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15TE655

Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Image Processing

Time: 3 hrs.

Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a. With neat block diagram, elaborate the fundamental steps involved in digital image processing. **(08 Marks)**

   b. With neat block diagram, describe the components of an image processing system. **(06 Marks)**

   c. How do you define :
i) Digital image ii) Digital image processing iii) Pticure element iv) Gray level. **(02 Marks)**

OR

2   a. Discuss image sampling and quatization in image processing system. **(08 Marks)**

   b. Consider the image segment shown in below :
i) For $v\{0, 1\}$ compute the lengths of shortest 4, 8 and m-path between p and q.
ii) Repeat for $v = \{1, 2\}$.

$$\begin{array}{cccc} 3 & 1 & 2 & 1 \ (q) \\ 2 & 2 & 0 & 2 \\ 1 & 2 & 1 & 1 \\ (p) \ 1 & 0 & 1 & 2 \end{array}$$

Fig.Q2(b) **(06 Marks)**

   c. Write a plot of weber ratio as a function of intensity and highlight its relevance. **(02 Marks)**

Module-2

3   a. With neat graph and equations explain the contrast stretching and bit plane slicing method of image enhancement. **(08 Marks)**

   b. For the given 4 × 4 image having gray levels between [0, 9], get the histogram equalized image and draw the histogram of image before and after equalization.

2	3	3	2
4	2	4	3
3	2	3	5
2	4	2	4

Fig.Q3(b) **(08 Marks)**

OR

4   a. Discuss the order statistics filters with their advantages. **(08 Marks)**

   b. Using second order derivative, develop a Laplacian mark for image sharpening. **(08 Marks)**

Module-3

5   a. Discuss any four properties of 2D – DFT. **(08 Marks)**

   b. Give any four noise pdf commonly dealt with image restoration process. **(08 Marks)**

OR

6 a. With a block diagram, explain the image degradation and restoration model. (06 Marks)
  b. Discuss the homomorphic filtering approach for image enhancement. (06 Marks)
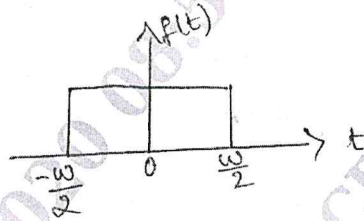 c. Find the Fourier transform of the function in fig.Q6(c) below. (04 Marks)

Fig.6(c)

Module-4

7 a. Discuss image restoration process using inverse filtering approach and its limitations. (06 Marks)
  b. Explain the opening and closing operation in morphological image processing with an example. (06 Marks)
  c. With an example discuss the boundary extraction in morphological image processing. (04 Marks)

OR

8 a. With relevant equations explain the three approaches to estimate the degradiation function in image restoration. (08 Marks)
  b. Explain Hit-or-Miss transformation in morphological image processing. (08 Marks)

Module-5

9 a. Discuss about region splitting and merging for image segmentation. (08 Marks)
  b. With relevant equations elaborate otsu's algorithm for global thresholding in image segmentation. (08 Marks)

OR

10 a. Explain about boundary following method of image representation. (08 Marks)
   b. Explain polygonal approximation using Minimum Perimeter Polygons (MPP). (08 Marks)

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