Code No: 07A70401 **R07** **Set No. 2**

IV B.Tech I Semester Examinations,December 2011
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) Describe the techniques used for color image smoothing?
   (b) What is the need of graylevel slicing in color images. [8+8]

2. (a) Explain the statement that Fourier transform is viewed as a "mathematical prism".
   (b) Get the expressions for magnitude spectrum, phase spectrum and power spectrum of Fourier transform. [8+8]

3. Write about various edge Detectors available in function edge. [16]

4. What is Error Free Compression? Explain about variable length coding. [16]

5. (a) Discuss the concept FWT and draw the flow graph for N=8.
   (b) Compare the FFT and FWT. [8+8]

6. (a) What is a Image Formation Model.
   (b) Write about Various Image Observation Models with Examples. [8+8]

7. Consider the image segment shown below

3	1	2	1(q)
2	2	0	2
1	2	1	1
(p)1	0	1	2

   (a) Let V = {0,1} and compute the D4, D8 and Dm distances between p and q
   (b) repeat for V = {1,2} [16]

8. (a) Give the algorithm for histogram equalization.
   (b) What is the histogram distribution for high contrast, low contrast images. [8+8]

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Code No: 07A70401 **R07** **Set No. 4**

IV B.Tech I Semester Examinations,December 2011
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. What is Thresholding? Explain about Local Thresholding. [16]
2. What is Noise? what are the spatial and frequency properties of noise? [16]
3. (a) Define sequency.
   (b) Discuss modified Hadamard transform. [6+10]
4. Draw a figure of a basic DPCM/DCT encoder for motion compensated video compression. [16]
5. Draw and Explain the schematic diagram how pixels of an RBG color image are formed from the corresponding pixels of the three components images. [16]
6. Develop an algorithm for converting a one pixel thick, 8-connected path to 4-connected path. [16]
7. What is histogram of an Image? Sketch histograms of basic Image types. Discuss how histogram is useful for Image enhancement. [16]
8. What are the techniques used for image smoothing? Explain any two techniques of :
   (a) Frequency domain
   (b) Spatical domain used for smoothing the image. [16]

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Code No: 07A70401 **R07** **Set No. 1**

IV B.Tech I Semester Examinations,December 2011
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. Explain the following properties of 2D-Fourier Transform:
   (a) Distributives and scaling
   (b) Rotation
   (c) Periodicity and conjugate symmetry
   (d) Seperability. [16]
2. Derive transformation matrices for
   (a) Translation
   (b) Scaling
   (c) Rotation about X-axis. [16]
3. Discuss the following intensity transformations.
   (a) Image negatives
   (b) Contrast stretching
   (c) Compression of dynamic range. [16]
4. Explain in detail about the CMY and HIS color spaces. [16]
5. The white bars in the test pattern shown in figure 5b are 7 pixels wide and 210 pixels high. The separation between bars is17 pixels. What would this image look like after application of
   (a) A 9 × 9 min filter?
   (b) A 5 × 5 min filter? [16]

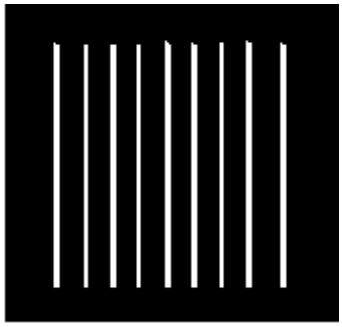

Figure 5b

6. Does fast algorithm is applicable for computation Hadamard transform, if so what are the problems encountered in implementation. [16]

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) Compute the average word length for each code and compare the to entropy form part.

   (b) Divide the symbols into two blocks of four and construct the best Huffman shift code. [16]

8. Answer the following from the given 3 × 3 region of image and various masks used to compute the gradient at point labledz$_5$
   Assume that the Sobel masks are used to obtain G_x and G_y. Show that the gradient computed by
   $\nabla f = mag(\nabla f)[G_x^2+G_y^2]^{1/2}$ 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

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Code No: 07A70401 **R07** **Set No. 3**

IV B.Tech I Semester Examinations,December 2011
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. Obtain Slant transform matrix for N=8. [16]
2. Explain the following Order-Statistics Filters.
   (a) Max and min filters
   (b) Median filter
   (c) Midpoint filter. [16]
3. What is Sparse Matrix? How it is used by Hough Transform? Explain. [16]
4. Explain the following:
   (a) Arithmetic operations on Images
   (b) Logical operations on Images. [16]
5. (a) Develop a procedure for computing the median of an nxn neighborhood.
   (b) Propose a technique for updating the median as the center of the neighborhood is moved from pixel to pixel. [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. Show that if a filter transfer function H(4,v) is real and symmetric, then the corresponding spatical domain filter h(x,y) also B real and symmetric. [16]

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