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06CS/IS762

Seventh Semester B.E. Degree Examination, January 2013
Digital Image Processing

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Define an image. Explain the various components of a general – purpose image processing system. (10 Marks)
 b. Explain some of the basic relationships that exist between pixels in a digital image. (10 Marks)
- 2 a. Explain the concept of sampling and quantization of an image. Explain how images are digitally represented. (10 Marks)
 b. How is image formed in an eye? Explain the importance of brightness adaptation and discrimination in image processing? (10 Marks)
- 3 a. Explain how image segmentation algorithms are categorized. Discuss how point detection and line detection algorithms work. (10 Marks)
 b. Briefly explain the different phases of Canny edge detector. Differentiate between Canny edge and Laplacian of Gaussian edge detector. (10 Marks)
- 4 a. Explain the concept of edge linking by using global processing via the Hough transform. (10 Marks)
 b. Explain with different steps, the working of region based segmentation algorithm. (10 Marks)

PART – B

- 5 a. The basic approach used to approximate a discrete derivative involves taking difference of the form $f(x+1, y) - f(x, y)$. (10 Marks)
 i) Obtain the filter transfer function, $H(u, v)$ for performing the equivalent process in the frequency domain
 ii) Show that $H(u, v)$ is a high pass filter.
 b. How is smoothing achieved in the frequency domain. Explain the three types (basic) of LPE? (10 Marks)
- 6 a. With a flow diagram, explain how homomorphic filtering approach is used for image enhancement. (10 Marks)
 b. With a neat diagram, explain a lossless predictive coding model used for image compression. (10 Marks)
- 7 a. Define chain codes. Explain the three different types of polygonal approximations techniques? (10 Marks)
 b. Along with the mathematical formulation, explain the various regional descriptors. (10 Marks)
- 8 a. Define the opening and closing. List the properties of opening and closing operations. (08 Marks)
 b. Explain some of the basic morphological algorithms? (12 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and/or equations written eg, $42+8=50$, will be treated as malpractice.