Digital image processing

Set-1

① Illustrate the mathematical model to represent gray-scale and color image? -2

② Define non-uniform sampling? Explain the effects of sampling and quantization on the quality of digital image? 4

③ ~~Define~~ Differentiate between grayscale and B/W image. Suppose you have a color in which the maximum intensity level of red, Green, BLUE color are 25, 26 and 27. How much memory is required to store the image of size 200 x 200 .- 2.75.

④ Define! brightness, contrast, dynamic range? 3

⑤ Discuss the model of the image degradation and restoration process? - 4

⑥ Illustrate the mathematical model for a grayscale and binary image representation in terms of incident and reflected light intensity? - 1.75

set-2

(7) Illustrate image processing system with block diagram? Explain its two most crucial steps? -4

(8) Why sampling is required? Explain effect of quantization on the quality of digital image? - 3

(9) State the model of grayscale and color image representation? 1.75.

(10) Define digital image? Explain the model for image representation? 3

(11) Define 4-adjacency, 8-adjacency and m-adjacency with example? 3

(12) Explain image digitization process briefly? -2.75

Set-2

① Define histogram and illustrate its applications in image understanding? - 3

② Explain the process of histogram equalization in image enhancement? Differentiate between histogram equalization and histogram specification method for image enhancement? - 3

③ Perform histogram equalization of 5×5 image having the following data - 2.75

Gray level	0	1	2	3	4	5	6	7
No of pixel	0	0	0	8	11	6	0	0

④ How does the histogram of the following image look like? - 2

i) Dark image ii) Bright image iii) low contrast image iv) high contrast image.

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(c) P

(b) What is resolution? Explain spatial resolution and intensity level resolution? - 2

(c) What type of information of image is represented by histogram? Can it be used image recognition? explain - 2.75

(d) Obtain im histogram equalization for the following image segment before and after equalization? 4

4 4 4 4 4

3 4 5 4 3

3 5 5 5 3

3 4 5 4 3

2 4 4 4 4

Set - 3, (b)

(1) How point processing works for image enhancement? 2.75

(2) Why log transform is used in Image enhancement? explain with example? 3

(3) How negative image is obtained? 1

(4) Is it possible to reduce the noise contents by adding a set of noisy image? justify answer? 3.75

(5) 2017 - 3(b)

(6) Explain gray level slicing method and bit plan slicing method? Mention application area? 3

(7) ~~Suppose above~~

(7) With necessary graphs, explain log transformation and power law transformation for spatial domain image enhancement? 8

4-5

① Explain weighted smoothing filter operation with example? – 3

② Mention effect of power law processing transformation? explain outcome of power law transformation with $\gamma = 3$ and $\gamma = 0.3$ in general equation $s = c * r^{\gamma}$ – 3

③ Differentiate between point processing and neighbourhood operation for image enhancement for spatial domain. Illustrate general model of spatial filtering? 2.75

④ What are different causes of image degradation? – 2

⑤ Mention the drawbacks of inverse filtering? 1.75

(6) Explain the problem of using ideal low pass filter? Explain equation $H_{hp}(u,v) = 1 - H_{lp}(u,v)$. 2.75

(7) Discuss in detail homomorphic and derivative filters? - 3

(8) How frequency domain image filtering is implemented? explain ideal filter for image sharpening - 3

(9) Why image sharpening filter is required for image enhancement? explain - 3

(10) ~~write~~ Compare frequency domain image filtering with spatial filtering - 2

Set - 6-7 (2 set)

(11) 2015-4

(12) ~~Define cross~~

(12) When edge detection is necessary? explain how a image enhancement is performed using histogram based thresholding - 3

(13) Define image sharpening filter? Compare between 1st and 2nd derivaties? 3

(14) Explain and compare ideal low pass filter and Butterworth filter for image smoothing? - 3.

Set - 6-7 (2 set)

① Define image segmentation? and mention its necessity? explain basic global thresholding algorithm with example? - 4

② Difference between single and multivalue thresholding with example - 1.75

③ Explain how histogram is used in threholding - 2.75

④ ~~How t~~

④ How thresholding can be applied in image segmentation - (2)

⑤ ~~Write~~ Discuss any four noise probility density function with diagram - 4

⑥ Mention the source of noise? explain the model of noisy image? - 3

⑦ Discuss the method of suppressing periodic noise from the image - 3

⑧ Explain geometric mean and midpoint filter to remove noise - 2.75

set-8 (1-set)

① Illustrate application of morphological operations in image processing with example - 3

② Explain opening/closing operation with example? - 3

③ Define hit, fit, structuring element. Explain the effect of structuring element in erosion - 2.75

④ Write morphological algorithm

(1) Convex hull (2) Thinning (3) Thickening

(4) (iv) Boundary extraction

(5) ~~Briefly discuss hit or miss~~

(6) Discuss hit or miss transformation - 4