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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 exists 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 works. **(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 homorphic 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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