National Institute of Technology Calicut

Winter Semester 2019-'20 - End Semester Examination

CS4043/CS4043D IMAGE PROCESSING

*Total time **2 hours***.   ***Maximum mark 20***.

Question 1: Fundamentals of Image Compression   [4 marks] Match the following.

1. Hamming Code	a) Run length Encoding
2. Inter-pixel Redundancy	b) Measure of Information
3. Entropy	c) Psycho Visual Redundancy
4. Quantization	d) Error Detection

Question 2: Huffman Coding   Consider the following set of symbols and their associated probabilities.

Symbol	Probability
$a1$	0.10
$a2$	0.40
$a3$	0.06
$a4$	0.10
$a5$	0.04
$a6$	0.30

1. [2+2+2 = 6 marks] Use Huffman coding to encode the given symbols. The solution shall contain probability of each symbol, encoding of each symbol using 2 bits - 0 and 1.

2. [2 marks] Compute the average number of bits to encode a symbol for this coding scheme.

Question 3: Arithmetic Coding   Consider your ***FIRST NAME***.

1. [2+1+3 = 6 marks] Encode the string using Arithmetic Coding. Show all the steps of encoding such as compute the probability of each symbol, compute the low and high values of symbol range in the interval [0,1]. Then encode the string.

2. [2 marks] Use the probability information computed in the encoding part to decode the code word to retrieve the actual string.

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