LECTERN II SYSTEM DEMONSTRATION

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1. INTRODUCTION

Deployment of asynchronous learning systems is still very limited mainly because of the use of expensive video to record and play back classroom lectures. The key advantage of the Lectern II approach is that all important lecture components can be effectively captured without video. Lectern II employs the touch-sensitive screen technology to build a "digital desk," which is shown to be able to effectively support and transparently capture the standard classroom lecturing activity. Similar to the hardware set up described in [1] Lectern II consists of a high resolution touch-sensitive screen, a PC, a video projector, and a microphone. The PC and the touch sensitive screen can be substituted with a tablet PC as illustrated in figure 1. Instructors carry out the entire lecturing activity using the touch sensitive screen, while its contents are mirrored on a big screen via the video projector. A digital pen is used to emphasize important points, draw illustrations and formulas, or simply attract students' attention to some location on the slide. Meanwhile, the voice is being recorded through a microphone. The whole setup consists of only two pieces and thus can be conveniently carried by the instructor and easily shared among many classrooms.

Recorded lectures can be edited and automatically uploaded to a Web server, and than searched and viewed via a standard streaming player. As the total cost of a complete Lectern II system is under $4,000, Lectern II represents the first course lecture recording system that has the potential to be widely deployed in the classrooms of universities and K-12 schools. More details about the implementation of the Lectern II system can be found in [2].

2. SLIDES PREPARATION

The lecture slides can be prepared in any program that can print on a printer on a windows platform. Once the slides are ready instructor can print them on a specially designed Lectern II virtual printer and the Lectern recording program is activated automatically.

3. LECTURE RECORDING AND EDITING

The system operates in one of two modes: recording and editing a recorded lecture. In both cases the toolbar pops up on the side of the screen if a mouse or a pen is moved at the screen edge. Otherwise the toolbar is completely covered by the slide and will not obstruct slide’s view.

In the recording mode the instructor can record/pause the lecturing process, choose a pen color, insert a new blank slide or create a copy of the current slide that is clean from pen remarks. As illustrated in figure 2, a scrollable list of thumbnail slides’ images is provided on the same toolbar to ease the slide navigation.

During the editing mode a prerecorded lecture can be played back and edited. The editing operations include cut to clipboard and paste from clipboard or another lecture. All the editing actions can be undone.

After the recording and editing is finished the lecture is saved in the vector format for subsequent editing operations. Optionally, a set of web-ready files is generated.
4. UPLOAD TO SERVER AND LECTURE SEARCH

To simplify the recorded lecture files upload FTP and HTTP clients are built into the recording/editing program. A special Perl-based set of scripts is responsible for the communication with the Lectern main program during the uploading process, placing the files in the appropriate directories and integrating the lecture into the server structure. An index page for a given collection of lectures is updated automatically based on an HTML template file as illustrated in figure 3. Textual information extracted from the slides used in the uploaded lectures is extracted, indexed, and placed into the HTML files that are made accessible to Web crawlers and therefore for majority of the Web search engines. In addition, extracted textual information is searchable by a special search engine. The information returned on a keyword search request includes previews of the slides and links to the appropriate lecture fragments. The server can be configured to use a streaming server from Real Networks [3] instead of a standard HTTP one.

5. LECTURES PLAYBACK

Recorded lectures are available in a web ready form based on the SMIL [4] and RealPix [5] standards and therefore can be played by a free Real Player [6] available for all the popular operation systems and platforms. The bandwidth required is on the order of 30 Kbps.

6. REFERENCES


