G 6566

M.E. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

Communication Systems

WS 1621 — MULTIMEDIA COMPRESSION TECHNIQUES

(Common to M.E. Digital Communication and Network Engineering)

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give the format of GIF.

2. What is the purpose of chroma sub sampling?

3. What are the properties of variable – length coding?

4. Define 'sliding – window''coding.

5. State μ – law and A – law.

6. Define Linear predictive coding.

7. What do you mean by blocking artifacts?

8. Differentiate predictive from transform coding.

9. Enumerate the important features of MPEG – 4.

10. How is compression performed in ATM networks?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What do you mean by DPCM? Describe in detail about the usage of DPCM in audio and video coding. (5)

(ii) Give the distinction among NTSC, PAL and SECAM standards. (5)

(iii) Give the classification of the compression techniques. (6)

Or

(b) (i) With an example, explain the LBG algorithm in detail. (10)

(ii) Give a detailed comparison between scalar and vector quantization. (6)

12. (a) (i) What is the entropy (η) of the image segment given in figure (1),where numbers (0, 20, 50, 99) denote the gray – level intensities? (5)

99	99	99	99	99	99	99	99
20	20	20	20	20	20	20	20
0	0	0	0	0	0	0	0
0	0	50	50	50	50	0	0
0	0	50	50	50	50	0	0
0	0	50	50	50	50	0	0
0	0	50	50	50	50	0	0
0	0	0	0	0	0	0	0

Figure (1).

(ii) Construct the Huffman tree to encode the image shown in Figure (1). (6)

(iii) What is the average number of bits needed for each pixel? (3)

(iv) Is it satisfies the Shannon's lossless theorem? (2)

Or

(b) For the image segment given in Figure(1), apply arithmetic coding and LZW algorithms. Compare the algorithm performance in terms of compression ratio.

13. (a) (i) With a neat sketch, explain a typical channel vocoder in detail. (10)

(ii) Differentiate between CELP and MELP. (6)

Or

(b) (i) With a block diagram, explain the functional units of CELP analysis model in detail. (12)

(ii) Enumerate the applications of sub band coding. (4)

14. (a) (i) Describe the various functional modules of sequential mode of JPEG in detail. (10)

(ii) Describe EZW coder with an example. (6)

Or

(b) (i) Give a detailed comparative, discussion among JBIG, JPEG and JPEG – 2000 standards. (10)

(ii) Describe SPIHT coder with an example. (6)

15. (a) (i) Explain the principles of Motion estimation and compensation, and also describe the importance of these modules in video coding standards. (6)

(ii) With a neat sketch, explain the encoder and decoder structures of H. 261 video coding. (10)

Or

(b) Give a detailed comparison among MPEG – 1, MPEG – 2, MPEG – 4 and MPEG – 7. (16)