Code No: 07A80504 | R07 | Set No. 2

**IV B.Tech II Semester Examinations,APRIL 2011**
**IMAGE PROCESSING**
**Computer Science And Engineering**

Time: 3 hours 　　　　　　　　　　　　　　　　　　Max Marks: 80

**Answer any FIVE Questions**
**All Questions carry equal marks**
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1. Explain in detail with block diagram the fundamental steps in digital Image processing and their importance. [16]

2. Explain in detail the following piece wise linear Transformations functions.

    (a) Contrast stretching

    (b) Gray level slicing

    (c) Bit plane slicing. [16]

3. Explain in detail about the following color models:

    (a) RGB

    (b) HSI

    (c) CMY. [16]

4. (a) Define and Explain about Hough transform.

    (b) Explain Global Processing via the Hough Transform. [8+8]

5. (a) Define and Explain about discriminant analysis.

    (b) Explain briefly pattern class. [8+8]

6. Explain in detail the constrained least squares filtering with related expressions. [16]

7. (a) Explain about Delta Modulation.

    (b) Define lossy predictive coding and explain with suitable examples. [8+8]

8. (a) How would you convert an image from a square grid to a hexagonal grid?

    (b) Explain and Draw the diagram for $(A \cap B) \cup (A \cup B)^{C}$. [16]

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Code No: 07A80504 | R07 | Set No. 4

### IV B.Tech II Semester Examinations,APRIL 2011
### IMAGE PROCESSING
### Computer Science And Engineering

Time: 3 hours | Max Marks: 80

**Answer any FIVE Questions**
**All Questions carry equal marks**
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1. Give the expression for pdf of the following and plot them

   (a) Rayleigh noise

   (b) Gaussian noise

   (c) Erlang noise

   (d) Exponential noise

   (e) Uniform noise

   (f) Impulse noise. [16]

2. Derive the expressions for conversion of HSI to RGB and HIS models. [16]

3. (a) Prove that for continuous signal Histogram equalization results in flat histogram.

   (b) Explain how Histogram statistics helps in Image Enhancement. [16]

4. (a) Explain about coding redundancy.

   (b) What is relative data redundancy? Compare with data redundancy. [16]

5. (a) Explain about Neural networks for image processing.

   (b) What is generalized delta rule for learning by back propagation? [8+8]

6. (a) Explain about point detection.

   (b) What are the different types of detection of discontinuities? [8+8]

7. Consider the two subsets S1 and S2 shown in the following figure. For V= 1. Determine whether the two subsets are [16]

   a) 4-adjcent b) 8- adjacent or c) m-adjacent.

   Define also the above terms.

   ```
   0
   1   | 0 0 0 0 0 0 1 1 |   0
   1   | 0 0 1 0 0 1 0 0 |   1
   0   | 0 0 1 0 1 1 0 0 |   0
   0   | 0 1 1 1 0 0 0 0 |   0
                             1

       0 1 1 1 0 0 1 1
   ```

8. (a) Define Dilation and erosion with suitable diagrams.

(b) Prove that $(A\Theta B)^C = A^C \oplus \hat{B}$ [8+8]

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Code No: **07A80504**    $\boxed{\textbf{R07}}$    $\boxed{\textbf{Set No. 1}}$

**IV B.Tech II Semester Examinations,APRIL 2011**
**IMAGE PROCESSING**
**Computer Science And Engineering**

Time: 3 hours                                                          Max Marks: 80

**Answer any FIVE Questions**
**All Questions carry equal marks**
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1. (a) Explain in detail the spatial domain Restoration using following mean filters.
    i. Arithmetic
    ii. Harmonic
    iii. Contraharmonic.
   (b) If the transform function for degradation is H(u,v)=$-2\sqrt{2\pi}\sigma(u^2+v^2)e^{-2\pi^2\sigma^2(u^2+v^2)}$ then give the expression for wiener filter. Assuming that the ratio of power spectra of noise and undegraded signal is constant.                        [16]

2. (a) Explain the following Arithmetic operations and their application for Image Enhancement:
    i. Image Subtraction
    ii. Image Averaging.
   (b) Explain how Region of Interest processing can be done using logic operations.
                                                                      [10+6]

3. (a) Define Parameter space.
   (b) Define accumulator cells.
   (c) Define expansion of the node.
   (d) Define star (or) root node.                                     [16]

4. (a) Explain about histogram processing for color Images.
   (b) Consider any two valid colors $C_1$ & $C_2$ with coordinates $(x_1\ y_1)$ &$(x_2\ y_2)$ in the chromaticity diagram. Derive the necessary general expressions for computing the relative percentages of colors $C_1$ & $C_2$ composing a given color that is known to lie on the straight line joining these two colors.      [16]

5. (a) Explain about Fidelity criteria.
   (b) What is the difference between channel encoder and channel decoder?  [8+8]

6. (a) Give the conditions (s) under which the D4 distance between two points p & q is equal to the shortest 4- path between these points. Is this path unique. Explain.
   (b) Explain in detail how digital Image is represented.                [16]

7. (a) Explain about Morphological Algorithms.

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    (b) What is Region-filling and explain with suitable diagrams?     [8+8]

8.   (a) Define and Explain about hyperspheres.

    (b) Write an algorithm to Bayes classifier for Gaussian pattern classes.     [8+8]

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Code No: 07A80504 | R07 | Set No. 3

**IV B.Tech II Semester Examinations,APRIL 2011**
**IMAGE PROCESSING**
**Computer Science And Engineering**

Time: 3 hours                                                Max Marks: 80

**Answer any FIVE Questions**
**All Questions carry equal marks**
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1. (a) Define and Explain about Dynamic (or) adaptive.

   (b) Define and Explain about back ground point.                    [8+8]

2. (a) Explain about string matching.

   (b) Explain briefly about structural methods.                     [8+8]

3. Explain what is pseudo color Image processing and explain the following pseudo color Image processing techniques.

   (a) Intensity slicing

   (b) Gray level to color Transformation.                           [16]

4. (a) Give the conditions (s) under which the D4 distance between two points p & q is equal to the shortest 4- path between these points. Is this path unique. Explain.

   (b) Explain in detail how digital Image is represented.           [16]

5. Explain the following filters used in Image restoration.

   (a) Inverse filter

   (b) Wiener filter.                                                [16]

6. (a) How we can use morphology in coding redundancy?

   (b) What are different types of interpixel redundancies?          [8+8]

7. (a) Explain about extensions to Gray-scale images.

   (b) Define pruning and explain about it.                         [8+8]

8. (a) In a given application an averaging mask is applied to input images to reduce noise and then a daplacian mask is applied to enhance small details. Would the result be same if the order of operations were reversed. Explain.

   (b) Show that isotropic property is lost in general if the gradient is completed using $\nabla f \approx |G_x| + |G_y|$ .                    [16]

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