

Sixth Semester B.E. Degree Examination, May/June 2010

Data Compression

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1
 - a. Discuss the modelling and coding in the development of data compression algorithms. Give examples. (05 Marks)
 - b. What is self-information? Discuss the entropy in detail, with examples. (10 Marks)
 - c. A source emits letters from an alphabet $A = \{ a_1, a_2, a_3, a_4, a_5 \}$ with probabilities $P(a_1) = 0.15, P(a_2) = 0.16, P(a_3) = 0.17, P(a_4) = 0.17, P(a_5) = 0.35$.
 - i) Calculate entropy of the source
 - ii) Find the Huffmann code for the source
 - iii) Find the average length of Huffmann code. (05 Marks)

- 2
 - a. Explain the different ways to evaluate compression algorithms. Explain with examples. (05 Marks)
 - b. Compare and contrast LZ77 and LZ78, with examples. (05 Marks)
 - c. A sequence is encoded using LZW algorithm and the initial dictionary is given below:

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Entry	a	b	c	d

 - i) The output of the LZW encoder is : 1, 1, 2, 6, 1, 3, 7, 9, 11, 4, 5. Decode the sequence
 - ii) Verify the decoded sequence by encoding it using the same initial dictionary. (10 Marks)

- 3
 - a. Explain the multiresolution approach, in detail. (10 Marks)
 - b. What is distortion? Discuss different ways to measure distortion. (10 Marks)

- 4
 - a. Differentiate between uniform and non-uniform scalar quantizers. (06 Marks)
 - b. Explain the vector quantization process, with a diagram. (08 Marks)
 - c. Illustrate the advantages of vector quantization over scalar quantization. (06 Marks)

PART – B

- 5
 - a. Discuss the different steps involved in image compression, using JPEG. (12 Marks)
 - b. Illustrate the linear system, in detail. (08 Marks)

- 6
 - a. Discuss the basic subband coding algorithm. (10 Marks)
 - b. Explain how bit allocation is done in subband coding. (10 Marks)

- 7
 - a. Discuss multiresolution analysis with respect to wavelet compression. (10 Marks)
 - b. Discuss wavelet compression in brief. (05 Marks)
 - c. Write a note on JPEG 2000. (05 Marks)

- 8
 - a. Illustrate motion compensation in video compression. (06 Marks)
 - b. Discuss MPEG-I video standard. (10 Marks)
 - c. Write a note on asymmetric applications. (04 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8=50$, will be treated as malpractice.

