2063
M.E. Electronics and Communication Engineering
Second Semester
ECE-1202: Digital Image Processing

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

1. (a) When we enter from bright outdoors to a dark room, it takes some time to adjust the vision to the dark surroundings. Which process of vision is responsible for this phenomenon?

    (b) Describe the role of Iso-preference curves in understanding relationship between level of information in an image and image resolutions?

    (c) Describe the effects of pruning.

    (d) Describe the properties of slant transform in relation to images.

    (e) Describe Photopic and scotopic vision.

    (5×2=10)

Section-A

2. (a) Describe different types of neighborhood relationships between pixels. Discuss adjacency, connectivity, and boundary in an image. (5)

    (b) Describe Image sharpening with the help of Laplacian. Give a 3×3 mask for performing unsharp masking in a single pass through an image. (5)

3. (a) Why does image averaging reduces the noise? Why median operation does reduce the noise? With the help of examples, show that image averaging is a linear operation and median operation is a non-linear operation. (5)

    (b) Describe the steps required to perform filtering in frequency domain. (5)

4. (a) Describe the basis functions in time-frequency plane. Explain the wavelet transform in two dimensions. (5)

    (b) Describe the following: (5)

    (i) Photopic and scotopic vision

    (ii) Wavelet Packets

Section-B

5. (a) Describe the 'HSI' color model and its significance. How can an image be converted from HSI to RGB model. (5)

    (b) Given a four symbol source {a, b, c, d, e} with source probabilities {0.2, 0.2, 0.3, 0.2, 0.1}, arithmetically encode the sequence 'baecd'. (5)

P.T.O.

6. (a) Describe lossy predictive coding and compare its performance with lossless predictive coding. (5)

(b) Describe the following morphological operations for images: convex hull, Thinning and Thickening. (5)

7. (a) Describe why the edges may form closed contours? Does the zero crossing method for finding edge location always result in closed contours? Explain. (5)

(b) Describe the steps to deal with noise present in color images. How are colors of images protected during filtering. (5)

x-x-x