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B.Tech IV Year II Semester (R15) Regular Examinations April 2019

DIGITAL IMAGE PROCESSING

(Electronics & Instrumentation Engineering)

Max. Marks: 70

Time: 3 hours

1

PART – A

(Compulsory Question)

- Answer the following: $(10 \times 02 = 20 \text{ Marks})$
 - List out the various types of adjacency and its significance. (a)
 - (b) Draw the basic sensor arrangement and define how to transform illumination energy into digital images.
 - State the periodicity property of 2-D-DFT. (c)
 - Write any two applications of hotelling transforms. (d)
 - (e) What is histogram? How to equalize the histogram?
 - State any two differences between image smoothing and image sharpening. (f)
 - Mention the disadvantage of inverse filtering. (g)
 - Define edge linking with an example. (h)
 - What is bit plane coding and what are its advantages? (i)
 - List out the various image compression standards. (j)

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Elaborate on sampling and quantization of an image in brief.

OR

3 With suitable example, explain the spatial operations on an image and the geometric spatial transformation of an image.

UNIT – II

4 Prove that both 2-D continuous and discrete Fourier transforms are linear operations.

OR

Consider an image form of size 2 X 2 and find the 2-D DCT of an image and verify the output after 5 inverse DCT.

 $f(m,n) = \begin{cases} 10 & 5\\ 5 & 10 \end{cases}$

UNIT – III

Explain any four spatial operations performed on images for enhancement. 6

OR

7 Elaborate on different histogram techniques used to modify an image with a suitable example.

UNIT – IV

Explain the model of image degradation/restoration process and the restoration process using 8 constrained least square error filter.

OR

With suitable example, elaborate on the threshold based segmentation methods. 9

[UNIT – V]

Consider certain images which are represented as (a, b, c, d, e, f) whose probabilities are {0.1, 0.4, 10 0.06, 0.1, 0.04, 0.3} using Huffman coding. Find its efficiency, redundancy and length of the code.

OR

State the advantages of transform coding and explain with suitable block diagram.

11