

Multimedia Systems

- Richard Akester & Mark Handley
- Taught as:
 - Z24 (DCNDS)
 - 4C34 (MSci)
 - VIVE0011

Aims

- describe the ways in which multimedia information is captured, processed, and rendered
- introduce multimedia quality of service (QoS) and to compare subjective and objective methods of assessing user satisfaction
- analyse the utility of QoS management schemes and the ability of unicast and multicast protocols to provide QoS guarantees
- discuss privacy and copyright issues in the context of multimedia

Learning Outcomes

- describe different realisations of multimedia tools and the way in which they are used
- analyse the structure of the tools in the light of low-level constraints imposed by the adoption of various QoS schemes (ie bottom up approach)
- analyse the effects of scale and use on both presentation and lower-level requirements (ie top down approach)
- plan experiments to test user perception of multimedia tools
- state the properties of different media streams; compare and contrast different multicast protocols
- describe mechanisms for providing QoS guarantees in the network and to propose experiments to analyse their performance.

Assessment

- The course has the following assessment components:
 - Written Examination (2.5 hours, 85%)
 - Coursework Section (1 piece, 15%)
- To pass this course, students must:
 - Obtain at least 40% on the coursework component
 - Obtain an average of at least 50% when the coursework and exam components of a course are weighted together

Reading List

- Recommended Text: Fred Halsall: "Multimedia Communications: Applications, Networks, Protocols, and Standards", 1/e 2000 Addison-Wesley
 - Jon Crowcroft, Mark Handley, Ian Wakeman: "Internetworking Multimedia", 1999 Morgan Kaufmann Publishers
 - Francis Flackiger: "Understanding Networked Multimedia: Applications and Technology", 1/e 1996 Prentice Hall
 - Nalin Sharda: "Multimedia Information Networking", 1/e, 1999 Prentice Hall
 - R. Steinmetz, K. Nahrstedt: "Media Coding and Content Processing", 2002 Prentice Hall /ims Press Multimedia Series
 - J. Irwin, Chuan-Hua Wu: "Emerging Multimedia Computer Communication Technologies", 1/e, 1998 Prentice Hall
 - Franklin Kuo, J.J. Garcia Luna-Aceves, Wolfgang Effelsberg: "Multimedia Communications: Protocols and Applications", 1/e, 1998 Prentice Hall
 - S.V. Raghavan, Satish Tripathi: "Networked Multimedia Systems: Concepts, Architecture, and Design", 1/e, 1998 Prentice Hall
 - A. Mitrovanic, Zoran S. Bjokovic, Dragorad A. Milovanovic, Kamisetty Ramamohan Rao: "Multimedia Communication Systems: Techniques, Standards, and Networks", 2002 Prentice Hall

Contents 1

- Discrete Cosine Transform
- Audio
- Video (Still and motion)
- System streams
- Signalling
- OS Issues

Contents 2

- Usability
- Describing network traffic
- Congestion control & resource management
- Enhanced QoS
- IP Multicast
- Digital Rights Management

Multimedia Representations

- Numbers
 - Binary
 - 2s Compliment (Negative numbers)
 - IEEE 754 (Floating point/fractional numbers)
- Characters
 - ASCII (American English)
 - Unicode (International)

Audio & Video

- Audio
 - Pulse Code Modulation (PCM)
 - GSM
 - MP3
- Video
 - Bitmap/colour representation
 - GIF (Graphical Images)
 - JPEG (Photographic Images)
 - MPEG (Motion Picture)
 - H.261/3

Networks

- Internet
 - IP (Internet Protocol)
 - TCP (Transmission Control Protocol)
 - Multicast
 - RTP (Realtime Transport Protocol)
- Signalling
 - H.323/SIP (Session Initiation Protocol)
 - RTSP (Realtime Streaming Protocol)