- (a) How a degradation process is modeled? Outline the design of linear position invariant degradation system. [BL: Understand| CO: 4|Marks: 7]
- (b) Determine the expression for transfer function of regional descriptors approach for image restoration. [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

- (a) List the types of noises in color image processing. Describe the process of pseudo color image processing with a real-time application. [BL: Understand| CO: 5|Marks: 7]
- (b) Identify how the derivatives are obtained in color transformations? Explain wavelet processing in 2-D form with respect to images. [BL: Apply| CO: 5|Marks: 7]

6. (a) What is meant by compression ratio? Describe image compression model with a neat sketch.
[BL: Understand| CO: 5|Marks: 7]
- (b) Obtain Huffman coding for the source symbols $S=\{S_0, S_1, S_2, S_3, S_4\}$ and the corresponding probabilities $P= \{0.4, 0.2, 0.2, 0.1, 0.1\}$.
[BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) Outline the features of morphological algorithms. Explain dilation and erosion in morphological processing using different kernels.
[BL: Understand| CO: 6|Marks: 7]
- (b) What is the importance of detecting discontinuities in an image? Discuss image segmentation based on various thresholding techniques.
[BL: Understand| CO: 6|Marks: 7]
8. (a) List the steps involved in region-based segmentation. Demonstrate the process of hit-or-miss transformation with an example.
[BL: Understand| CO: 6|Marks: 7]
- (b) Summarize the performance of edge detection method with suitable algorithm discuss how the edge points are linked.
[BL: Understand| CO: 6|Marks: 7]

