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Question Paper Code: 57803

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

Third Semester

Information Technology

15UCS703 - FUNDAMENTALS OF IMAGE PROCESSING

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Image function is _____ CO1- R
(a) $f(x,2)$ (b) $f(x,3)$ (c) $f(x)$ (d) $f(x,y)$
2. If the resolution is decreased too much, the _____ effect can occur. CO2- R
(a) Band (b) Mach (c) Checkerboard (d) Sampling
3. In a dark image, the components of histogram are concentrated on which side of the grey scale? CO3- R
(a) High (b) Low
(c) Medium (d) Evenly distributed
4. In linear spatial filtering, what is the pixel of the image under mask corresponding to the mask coefficient $w(1, -1)$, assuming a 3×3 mask? CO4- R
(a) $f(x + 1, y - 1)$ (b) $f(x, y - 1)$ (c) $f(x + 1, y)$ (d) $f(x, -y)$
5. Which of the following measures are not used to describe a region? CO5 R
(a) Mean and median of gray values (b) Minimum and maximum of gray values
(c) Number of pixels alone (d) Number of pixels above and below mean

PART – B (5 x 3= 15 Marks)

6. Determine the gray levels and storage size (in kb) of 12 bit image of 128x128. CO1- App
7. Mention any four image file formats. CO2- R
8. List the three basic functions used in image enhancement. CO3- R
9. What are the three types of discontinuity in digital image? CO4- U
10. Specify the steps involved in splitting and merging. CO5- U

PART – C (5 x 16= 80Marks)

11. (a) With a neat block diagram, explain the fundamental steps in digital image processing system. CO1- U (16)
Or
(b) Explain the color fundamentals and color models. CO1- U (16)
12. (a) Compute the 2D DFT of the 4x4 gray scale image $f(m,n) = [1\ 1\ 1\ 1; 1\ 1\ 1\ 1; 1\ 1\ 1\ 1; 1\ 1\ 1\ 1]$ and reconstruct using Inverse DFT. CO2- App (16)
Or
(b) Compute the Discrete Cosine Transform matrix for N=4. CO2-App (16)
13. (a) Explain in detail about histogram equalization & specification. CO3- U (16)
Or
(b) What are image sharpening filters? Explain its types in spatial domain. CO3- U (16)
14. (a) Explain the image smoothing filters with their model in the spatial domain. CO4- U (16)
Or
(b) How is line detected? Explain through the operators. CO4- U (16)
15. (a) Define thresholding. Explain its various methods for image segmentation. CO5- U (16)
Or
(b) Explain the watershed segmentation algorithm and its implementation using MATLAB. CO5- App (16)