Total No. of Questions : 12] [Total No. of Pages : 3

P1101

[3864] - 405

B.E. (Computer)

IMAGE PROCESSING

(2003 Course) (Elective - I) (410445)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Attempt Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 from section I and Q. 7 or Q. 8, Q. 9 or Q. 10, Q. 11 or Q. 12 from section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What is the use of orthogonal transform in Image processing? Define a 2-D Haar transform pair and represent Haar matrix of order 8. **[8]**

b) With block diagram, explain in brief different stages of Image processing and analysis scheme. **[8]**

OR

Q2) a) Define 2-D DCT transform. How it can be used in processing images? Explain the algorithmic steps for DCT implementation. **[8]**

b) How Fuzzy logic is useful in image processing? What is the membership function? Define the basic operations and properties of fuzzy set. **[8]**

Q3) a) Discuss the problem of camera calibration in detail w.r.t. Geometric model of image formation. **[8]**

b) How digital image is represented? What is the Quantization process in image digitization? What are the problems associated with sampling and Quantization? **[8]**

OR

P.T.O.

Q4) a) What is the use of photometric model? Explain the term intensity and differentiate between an image intensity and scene intensity. **[8]**

b) With respect to digital image define: **[8]**

i) Distance function. ii) City - block distance.

iii) A frame F. iv) Boundary pixel.

Q5) a) How restoration technique can be defined? Write an algorithm for least square estimation method using single noise correlation criterion. **[9]**

b) With suitable example, discuss linear and non -linear histogram stretching method for improving contrast. **[9]**

OR

Q6) a) What is ordered statistic filter? Discuss the use of median and min - max filter in image enhancement. **[9]**

b) With algorithm discuss Huffman coding scheme used for image compression. What is entropy coding? **[9]**

SECTION - II

Q7) a) How histogram is used for image segmentation? Discuss two algorithms based on threshold selection using histogram. **[10]**

b) What is the use of component labelling algorithm in image feature extraction? Discuss the algorithm in brief. **[8]**

OR

Q8) a) What is the use of derivative operators in edge detection? Discuss the criteria considered by Canny for localizing edges. Write the algorithmic steps for Canny edge detection. **[10]**

b) Explain with algorithm, fuzzy C-means clustering for pattern recognition. **[8]**

Q9) a) Explain the following morphological transforms: **[8]**

i) Dialation ii) Crosion.

b) What is pseudo - colour processing? With mapping functions, discuss a simple scheme for pseudo colouring. **[8]**

OR

Q10) a) State different colour spaces used for colour representation. Discuss briefly the colour interpolation. **[8]**

b) How an image is described by means of a skeleton? Discuss one such algorithm in brief. **[8]**

Q11) Explain in detail any two image enhancement and feature extraction techniques used in medical image processing with specific applications. **[16]**

OR

Q12) Discuss in detail the use of Image Processing in multimedia applications w.r.t. following processing stages. **[16]**

a) Pre-processing.

b) Feature extraction.

c) Recognition.

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