C   Reg. No. :

Question Paper Code: 59409

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Elective

Electronics and Communication Engineering

15UEC909 – DIGITAL IMAGE PROCESSING

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5x 1 = 5Marks)

1. Average value of an image f(x,y) is given as_____   CO1- R

   (a) $\frac{1}{N}$ F(1,1)   (b) $\frac{1}{N}$ F(u,v)   (c)) $\frac{1}{N}$ F(0,0)   (d) $\frac{1}{N}$ F(N,N)

2. Salt and pepper noise can be removed by using _____filter   CO2- R

   (a) Mean   (b) Median   (c) Minimum   (d) Maximum

3. High pass filter is also called as _____filter   CO3- R

   (a) Smoothening   (b) Statistical   (c) Sharpening   (d) Averaging

4. _____ is a process in which the binary image is expanded from its original shape   CO4- R

   (a) Dilation   (b) Erosion   (c) Opening   (d) Closing

5. When the threshold value T depends only on the intensity value [f(x, y)] then threshold technique is called _____threshold   CO5- R

   (a) Local   (b) Global   (c) Adaptive   (d) Optimum

PART – B (5 x 3= 15Marks)

6. What is the total number of bits to store a 512×512 image with 256 gray levels?   CO1-U

7. What are the various types of noise models?   CO2- R

8. How to obtain the negative of an image   CO3- R

9. State the different Robert cross gradient mask?   CO4- R

10. What is meant by hit-or-miss transformation?   CO5- R

PART – C (5 x 16= 80Marks)

11. (a) (i) Describe various components of digital image processing system. CO1- U (10)

    (ii) Explain the following (6)
       a) Dithering
       b) Weber ratio
       c) Connectivity between pixels

Or

(b) Compute 2D-DFT for the following image. CO1- App (16)

$$F = \begin{bmatrix} 5 & 3 & 0 & 2 \\ 1 & 7 & 8 & 3 \\ 4 & 2 & 2 & 2 \\ 8 & 5 & 2 & 1 \end{bmatrix}$$

12. (a) Apply 3×3 averaging filter for and median filter the following image with zero padding. CO2- App (16)

$$A = \begin{vmatrix} 7 & 9 & 11 \\ 10 & 50 & 8 \\ 9 & 5 & 6 \end{vmatrix}$$

Or

(b) Describe the filter which controls both HF and LF components of an image. CO2-U (16)

13. (a) Explain Geometric transformation in detail. CO3- U (16)

Or

(b) Design an Least Mean Square filter with $\Upsilon=1$(Weiner filter)and also derive its equation. CO3- App (16)

14. (a) Demonstrate the detection of horizontal, vertical and diagonal edges using derivative filters. CO4- App (16)

Or

(b) Explain region splitting and merging segmentation technique with an example. CO4- U (16)

15. (a) Explain the basic operations of morphological image processing. CO5- U (16)

Or

(b) Define Thresholding and derive the equation for threshold under optimum Thresholding technique. CO5- U (16)

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