Code No: 07A70505 **R07** **Set No. 2**

IV B.Tech I Semester Examinations,November 2010
IMAGE PROCESSING AND PATTERN RECOGNITION
Bio-Medical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain briefly
   (a) Distance functions
   (b) linear decision functions. [8+8]
2. What is a gradient? Explain the gradient approach with an example. [16]
3. (a) With the help of a block diagram explain the elements of digital image processing system.
   (b) List out and explain various applications of digital image processing. [8+8]
4. What is an Image? Explain the basic concepts of image processing in detail. [16]
5. Explain how the distance functions are helpful for pattern recognition. [16]
6. Define a template. Explain the concept of image enhancement with the help of high pass spatial filtering techniques. [16]
7. Justify that the perceptron training algorithm converges in a finite number of steps if training patterns are linearly seperable. [16]
8. (a) Explain Objective image fidelity.
   (b) Arithmetic decoding is the reverse process of encoding. Decode the message 0.0688 given the following coding table. [6+10]

Symbol	Probability
A	0.2
B	0.2
C	0.4
D	0.2

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Code No: 07A70505 **R07** **Set No. 4**

IV B.Tech I Semester Examinations,November 2010
IMAGE PROCESSING AND PATTERN RECOGNITION
Bio-Medical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Write short notes on:
   (a) Image acquisition
   (b) Image processing. [8+8]
2. Explain LMSE algorithm using stochastic approach for pattern classification. [16]
3. Write short notes on:
   (a) Training patterns
   (b) Learning
   (c) Bayes classifier. [5+6+5]
4. Explain LMSE algorithm with a suitable example. [16]
5. Explain histogram specification technique. With an example explain how this technique can be used to enhance the image. [16]
6. (a) Explain the role of thresholding in segmentation.
   (b) Describe
      i. region growing
      ii. region splitting and merging. [6+10]
7. Justify the statement.
   "The surface given by $d_{ij} = X^T (m_i - m_j)(m_i - m^T{}_j)(m_i - m_j)$ is perpendicular bisector of the line joing n-dimensional point m_i and m_j". [16]
8. What is meant by perspective transform action? Derive the necessary relationships for perspective transformation. [16]

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Code No: 07A70505 **R07** **Set No. 1**

IV B.Tech I Semester Examinations,November 2010
IMAGE PROCESSING AND PATTERN RECOGNITION
Bio-Medical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the elements required to acquire digital images ?
   (b) Write brief notes on various types of images. [8+8]
2. Explain briefly minimum distance with an example. [16]
3. Write short notes on:
   (a) Image Negatives.
   (b) Log Transformation.
   (c) Power-law Transformation. [5+5+6]
4. (a) What is meant by color segmentation? Explain.
   (b) Distinguish between global threshold, local threshold and dynamic threshold. [6+10]
5. What are the fundamental problems in pattern recognition system? [16]
6. Determine the decision boundary by increment correction algorithm to classify the following patterns into two classes.
   CLASS 1 $\{(0,0,0)\,(1,0,0)\,(1,0,1)\,(1,1,0)\}$
   CLASS 2 $\{(0,0,1)\,(0,1,0)\,(0,1,1,)\,(1,1,1)\}$ [16]
7. Explain briefly about delta correction algorithm. [16]
8. What is classification? Explain multi category classification with an example. [16]

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Code No: 07A70505 **R07** **Set No. 3**

IV B.Tech I Semester Examinations,November 2010
IMAGE PROCESSING AND PATTERN RECOGNITION
Bio-Medical Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Write short notes on:
   (a) Pixel neighbors.
   (b) Pixel connectivity.
   (c) Distance measure.
   (d) Equivalence of pixels. [4+4+4+4]
2. (a) Distinguish between edge based and region based segmentation.
   (b) Explain thresholding. [10+6]
3. Explain the following filtering techniques:
   (a) Median filtering.
   (b) High boost filtering.
   (c) Frequency domain filtering. [5+5+6]
4. Explain about the Syntatic Recognition of trees. [16]
5. Explain Gradient descent algorithm with an example. [16]
6. Explain linear decision functions with relevant examples. [16]
7. (a) Explain character recognition with an example.
   (b) Differentiate between the speech recognition and character recognition. [8+8]
8. (a) What is mean by classifier? What are the applicaations of classifiers?
   (b) Write short notes on Bayes classified decision function. [8+8]

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