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TEST -3 EXAMINATION- May 2017

B.Tech 8th Semester & M.Tech 2nd Semester (ECE)

COURSE CODE: 16M1WEC231

MAX. MARKS: 35

COURSE NAME: Advanced Digital Image Processing

COURSE CREDITS: 3

MAX. TIME: 2 Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Perform all questions in sequence.

Q1. The input data to be compressed is composed of symbols in the alphabet "IMAGER#" with probabilities:

Symbol	Probability
I	0.05
M	0.2
A	0.1
G	0.05
E	0.3
R	0.2
#	0.1

Find the Arithmetic code for the string MMAAEE#.

[3]

Q2. Consider the following image

1	1	9	8	7
0	1	8	8	8
0	0	7	9	8
0	1	8	8	9
1	2	8	8	9

What is the result if the threshold is 3? If the threshold condition is changed to: (pixel value - seed value) < 0.1(maximum - minimum) of 8-neighborhood. What is the resultant image? Take the absolute values.

[1+3]

Q3. A set of images is to be compressed by a lossless method. Each pixel of each image has a value in the range (0-3) i.e. 2bits/pixel. An image from this set is given below. In this image the occurrence of pixels of different values is typical of the set of images as a whole.

3	3	3	2
2	3	3	3
3	2	2	2
2	1	1	0

Calculate the compression ratio using the following methods

- Huffman coding of the pixel values. (Give highest priority to the new probability)
- Form an alternative representation by taking the difference between adjacent pixels (assuming horizontal raster scan) and then Huffman coding of these differences. (Give highest

priority to the new probability)

- e). Run length coding assuming 2 bits to represent the pixel value and 2 bits to represent the run length. [2+2+2]

Q4. Perform histogram specification to the 8X8 image shown in the following table:

r_k	0	1	2	3	4	5	6	7
n_k	8	10	10	2	12	16	4	2

The target histogram is shown in the following table:

r_k	0	1	2	3	4	5	6	7
n_k	0	0	0	0	20	20	16	8

[3]

- Q5. What is the principal of Homomorphic filtering? [3]

- Q6. Write a note on band pass, band reject and Notch filter. [2+2+2]

- Q7. Write down the algorithm for frequency domain filtering. Compare the performance of various types of smoothing filters in frequency domain. [1+3]

- Q8. What are the various categories of image degradation? Discuss various types of noise on the basis of distribution. [1+3]

- Q9. What are the stages through which an image passes in an image processing system? Explain each stage. [2]

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