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EyA system: Automated audio-video-slide recordings

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Key words: *Synchronized presentations, Rich-media, Web streaming*

Abstract:

*We discuss on an innovative system developed in-house to archive and share scientific lectures carried out using modern presentations (PPT, PDF, animations, etc) or, alternatively, the commonly used traditional chalkboards found in classrooms. The system -named "**Enhance your Audience**" (**EyA**), allows to widening the audience for such activities with little efforts. The technologies employed are low-cost.*

1 Rich-media

To produce rich-media presentations consisting of audio and visual material for Internet streaming both the type of audience and their available computer/networking facilities need to be considered. It is necessary:

- to select low-bandwidth compliant applications that can keep the video quality as high as possible;
- to follow as much as possible the proposed open standards for the authoring of audio-visual presentations to make them visible under many platforms and operating systems.
- Also relevant to mention is to automate as much as possible the production of the presentations and to reduce any post-processing and editing (in terms of human resources and financial costs).

The final result should be similar (or as much as closer) to a high quality learning experience for the remote audience. This is still an open technological challenge for research and experimentation.

We briefly introduce here our innovative automated audio-video-slide recording system (EyA) developed to archive and share scientific lectures carried out using modern presentations (PPT, PDF, animations, etc) or, alternatively, the commonly used traditional chalkboards found in classrooms.

2 Enhance your Audience

2.1 Scientific Presentations

Typical scientific presentations, including seminars, talks, lectures, etc, are much more complex in form than relatively simpler PowerPoint (PPT) or Keynote presentations. In fact, they can include the simultaneous use of a chalkboard, transparencies and overhead projector, the display of simulations via animations, the use of a laser pointer, the display of films and photos from experiments, devices, etc. So all of these variables need to be considered and synchronized when producing and archiving a recording in order not to loose information in practice.

2.2 EyA

The EyA system works like this:

- video/audio is recorded on a local computer ("producer") with a webcam and USB microphone fixed on the wall. Photos are taken every 15 seconds with a digital camera controlled by USB and proprietary software and immediately downloaded from the camera to the computer via USB (this limits the shooting interval at around 15 seconds for high resolution images). The recording time is in slots of 1 hour to follow usual classroom schedules.
- All photos, together with the movie and info about the synchronization, are transferred through the network, to a dedicated server ("master") as a TAR archive. This is done immediately after every hour of recording, and can happen at the same time while the computer is recording the next hour.
- The "master" server expands the TAR files just received from multiple rooms (they have unique names, with timestamps and info about the rooms), and queues them for post-processing. They are immediately processed room-by-room, creating a QuickTime (QT) synchronization track that, added to the movie file, provides the synchronization between the images and the movie. Images are also compared together to drop duplicates, in order to decrease the space needed for the storage and the download of recordings.

A dedicated web server then automatically publishes the recordings with all relevant information (room, starting and ending time, size of the zip file).

The EyA system has been developed with these main features:

a. high resolution of images
b. no human intervention during recording and post-processing
c. no special requirements for the speaker/lecturer
d. low total cost of ownership and implementation
e. scalable architecture
f. low-bandwidth friendly features (zip, CD/DVD).

To the best of our knowledge, no existing recording system is designed with these aspects in mind [1, 2]. Furthermore, the cost of human intervention in the recording and/or any post-processing phase is negligible when using EyA, whereas using other more conventional (dedicated and proprietary) systems the cost may amount to several hundreds euros/hour. [3]

3 EyA @ work

The EyA system is an open source application. It is completely automated, non-intrusive, low-cost and allows the recording of any lecture without dedicated human intervention. An example of EyA recording is depicted in Fig.1.

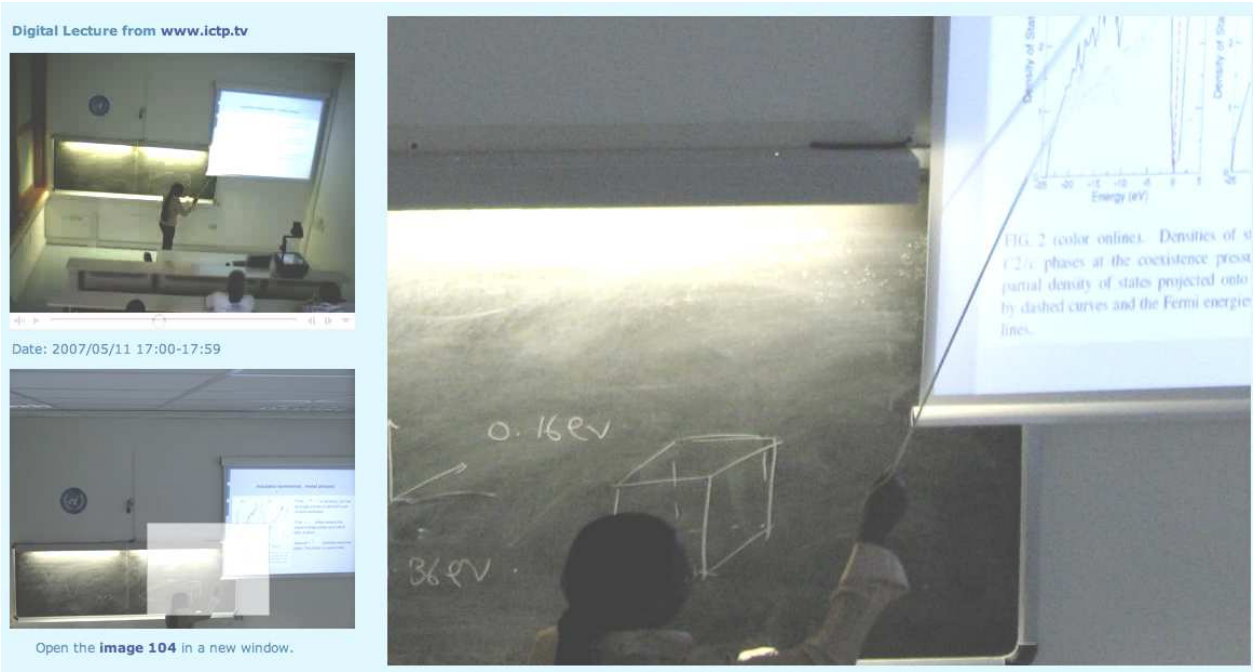

***Fig.1**: EyA snapshot with (audio) video and slides (on the left) recorded automatically. OnMouseOver a synchronized high resolution zoomed image appears on the right.*

Complete synchronized web-based presentations (of, e.g., 10 days long) with audio, QT video and synchronized photos of chalkboard Diploma course Lectures and Conference talks, etc can be seen at the website: **www.ictp.tv**

References:

[1] G. Friedland, L. Knipping, R. Rojas, Freie Universitat Berlin, "Mapping the Classroom into the Web: Case studies from Several Institutions", article available at www.echalk.de
[2] M Fardon, “Internet Streaming of Lectures: A Matter of Style”, Proceedings of Educause Australasia, 2003.
[3] University of Texas TIF Report: *http://www.utexas.edu/computer/grants/di4/cit/cit.html*

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