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Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015
Digital Image Processing

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. Explain the basic steps in digital image processing, with a block diagram. (08 Marks)
 b. Discuss the procedure of sampling and quantization, with example. (06 Marks)
 c. Discuss in brief, metric and topological properties of an image. (06 Marks)
- 2 a. Define histogram equalization. Develop an algorithm for contrast enhancement using this technique. (08 Marks)
 b. Discuss any two image smoothing techniques in spatial domain. (06 Marks)
 c. What are LOG and DOG? Describe the procedure of extracting edges using LOG edge detection technique. (06 Marks)
- 3 a. What are the properties to be preserved for segmentation? Describe an iterative optimal threshold detection technique. (10 Marks)
 b. Explain inner boundary and outer boundary tracing techniques. (10 Marks)
- 4 a. Describe the procedure of detecting lines using Hough transform. (10 Marks)
 b. Discuss the procedure of obtaining the segmented regions using split and merge strategy with example. (10 Marks)

PART – B

- 5 a. Explain the various types of gray level transformations. (10 Marks)
 b. Discuss briefly image sharpening techniques in frequency domain. (06 Marks)
 c. Write a short note on Homomorphic filters. (04 Marks)
- 6 a. Define image compression. Describe the general image compression model with block diagram. (07 Marks)
 b. Explain how Huffman coding technique helps in reducing the size of an image data. Obtain Huffman code for the following data. Also compute entropy and efficiency. (08 Marks)

Data	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆
Probability of occurrence	0.4	0.06	0.1	0.04	0.1	0.3

- c. Discuss in brief, transform coding technique with a neat block diagram. (05 Marks)
- 7 a. Describe the procedure of region identification using 4-neighbourhood and 8-neighbourhood concept. (08 Marks)
 b. Explain any three region and contour based shape representation models. (12 Marks)
- 8 a. Define morphology. Discuss binary dilation and erosion in detail. (10 Marks)
 b. Briefly explain the following morphological algorithms:
 i) Hit-or-miss transform.
 ii) Region filling. (10 Marks)