Code No: 07A80504 **R07** SET 1

B.Tech IV Year II Semester Examinations, April/May-2012
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. What are the fundamental steps in image processing? Explain them in detail with some examples. [16]

2. Explain the following image enhancement methods:
   a) Bit-plane slicing b) Image negative
   c) Contrast stretching d) Log transformation. [4x4=16]

3.a) Draw the degradation model and give the reasons for degradation.
   b) How is an inverse filter used for image restoration in presence of noise? [8+8]

4.a) Write a short note on color fundamentals in image processing.
   b) Explain segmentation process in HIS color space. [8+8]

5.a) What is redundancy? How to measure it?
   b) How is a prediction coding used for lossy image compression? [8+8]

6.a) What are skeletons? How it is used in image processing?
   b) Give result of logical operations on an image. [8+8]

7. Explain the region based segmentation in detail with examples. [16]

8.a) Explain how image correlation is used for recognization.
   b) Specify the structure and weights of a neural network capable of performing exactly the same function as a minimum distance classifier for two pattern classes in n-dimensional space. [8+8]

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Code No: 07A80504 | **R07** | SET 2

B.Tech IV Year II Semester Examinations, April/May-2012
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. What are the different components of image processing? Explain the function of each with suitable examples. [16]

2.a) What is point processing? How is it used in image enhancement?
b) Explain how a spatial high pass filter is used for image enhancement. [8+8]

3.a) What are the different noises present in image? How to represent them?
b) How is a wiener filter used for image restoration? [8+8]

4.a) How to convert HSI color model to RGB color model?
b) What are the various color space components in full color image?
c) What is color slicing? Give some examples. [6+5+5]

5.a) Explain the following with respect to an image:
i) Inter pixel redundancy ii) Psychovisual redundancy
iii) Coding redundancy iv) Fidelity criteria.
b) Explain how Huffman coding is used for image compression? [8+8]

6.a) How a boundary of an image can be extracted by morphological processing?
b) What are the applications of Morphological opening and closing operations? [8+8]

7. Explain in detail how a point, line and edge can be detected in an image. [16]

8.a) Explain recognition techniques based on matching.
b) Give an expansive tree grammar for generating images consisting of alternating 1's and 0's in both spatial directions (in checkerboard pattern). Assume that the top left element is a 1 and that all images terminate with a 1 as the bottom left element. [8+8]

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Code No: 07A80504 **R07** SET 3

B.Tech IV Year II Semester Examinations, April/May-2012
IMAGE PROCESSING
(COMPUTER SCIENCE AND ENGINEERING)

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

Answer any five questions
All questions carry equal marks

1.a) How can an image be sampled?
b) What is meant by neighborhood criteria in an image?
c) Explain different connectivity methods in an image. [5+5+6]

2.a) Explain Histogram equalization method for an image enhancement.
b) What are the different Arithmetic and logic operators used in image enhancement? [8+8]

3.a) How a constrained least square filter is used for image restoration? What are advantages of it compared to wiener filter?
b) How to estimate the degradation function? [10+6]

4.a) How a RGB color model convert into HSI model?
b) Explain smoothing of color image based on neighborhood averaging method. [8+8]

5.a) What are fidelity criteria? How is it used in an image processing?
b) Explain one and two dimensional run-length codes used for image compression. [6+10]

6. Explain the following with respect to image processing:
a) Hit-or-Miss transformation b) Thinning and Thickening. [8+8]

7.a) Explain how a gradient operator can be used to detect an edge?
b) Explain the region splitting and merging procedure for image segmentation.[8+8]

8.a) Explain how a string matching is used for recognization.
b) Specify the structure and weights of a neural network capable of performing exactly the same function as a Bayes classifier for two pattern classes in n-dimensional space. The classes are Gaussian with different means but equal covariance matrices. [8+8]

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Code No: 07A80504 **R07** SET 4

B.Tech IV Year II Semester Examinations, April/May-2012
IMAGE PROCESSING
(COMPUTER SCIENCE AND ENGINEERING)
Time: 3 hours **Max. Marks: 80**
Answer any five questions
All questions carry equal marks

1.a) How quantization is used in an image processing?
b) What is mean by 4-, 8-, and m- connectivities?
c) What are different methods of distance measurement? [5+6+5]

2.a) What is Histogram? Explain the Histogram Specification method.
b) Explain how Spatial low pass filter is used in an image enhancement? [8+8]

3.a) Explain an image restoration process with suitable block diagram.
b) How spatial filter is used for image restoration? [8+8]

4.a) How to represent an image in RGB model?
b) Explain any one method of segmentation of color image. [8+8]

5.a) Draw a general compression system model and explain it.
b) Explain the Arithmetic coding for image compression. [8+8]

6. Explain the following with respect to image processing:
a) Dilation and erosion b) Opening and closing. [8+8]

7.a) What is thresholding? How is it used for image segmentation?
b) Explain a region growing procedure for an image segmentation. [8+8]

8.a) Explain the probabilistic approach for recognization.
b) Two pattern classes in two dimensions are distributed in such a way that the patterns of class w_1 lie randomly along a circle of radius r_1. Similarly, the patterns of class w_2 lie randomly along a circle of radius r_2, where $r_2 = 2r_1$. Specify the structure of a neural network with the minimum number of layers and nodes needed to classify properly the patterns of these two classes. [8+8]

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