3X-4 | Design and Implementation of Multimedia Database for GUIDEE

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1. Introduction

GUIDEE stand for Graphic User Interface for Digitized Education Environment is the general term of the basic computer application group to do the class to accomplish the root of the education activity at the school through the digital network. By using computer, multimedia and Internet technology, we can provide an alternative lecture model called Multimedia Lecture Model to achieve a high reformation in the education environment.

2. Multimedia Lecture Model

The component for recent lecture model (conventional lecture) can be divided as four elements (Lecture speech, Note on the blackboard, Reference and Discussion). In the Multimedia Lecture Model, these four components will be reformed to achieve a better system of lecture model. The first element, lecture speech is not drastically changing, but we will use video camera and LAN technology to record and broadcast the lecture speech, so, the students can follow the lecture by using computer that provided for them. We use a new technology of digital whiteboard instead of the conventional whiteboard. By using digital whiteboard (http://www.mimio.com), we can broadcast what the teacher wrote on the whiteboard to each computer used by students. Web document is used instead of book reference or other text. The last one, discussion between student and teacher is handled by using chat or net meeting.

To construct the system above, GUIDEE divided as four components (Management Agent, Communication Agent, Presentation Agent and Database Agent). In this paper we will discuss about Database Agent.

3. Database Design and Interface for Database Agent

Database Agent has responsibility about data collection, data composition and providing an interface for user to store or retrieve data. We use HTML and (or) Java Applet to provide a simple interface on the client side, Java Servlet as a middle tier that act as bridge for client and database server, and Postgresql as our database engine.

Data that used in a multimedia lecture is divided as two kinds of data, static data and dynamic data. Static data is a data that would not change during lecture such as the teacher data. The dynamic data is a data that will changeable during lecture such as video or presentation data.

A user/student can use a simple user interface to reproduce a complete or part of a session of lecture and then displaying the multimedia contents that used during lecture such as video or presentation file on Real Player. Figure 1 shows the applet, servlet and database request-response flow.
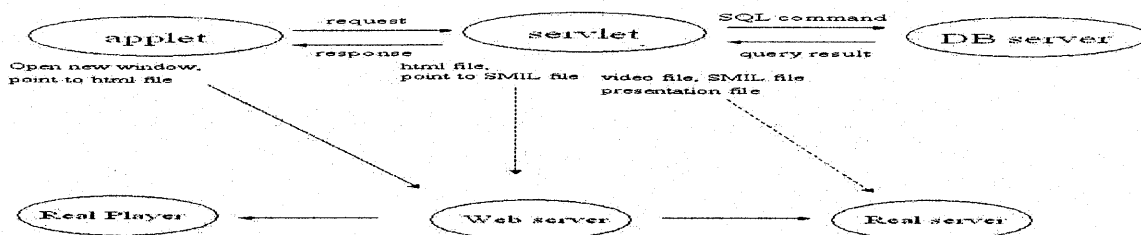
Figure 1 Process of Data Retrieval

Data/information entered by a student will be used by applet as his argument, applet then sends request including this argument for servlet. Using this argument, servlet sends SQL command to database server, and waiting for database server's response. As a response, servlet gets video or presentation content from database server in array byte. Actually, servlet have to send response including the video content for applet. But because some times applet has no permission to write and (or) execute a file from disk, we use other method to handle this problem. Instead of sending array byte of video content to applet, servlet creates a temporary video or presentation file in RealServer. In addition of creating video or presentation file, servlet also create HTML file and SMIL (http://www.w3.org/AudioVideo) file that used by applet to connects and displays the video file in Real Player. If everything is correct, applet will receive a good response from servlet including information that user request was processed, then applet will open a new window pointing to HTML and SMIL file created by servlet. And user can replay a multimedia lecture on Real Player as shown in figure 2.
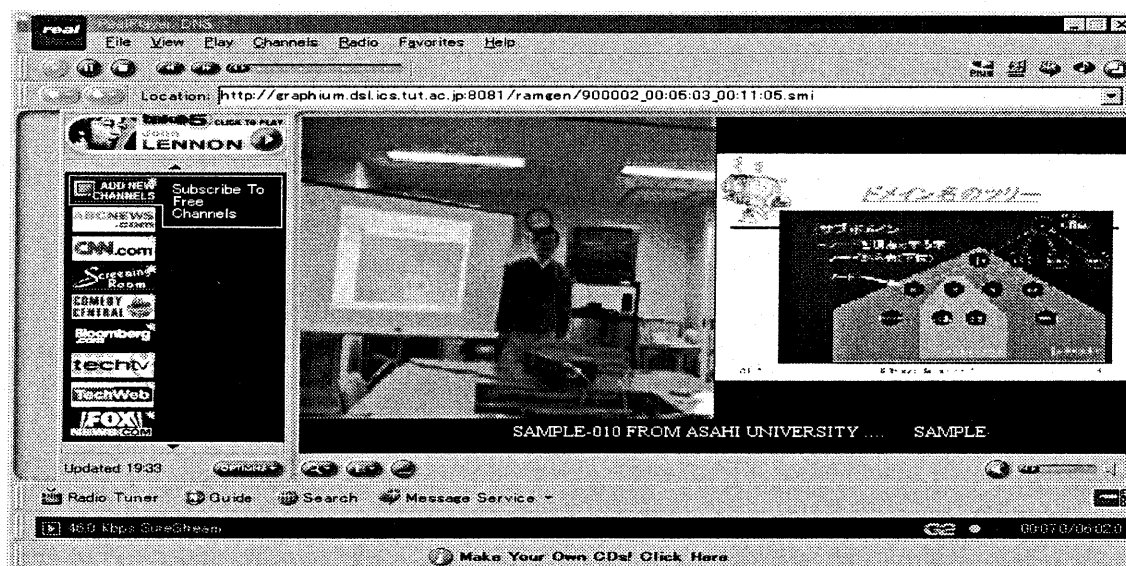

Figure 2 Replaying multimedia lecture

4. Conclusion

By using the computer, multimedia and Internet technology, we can provide an alternative lecture model called multimedia lecture model. A student can learn a course subject by using a simple user interface provided by Database Agent to replay a complete or part of a session of lecture including video and presentation file.