Video Streaming: Remote Participation and Engagement in the Conference Environment

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Outline

1 Motivation
   - Background
   - The Technical Infrastructure

2 Implementation
   - Literature Review
   - Implementation Choices

3 Results
   - Feedback
   - Conclusion
The Community

- Institutional Web Managers Workshop (IWMW)
- Members from very diverse backgrounds and institutions (HE, FE, Museums)
- Formed around the roles of members with UK institutions
- Limited interaction between members, only on ad hoc basis
- Members fairly technically savvy
- Keen to try out new technologies
The Event

- Yearly event since 1997
- Exchange of ideas
- Evolution of trends
- Networking
- Social activities
The Challenges

- limited available hardware
- no budget to buy purpose built system (hardware or software)
- possible to reimplement by small institutions or departments
Available Hardware

- one laptop with bluetooth and mobile SIM card
- one borrowed desktop with firewire port running Linux (mine)
- one miniDV video camera
- one tripod
- UKOLN existing web server (Sun Fire v40z) running Linux
- University of Bath network infrastructure
Available Technologies

- **Synchronous**
  - IRC (Internet Relay Chat)
  - Videoconferencing

- **Asynchronous**
  - Video Streaming
  - SMS
  - Bluetooth Messaging and File Transfer
Definitions of Presence

- The sense of being part of an environment – Freeman et al, 2001
- The defining experience for virtual reality – Steuer, 1992
- Aim: the context and activity should seem familiar – the technology unobtrusive.
What breaks the user experience?

- Gaze and gestural information lost
- Little information available for turn-taking
- Out-of-sync or degraded audio
  - Synchronisation information important for repair
  - Loss of sync causes perceptions such as speaker less credible, or slow
What doesn’t?

- Bandwidth economies for video
  - Relatively low framerate
  - Relatively low video quality, if synchronised correctly to audio
- Some problems irrelevant in context
  - Turntaking is minimised in conference context
  - Formalised environment → ad hoc interaction minimised
Synchronous Video Conferencing

- provided by Rob Bristow (Uni. of Bristol) and Mark Lydon (I2A Consulting)
- using AccessGrid based technology
- required software and/or specialised hardware
Open Source Alternatives

- full linux based environment
- Audio codec used: vorbis
- Video codec used: theora
- multimedia envelop: ogg
- streaming server: icecast
- other possibilities:
  - simultaneous multiple format streams (SWF, WMV, OGG, RM)
  - using ffmpeg/ffserver for encoding and streaming
- choice made considering uncertainty of bandwidth availability.
Implementation concerns

- Cost – a shoestring budget
- Intellectual property and preservation issues
- Accessibility to the casual viewer – widely-supported codecs
- Not much consensus on interoperable technologies...
Videoconferencing audience agreed ahead of time
Fear of scalability issues caused us to (unnecessarily!) limit participation
Video streaming audience resulted from a small amount of last-minute advertising (mailing list)
Page contained details of IRC network, etc.
Social/legal issues

- Requirements of the Data Protection Act
- Remote participants not identified/identifiable — limiting would produce ‘walled society’
- Possibility of real-time recording of video stream
- Video is stressful: feeling under surveillance
- Contributor’s remorse (or organiser’s remorse):
  - I said what?
  - We can’t publish that on the logs!
User Feedback: Videoconferencing

- Uncomfortable sensation of being watched
- Conference ‘mood’ missing, thus:
  - Inconsistent with conference environment
- Good technology but not entirely appropriate in a conference context in which audience participation is not requested
User Feedback: Video Streaming

- Video Stream helped remote users but space for improvements
- Single IRC back channel was still very much used, with more participation from remote users
- IRC feedback channel also used for community repair (‘what did he say?’)
- Availability of parallel incoming and outgoing asynchronous technology increased sensation of involvement
- Still hearing from remote participants — lots of enthusiasm
- But: accessibility issues in video streaming.
- Good camera work made the session ‘come alive’
Documenting after the event

- Multimedia to be marked-up ie. with SMIL?
- Projects like ILRT’s IUGO looking to index user contributions relating to conferences/workshops (moderated SW approach)
- Web 2.0/community-based approaches: tagging related resources, collecting blog pingbacks/trackbacks
- Linking multimedia information to user-contributed resources; information ‘trails’
Future work

- Near real-time linking of dissimilar channels
- Establishing ‘information trails’ or ‘narratives’
- Exploring real-time community multimedia annotation across low-bandwidth feedback channels
- Experimenting with different camera angle
- Experimenting with picture-in-picture with simultaneous multiple view points (small icon size of speaker in close-up, and full frame of slides)
- Improve sound capturing
Any Questions?
For Further Reading I

M. Chen

J. Wegge.

S. Whittaker and B. O’Conaill.
For Further Reading II

J. Freeman, J. Lessiter, and W.A. IJsselsteijn.
An introduction to presence: A sense of being there in a mediated environment.

J.S. Steuer.
Defining virtual reality: Dimensions determining telepresence.