

1. Introduction

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Multimedia Systems

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Internet Standards - author of more than 25 RFCs including:

- RFC 5015: Bidirectional PIM multicast routing.
- RFC 4340: DCCP (Datagram Congestion Control Protocol)
- RFC 3448 & RFC 5348: TFRC (TCP-Friendly Rate Control)
- RFC 2736: Guidelines for RTP Payload Format Specifications
- RFC 2543: SIP (Session Initiation Protocol)
- RFC 2362 & RFC 4601: PIM Sparse Mode multicast routing.
- RFC 2327: SDP (Session Description Protocol)
- RFC 2198: RTP Payload for Redundant Audio Data

Multimedia Systems

- Taught as:
 - GZ05 (MSc DCNDS, option for MSc VIVE)
 - 4034 (MSci)
- Join the GZ05 or 4034 mailing list!
 - "mlist gz05" on one of the Unix systems.
 - "mlist 4034"
- Web page: <http://www.cs.ucl.ac.uk/teaching/GZ05/>

Aims

- Learn how multimedia information is captured, processed, compressed, and rendered.
- Understand how multimedia is transmitted over networks (especially the Internet).
- Understand a little about network QoS.
- Understand a little about how the Operating System impacts multimedia data.
- Discuss privacy and copyright issues in the context of multimedia.

Assessment

- The course has the following assessment components:
 - Written Examination (2.5 hours, 85%)
 - Coursework (1 piece, 15%)
- To pass, students must:
 - Complete the coursework.
 - Obtain an average of 50% when the coursework and exam components are weighted together.

Reading List

No book is all that great.

- Fred Halsall, *Multimedia Communications: Applications, Networks, Protocols, and Standards*, Addison Wesley, 2000.
- Jon Crowcroft, Mark Handley, Ian Wakeman: *Internetworking Multimedia*, Taylor and Francis, 1999.



Internetworking Multimedia

- Ignore:
 - Chapter 3: Multicast (except PIM-SM)
 - Chapter 7: Conference Control
 - Chapter 8: Applications
 - Chapter 9: Media-on-demand (except RTSP)
- Free online version:
 - <http://www.cl.cam.ac.uk/~jac22/books/mm/book/book.html>



Course Overview (1)

- Audio
 - Sampling, Representation
- Discrete Cosine Transform
- Audio Compression;
 - Speech Compression
 - Music Compression
- Video:
 - TV standards, colourspace representation.
- Image Compression
- Video Compression
 - H.261
 - MPEG

Course Overview (2)

- System Streams
- Transport over the Internet
 - RTP
- Signalling Protocols
- Traffic Patterns, QoS Parameters
- OS Issues
- Congestion Control
 - Queue Management
 - Enhanced QoS
- Usability of Multimedia
- Digital Rights Management

Audio and Video

- Audio
 - Pulse Code Modulation (PCM)
 - GSM
 - MP3
- Images and Video
 - Bitmap/colour representation
 - GIF (Graphical Images)
 - JPEG (Photographic Images)
 - MPEG (Motion Picture)
 - H.261/H.263 (Video Telephony)

Networks

- Internet
 - IP (Internet Protocol)
 - UDP vs TCP
 - Telephony vs Streaming
 - RTP (Realtime Transport Protocol)
- Signalling
 - H.323 (Video Conferencing)
 - SIP (Session Initiation Protocol)
 - RTSP (RealTime Streaming Protocol)