Code No: 07A70501 **R07** **Set No. 2**

IV B.Tech I Semester Examinations,November 2010
DIGITAL IMAGE PROCESSING
Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. propose a technique for detecting gaps of length ranging between 1 and L pixels in line segment of a binary image. Assume that the lines are 1 pixel thick. Note: base your technique on 8-neighbor connectivity analysis. [16]

2. Discuss following histogram techniques for Image enhancement.
   (a) Histogram specification.
   (b) Local enhancement. [16]

3. (a) Discuss in detail sampling and quantization of Images.
   (b) Define spatial resolution? What is its effect on Image processing. [10+6]

4. Sketch perspective plot of an 2-D Ideal High pass filter transfer function and filter cross section and explain its usefulness in Image enhancement. [16]

5. Give the expressions for 1D and 2D kernels of Walsh transform, also give the transform expressions. [16]

6. Explain the following:
   (a) Spatial processing
   (b) Color vectoring processing. [8+8]

7. An 8 level image has the gray level distribution given in table.

$\mathbf{r}_k$	$\mathbf{P}_r(\mathbf{r}_k)$	**Code 1**	$\mathbf{L}_1(r_k)$	**Code 2**	$\mathbf{L}_2(\mathbf{r}_k)$
r_0= 0	0.19	000	3	11	2
r_1=1/7	0.25	001	3	01	2
r_2=1/7	0.21	010	3	10	2
r_3=3/7	0.10	011	3	001	3
r_4=4/7	0.08	100	3	0001	4
r_5=5/7	0.06	101	3	00001	5
r_6=6/7	0.03	110	3	000001	6
r_7=1	0.02	111	3	000000	6

   (a) construct the best 2-bit binary shift code.
   (b) construct the best B_1- code for the distribution. [16]

8. (a) How the Periodic Noise is reduced by Frequency Domain Filtering.

(b) Write that transfer function of a Butter worth notch filter. [8+8]

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Code No: 07A70501 **R07** **Set No. 4**

IV B.Tech I Semester Examinations,November 2010
DIGITAL IMAGE PROCESSING
Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Distinguish between spatial domain techniques and frequency domain techniques of Image enhancement. [16]
2. (a) Non uniform sampling is useful for what type of Images. Give reasons.
   (b) What are the disadvantages of non uniform sampling. [8+8]
3. Write about Various Estimation of Noise Parameters. [16]
4. Suggest typical derivative masks for Image enhancement i.e.
   (a) Roberts
   (b) Prewitt
   (c) Sobel. [16]

   How many unique Huffman codes are there for three-symbol source? Construct them. [16]
6. With reference to FFT show that
   (a) W2ux2M=WuxM
   (b) Wu+MM=WuM
   (c) Wu+M2M=-Wu2M. [16]
7. Show that the Sobel and Prewitt Gradient masks of following images give isotropic results for horizontal and vertical edges and for edges oriented at + or - 45^0. $\nabla f = mag(\nabla f)[G_x^2+G_y^2]^{1/2}$ and $\nabla f = |Gx| + |Gy|$ give identical results for edges oriented in the horizontal and vertical directions. [16]

Z1	Z2	Z3
Z4	Z5	Z6
Z7	Z8	Z9

8. What are the techniques used for Image smoothing?Explain any two spatial and two frequency techniques used for image smoothing. [16]

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Code No: 07A70501 **R07** **Set No. 1**

IV B.Tech I Semester Examinations,November 2010
DIGITAL IMAGE PROCESSING
Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Discuss basic transformations of pixels.
   (b) Define concatenation. [12+4]
2. What is Noise? what are the spatial and frequency properties of noise? [16]
3. Write about various edge Detectors available in function edge. [16]
4. (a) Draw the relevant diagram for a communication system model.
   (b) Explain the noiseless coding theorem. [8+8]
5. (a) With example discuss FWT concept .
   (b) What are the advantages and disadvantages of FWT. [8+8]
6. (a) Explain about YCbCr color space.
   (b) Explain about HSC color space. [8+8]
7. What is histogram of an Image? Sketch histograms of basic Image types. Discuss how histogram is useful for Image enhancement. [16]
8. (a) Explain the Homomorphic filtering approach for image enhancement
   (b) Show that the fourier transform and its inverse are linear processor. [16]

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Code No: 07A70501 **R07** **Set No. 3**

IV B.Tech I Semester Examinations,November 2010
DIGITAL IMAGE PROCESSING
Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Compute Fourier transform of 2D-gate function f(x,y) with amplitude ?A? and width along x- axis is 'X' and width along y- axis is 'Y'. Also sketch its spectrum and light intensity function. [16]
2. Explain about the Hough Transform Peak Detection. [16]
3. Discuss following terms w.r.t Digital Image Processing.
   (a) Sampling
   (b) Quantization
   (c) Relations between pixels
   (d) Transformations. [16]
4. Explain the following:
   (a) Gaussian noise
   (b) Erlang noise. [16]
5. Basic approach used to compute the digital gradient involves taking the differences of the form f(x,y) - f(x+1,y).
   (a) Obtain filter transfer function H(u,v) for performing equivalent process in the frequency domain.
   (b) Show that it is a high pass filter. [16]
6. Explain the following:
   (a) Color transformation
   (b) Spatial processing. [16]
7. A 64 × 64 pixel binary image has been coded using 1-D WBS with blocks of four pixels. The WBS code for one line of the image was 0110010000001000010010000000, where a 0 is used to represent a black pixel.
   (a) Decode the line.
   (b) Create a 1 -D iterative WBS procedure that begins by looking for all white lines (a 64-pixel block) and successively halves nonwhite intervals until four pixel blocks are reached. [16]

8. Discuss the limiting effect of repeatedly applying a 3X3 low pass spatial filter to a digital Image. You may ignore the border effects. [16]

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