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BIELE-010

00220

B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

June, 2013

BIELE-010 : SIGNAL COMPRESSION

Time : 3 hours *Maximum Marks : 70*

Note : (i) *Attempt **any seven** questions.*

(ii) ***All** questions carry **equal** marks.*

1. (a) Discuss the difference between lossless and lossy compression. 2x5=10

   (b) Define the relative data redundancy and also explain the significance of compression ratio.

2. Consider a word 'COMMITTEE'. 10

   Determine :

   (a) Huffman code

   (b) Efficiency

3. Consider a source emits four symbols {a, b, c, d} with probabilities 0.4, 0.2, 0.1 and 0.3 respectively. Construct arithmetic coding to encode and decode the word 'dad'. 10

4. Consider an image shown below **2x5=10**

$$\begin{bmatrix} 3 & 3 & 3 & 2 \\ 2 & 3 & 3 & 3 \\ 3 & 2 & 2 & 2 \\ 2 & 1 & 1 & 0 \end{bmatrix}$$

Determine the degree of compression that can be achieved using.

(a) Huffman coding of pixel values.

(b) Run Length Coding, assuming 2 bits to represent the pixel value and 2 bit to represent the run length.

5. Explain the encoding and decoding process of LZ77 coding scheme with a suitable example. **10**

6. Consider the uniform scaler quantization the quantizer rate is R and the level of quantizer is M, then prove that the signal to quatisation ratio is $10 \log_{10} M^2$. **10**

7. (a) Explain the advantages of vector quantization over scaler quantization. **2x5=10**

(b) What is Gain-Shape vector quantization ?

8. What is multi-resolution analysis and how it is performed using wavelets ? 10

9. The wavelet coefficients of the given image is shown below : 10

34	0	1	-1
0	0	-1	1
4	-4	10	-6
-4	4	6	-10

Encode the coefficients using the SPIHT algorithm.
SPIHT : Set Partioning in Hierarchical Trees.

10. Write short notes on *any two* of the following : 2x5=10

(a) JPEG 2000 standard

(b) HDTV

(c) LZ78