Reg. No. :

Question Paper Code: 99806

B.E./B.Tech. DEGREE EXAMINATION, NOV 2022

Elective

Information technology

19UIT906- Fundamentals of Image Processing

(Regulations 2019)

Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART – A (5 x 20= 100Marks)

1. (a) Do the following: Give a continuous function for implementing the   CO2-App   (20)
        contrast stretching transformation the equation. In addition to m,
        your function must include a parameter, E, for controlling the slope
        of the function as it transitions from low to high intensity values.
        Your function should be normalized so that its minimum and
        maximum values are 0 and 1,respectively

                                        Or

    (b) You are given a computer chip that is capable of performing linear   CO3-Ana   (20)
        filtering in real time, but you are not told whether the chip performs
        correlation or convolution. Give the details of a test you would
        perform to determine which of the two operations the chip
        performs.

2. (a) The following 8 –bit images are (left to right) the H, S and I   CO3-Ana   (20)
        Component images. The numbers indicate gray-level values.
        Answer the following questions, explaining the basis for your
        answer in each. If it is not possible to answer a question based on
        the given information, state why you cannot do so
        a.Give the gray-level values of all regions in the hue image
        b. Give the gray level value of all regions in the saturation image
        c.Give the gray level values of all regions in the intensity image

                                        Or

    (b) What is meant by the Gradient and the Laplacian? Discuss their   CO1-U   (20)
        role in image enhancement

3. (a) Compare the Lossless Compression and Lossy Compression with Real time Applications   CO3-Ana   (20)

Or

(b) Describe in detail about the PCA   CO1-U   (20)

4. (a) Consider a binary image of size 200 200 × pixels, with a vertical black band extending from columns 1 to 99 and a vertical white band extending from columns 100 to 200.   CO2-App   (20)
(a) Obtain the co-occurrence matrix of this image using the position operator "one pixel to the right."
(b) Normalize this matrix so that its elements become probability estimates
(c) Use your matrix from (b) to compute the six descriptors

Or

(b) Describe in detail about the PCA   CO1-U   (20)

5. (a) Three curve types (lake, bay, and line segment) useful for differentiating thinned objects in an image are shown in the following figure. Develop a morphological/logical algorithm for differentiating between these shapes. The input to your algorithm would be one of these three curves. The output must be the type of the input. You may assume that the curves are 1 pixel thick and are fully connected. They can appear in any orientation   CO2- App   (20)

Lake   Bay   Line segment
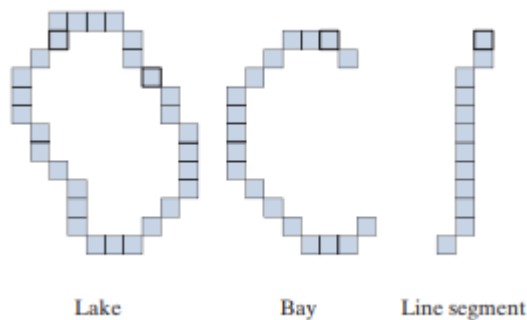
Or

(b) Compare Contour extraction and representation with the Homogenous region extraction and representation   CO3- Ana   (20)

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