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14SCS151

First Semester M.Tech. Degree Examination, Dec.2015/Jan.2016
Advances in Digital Image Processing

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Discuss any three fields that use digital image processing. **(06 Marks)**

b. With a neat block diagram, explain various components of an image processing system in detail. **(08 Marks)**

c. Explain briefly the mechanism of brightness adaptation and discrimination. **(06 Marks)**

2 a. Explain the concept of sampling and quantization of an image with an example. **(07 Marks)**

b. Briefly explain the following with example.
i) Connectivity ii) Adjacency iii) Regions iv) Boundary **(08 Marks)**

c. How bit plane slicing helps in enhancing image appearance? Explain. **(05 Marks)**

3 a. Discuss the mechanism of image enhancement through basic gray level transformations. **(10 Marks)**

b. Distinguish between first order and second order derivatives in sharpening images. **(04 Marks)**

c. Explain basics of filtering in the frequency domain. **(06 Marks)**

4 a. How smoothing is achieved in frequency domain? Explain different low pass filters in frequency domain. **(10 Marks)**

b. What is high boost filtering? Explain how unsharp masking helps in generating sharp image. **(04 Marks)**

c. Discuss homomorphic filtering for image enhancement. **(06 Marks)**

5 a. Explain the image degradation/restoration process with a neat block diagram. **(06 Marks)**

b. Discuss various noise models with their probability density functions. **(08 Marks)**

c. What are order stastics filters? Discuss any two order stastics filtering with their mathematical formulation. **(06 Marks)**

6 a. What are color models? Discuss in brief any two color models. **(08 Marks)**

b. Explain color complement for color transformation enhancing. **(06 Marks)**

c. Write a note on color image smoothing and sharpening. **(06 Marks)**

7 a. Explain wavelet transform in two dimensions. **(06 Marks)**

b. Discuss wavelet based procedure for denoising the image, explaining hard and soft thresholding. **(06 Marks)**

c. What is error free compression? Generate the Huffman code for the following sequence and calculate average length. **(08 Marks)**

Symbol	Probability
a_1	0.1
a_2	0.4
a_3	0.06
a_4	0.1
a_5	0.04
a_6	0.3

8 a. Discuss boundary extraction and thickening in morphological algorithms. **(06 Marks)**

b. Explain point and line detection mechanisms based an detection of discontinuities. **(08 Marks)**

c. Explain the mechanism of region splitting and merging. **(06 Marks)**

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