An Efficient Method of Supporting Interactions for an Integrated Distance Learning System

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ABSTRACT

In recent years, as the demand of taking lectures without the limitation of time and place by those who have jobs and require lifelong education grows, there are more and more expectations on the implementation of a distance learning system. However, in most of the existing asynchronous distance learning systems, the images shown on screen are limited to the images of the teacher with synchronized digital documents used in lectures. Since these systems have not been able to convey interactions between a teacher and students, the educational effectiveness is lower than the traditional lecture. This paper describes a distance learning system that supports interactions between a teacher and students in asynchronous distance learning. During synchronous distance learning, this system can record interactions automatically with XML. It can provide recorded interactions to students who are studying asynchronously. An important point to emphasize is not only synchronizing digital documents with recorded lecture video, but also synchronizing recorded interactions with digital documents and lecture video. Moreover in order to support interactions, this system also links similar questions together and can suggest the most meaningful question.

Keywords: distance education system; multimedia system; supporting interactions; virtual university; Web-based application.

INTRODUCTION

In recent years, we have been witnessing the rapid evolution of computer networking technology and the demand for acquiring lifelong knowledge. Most of the workers are needed to broaden their academic knowledge, in order to gain economic stability and progress. Some of them prefer attending traditional schools at their own available time. However they must compromise having formal schooling because of time and distance. For these reasons, the implementation of a distance learning system has been desired, and now has been researched and developed (Latchman, Salzmann, Gillet, & Bouzekri, 1999; Maeda et al., 1997; Mashita, Shigeno, & Matsushita, 2001).

Distance learning has four factors that increase the number of questions. They are: (1) the lack of awareness, (2) the ability to
easily ask a question due to the distance between a teacher and students, (3) the difficulty of solving a question among students, and (4) the possibility of a lot of students taking a class simultaneously. The increase in the number of questions prevents a teacher from lecturing, because he may have to spend all of his time answering questions.

On the other hand, human communication is becoming increasingly important as the Internet grows. In addition, interactions and collaborative interpretation (Cox & Greenberg, 2000) are crucial in the development of human communication through distance learning (Ikehata, Shigeno, Okada, & Matsushita, 2000). Furthermore, in a cooperative educational environment, there is a notion of “Learning by Observation” (Kolodner & Guzdial, 1996; Dillenbourg & Self, 1994; Hmelo, 1998). Students that can learn by other students’ actions and awareness have an important advantage over those who can’t. Viewed in this light, Learning by Observation is one of the most important factors for the effective education.

However, most of the existing asynchronous distance learning systems can support the images of the teacher with synchronized digital documents used in lectures; however, they have not been able to convey interactions (between a teacher and students, or among students), atmosphere, or awareness to students who study asynchronously. As a result, students cannot experience such as a traditional face-to-face lecture.

In order to solve these problems, we propose a distance learning system, “I-IE-DLS (Integrated Interaction EVENT Distance Learning System),” which provides the ability to display questions and also links similar questions together. It can suggest the most meaningful question. Moreover I-IE-DLS supports live interactions and records interactions during synchronous distance learning. It conveys recorded interactions to students who are studying asynchronously.

**EFFECTIVE INFORMATION FOR DISTANCE LEARNING**

This section describes the many questions and importance of interactions in distance learning.

**Linking Similar Questions Together**

As we said earlier, distance learning has factors that increase questions. If too many questions are sent to a teacher, a teacher cannot answer all questions in lecture-time. For example if the number of questions sent to a teacher is 20 or 30 in the traditional lecture, he may have to spend all of his time answering questions.

On the other hand, if students ask too many similar questions, it may be more meaningful for the students if the teacher answers the questions many students have in common. This is because, by answering these questions, more students will be pleased at once.

However, the distance learning system that exists now supports mail, chat, or BBS during question-and-answer sessions. Currently very little information about the question is known, for example who sent a question, when the question was sent, and what the content of the question was. As a result, the teacher cannot tell what questions should be answered.

**Interactions in Distance Learning**

As discussed in introduction, Learn-