

Total No. of printed pages = 3

CSE 1816PE31

19/6/23

Roll No. of candidate

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2023

Azara, Haikhowapara
Guwahati - 781017

B.Tech. 6th Semester End-Term Examination

Computer Science and Engineering

IMAGE PROCESSING

(New Regulation (w.e.f. 2017 - 18) & New Syllabus (w.e.f. 2018-19))

Full Marks - 70

Time - Three hours

The figures in the margin indicate full marks
for the questions.

Answer question No. 1 and any *four* from the rest.

1. Answer the following questions : (10 × 1 = 10)
- (i) Which of the following process helps in image enhancement?
- (a) Digital Image Processing
 - (b) Analog Image Processing
 - (c) Both (a) and (b)
 - (d) None of above
- (ii) Which of the following is an example of digital image processing?
- (a) Computer graphics
 - (b) Pixels
 - (c) Camera mechanism
 - (d) All of above
- (iii) How does picture formation in eye vary from image formation in camera?
- (a) Fixed focal length
 - (b) Varying distance between lens and imaging
 - (c) No difference
 - (d) Variable focal length

[Turn over

- (iv) Which of the following is the next step in image processing after compression?
- (a) Representation and description
 - (b) Morphological processing
 - (c) Segmentation
 - (d) Wavelets
- (v) _____ determines the quality of a digital image.
- (a) Discrete gray levels
 - (b) The number of samples
 - (c) Discrete gray levels and the number of samples
 - (d) Wavelets
- (vi) Which of the following tool is used in tasks such as zooming, shrinking, rotating, etc?
- (a) Filters
 - (b) Sampling
 - (c) Interpolation
 - (d) None of above
- (vii) Region of Interest (ROI) operations is generally known as _____.
- (a) Masking
 - (b) Dilation
 - (c) Shading correction
 - (d) None of above
- (viii) _____ is the principal objective of sharpening, to highlight transitions.
- (a) Brightness
 - (b) Pixel density
 - (c) Composure
 - (d) Intensity
- (ix) Which gray level transformation increases the dynamic range of gray level in image?
- (a) Negative transformation
 - (b) Contrast stretching
 - (c) Power law transformation
 - (d) None of above
- (x) A basic image is represented in
- (a) 1 D
 - (b) 2 D
 - (c) 3 D
 - (d) 4 D

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2. (a) Explain the fundamental steps in digital image processing which can be applied to images. (8)
- (b) Explain the image negative transformation with a suitable example. (7)
3. (a) Perform histogram equalization on the following 8×8 image. The gray level distribution of the image is given below : (8)

Gray level	0	1	2	3	4	5	6	7
No. of pixels	8	10	10	2	12	16	4	2

- (b) Apply contrast stretching on the following image: (7)

Grey level	0	1	2	3	4	5	6	7
No. of pixels	0	0	50	60	50	20	10	0

4. (a) Perform Huffmann coding for given seven letters whose probabilities are given : (8)

A	0.154
B	0.110
C	0.072
D	0.063
E	0.059
F	0.015
G	0.011

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- (b) Explain two morphological operations with examples of your own. What do you mean by opening and closing of an image? Give examples. (4+3=7)
5. (a) Justify the statement "Median filter is an effective tool to minimize salt and pepper noise through simple illustration. (8)
- (b) Draw the flow chart and algorithm to generate Haar basis. (7)
6. (a) Explain what is frequency domain in image processing. Discuss the steps involved in frequency domain enhancement. (8)
- (b) Explain with a suitable example, Arithmetic coding technique. (7)
7. Write short notes on (any *three*): (3 × 5 =15)
- (a) Image morphing
- (b) Adaptive filters
- (c) Perspective projection
- (d) Point operations.