

Multimedia Systems

B.E. Sem. VII [INFT]

(Elective – I)

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25
Term Work	–	25

Prerequisite : Computer Graphics.

Objective : Students will be able to understand the relevance and underlining infrastructure of multimedia system. The purpose of the course for the students is to apply contemporary theories of multimedia learning to the development of multimedia products. Analyze instructional and informational media (audio/ visual materials, web based materials, games and simulations etc).

SYLLABUS

1. Multimedia Basics, Multimedia Authoring and Tools

What is Multimedia?, Multimedia and Hypermedia, World Wide Web, Overview of Multimedia Software Tools, Further Exploration, Multimedia Authoring, Some Useful Editing and Authoring Tools, VRML.

2. Graphics and Image Data Representation

Graphics/Image Data Types 60, Popular File Formats.

3. Concepts in Video and Digital Audio

Color Science, Color Models in Images, Color Models in Video. Types of Video Signals, Analog Video, Digital Video, Digitization of Sound, MIDI: Musical Instrument Digital Interface, Quantization and Transmission of Audio.

4. Lossless & Lossy Compression Algorithms

Introduction, Basics of Information Theory, Run-Length Coding, Variable-Length Coding, Dictionary-Based Coding, Arithmetic Coding, Lossless Image Compression. Distortion Measures, The Rate-Distortion Theory, Quantization, Transform Coding, Wavelet-Based Coding, Wavelet Packets, Embedded Zerotree of Wavelet Coefficients, Set Partitioning in Hierarchical Trees (SPIHT).

5. Image Compression Standards

The JPEG Standard, The JPEG2000 Standard, The JPEG-LS Standard, Bilevel Image Compression Standards.

6. Basic Video Compression Techniques

Introduction to Video Compression, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261, H.263 303.

7. MPEG Video Coding

Overview, MPEG-1, MPEG-2, Object-Based Visual Coding in MPEG-4, Synthetic Object Coding in MPEG, MPEG-4 Object types, Profiles and Levels, MPEG-4 Part10/H.264, MPEG-7.

8. Basic Audio & MPEG Audio Compression Techniques

ADPCM in Speech Coding, G.726 ADPCM, Vocoders, Psychoacoustics, MPEG Audio, Other Commercial Audio Codecs, future: MPEG-7 and MPEG-2.

9. Computer and Multimedia Networks

Basics of Computer and Multimedia Networks, Multiplexing Technologies, LAN and WAN, Access Networks, Common Peripheral Interfaces.

10. Multimedia Network Communications and Applications

Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD), Multimedia over Wireless Networks.

11. Content-Based Retrieval in Digital Libraries

How Should We Retrieve Images?, C-BIRD— A Case Study, Synopsis of Current Image Search Systems, Relevance Feedback. Quantifying Results, Querying on Videos, Querying on Other Formats, Outlook for Content-Based Retrieval.

12. Image Databases

Raw Images, Compress Image Presentations, Image Processing Segmentation, Similarity- Based Retrieval, Alternating Image DB Paradigms, Representing Image DBs with Relations and R Trees, Retrieving Images by Special Layout, Implementations, Selected Commercial Systems.

13. Text/Document Databases

Precision and Recall, Stop Lists, Word Stems and Frequency tables, Latent Semantic Indexing, TV-Trees, Other Retrieval Techniques, Selected Commercial Systems.

14. Video & Audio Databases

Organizing content of a Single video, Querying content of Video Libraries, Video Segmentation, Video Standard and Selected Commercial Systems. A general Model of Audio Data, Capturing Audio Content through Discrete Transformation, Indexing Audio Data and Selected Commercial Systems.

15. Multimedia Databases

Design and Architecture of a Multimedia Database, Organizing Multimedia Data based on the Principal of Uniformity, Media Abstractions, Query Languages for Retrieving Multimedia Data , Indexing SMDSS with Enhanced Inverted Indices, Query Relaxation/ Expansion, Conclusions and Selected Commercial Systems.

References :

1. Fundamental of Multimedia (*Ze-Nian Li and M. S. Drew*) Pearson Education.
2. Principles of Multimedia Database Systems (*V. S. Subrahmanian*) Morgan Kaufmann Punlication.
3. Introduction to Multimedia Communications (*K.R. Rao, Zoran S. Bojkovic, D.A. Milovanovic*) Wiley.
4. Multimedia: Computing, Communication & Applications (*R. Steinmetz and K. Nahrstedt*) Pearson Education.
5. Multimedia Systems (*Buford*) Pearson Education.
6. Multimedia and multimedia Communications (*C. T. Bhunia*) New Age International Publishers.
7. Multimedia Systems design (*Prabhat K. Andheigh, Kiran Thakrar*) PHI.
8. Multimedia Systems (*Koegel Buford*) Pearson Eduaction.
9. Multimedia Communications: Directions and Innovations (*J. D. Gibson*) Academic Press, Hard-court India.
10. Multimedia Communications (*Free Halshal*) PEA.

