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Question Paper Code: 99806

B.E./B.Tech. DEGREE EXAMINATION, MAY 2024

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 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. CO2-App (20)
Or
(b) You are given a computer chip that is capable of performing linear 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. CO3-Ana (20)
2. (a) The following 8 –bit images are (left to right) the H, S and I 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 role in image enhancement. CO1-U (20)

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.”

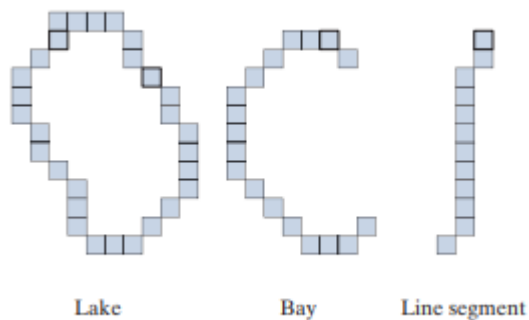
(b) Normalize this matrix so that its elements become probability estimates

(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)



Or

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