

6E1551

Total No. of Questions : 14

Total No. of Pages : 04

Roll No. :

6E1551

B.Tech. VI-Sem. (Back) Exam. - 2024

Computer Science. & Engineering

6CS3-01/Digital Image Processing

CS, IT,

Time : 2 Hours

Maximum Marks : 80

Instructions to Candidates :

Attempt all five questions from Part-A, four questions out of six questions from Part-B and two questions out of three questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (As mentioned in Form No. 205)

ersahilkagyan.com

1.

2.

PART-A

[5×2=10]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. Explain the effect of setting to zero the half of lower order bit planes have on the histogram of an image in general.

- Q.2. What is the role of Fourier transform in the context of image processing?
- Q.3. How is salt and pepper noise different from Gaussian noise?
- Q.4. State the conditions for Region Splitting and Merging Processes.
- Q.5. What are the performance metrics for evaluating image compression?

PART-B

[4x10=40]

(Analytical/Problem solving questions)

Attempt any five questions

- Q.1. Explain what you would expect the result of Sampling and Quantization operations on image.

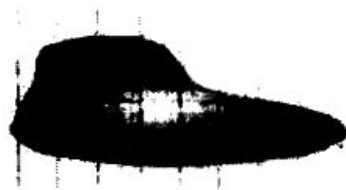


Fig.1

- Q.2. Consider a 1-D image $f(x) = [10 \ 10 \ 10 \ 10 \ 40 \ 40 \ 40 \ 20 \ 20]$. Calculate the first and second order derivatives. Locate the respective edge positions.
- Q.3. Explain HIS color model with an appropriate figure. Explain the conversion procedure from RGB color space to HSI color space.
- Q.4. Explain the image restoration technique to remove the blur caused by uniform linear motion.
- Q.5. What are the derivative operators useful in image segmentation? Explain their role in segmentation.
- Q.6. Explain any two boundary representation schemes and illustrate with example.

PART-C

[3x10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1. Consider the image shown in Fig. 2. Explain what you would expect the result to be in each of the following four filtering operations :

- (a) Horizontal gradient operation
- (b) Vertical gradient operation
- (c) Horizontal Sobel operator
- (d) Vertical Sobel operator

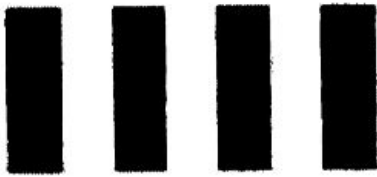


Fig.2

Q.2. Explain the following terms with examples :

- (a) Lookup Table
- (b) Additive Vs. Subtractive color system
- (c) Hue and Saturation
- (d) Hue-Max-Min-Diff (HMMD) color space

Q.3. A source emits three symbols A, B, C with a probability (0.50, 0.25, 0.25) respectively. Construct an Arithmetic code to encode the word 'CAB'.

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