Development of a Real Time Audio-Text Based E-Learning System

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ABSTRACT - A real time Audio-text based Electronic learning system can be considered an important multimedia service among the various ones which are receiving much attention to-date. In order to support a service of this kind, the telecommunication infrastructure has to efficiently cope with the transmission of different types of streams that have different requirements in terms of constraints and required bandwidth. Electronic Learning is the delivery of learning or educational program by electronic means, the acquisition of knowledge and skills using technologies such as computer and internet-based courseware and local and wide area networks. The work discussed the development of an audio-text based electronic learning system and how it is implemented. The development of this program can lead to a potential increase in the use of the remote-learning sessions and requirements of such a service.

I. INTRODUCTION

In this respect, a real-time audio based learning system can be considered an important multimedia service among the various ones which are receiving much attention to date. In order to support a service of this kind, the telecommunication infrastructure has to efficiently cope with the transmission of different types of streams that have different requirements in terms of constraints and the required band-width. High speed networks will certainly be able to provide all the bandwidth necessary to whatever requirement but, by carefully analyzing the nature of a real-time session, it is possible to come out with a system able to give a more than sufficient grade of service, even with the existing network structures. This leads to a potential increase in the use of remote-learning sessions and to the possibility of experiencing the real issues and requirements of such a service today.

During these years, however, several improvements in machine power and network performances have taken place. This has led us to study the possibility of carrying a distance learning session based on packet switching mode between workstations. In particular, we have taken into account the utilization of visual studio tools, which seem to be the most promising one for networked applications.

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The term e- learning covers a wide set of applications and processes including computer based learning, web based learning, virtual class room and digital collaboration. E-learning is the delivery of a learning or education program by electronic means. E- Learning can involve a greater variety of equipment than online training or education, for as the name implies, “online” involves using the internet or an intranet. CD ROM and DVD can be used to provide learning materials. Distance education provided the base for e-learning’s development. E-learning came “on demand” as it overcomes timing, attendance and travel difficulties.

Due to the broad nature of the topic in view, as many as possible definitions of learning could be reached. Perhaps this could be attributed to the fact that learning is becoming so important that anyone without knowledge would pay dearly for it.

Learning using electronic medium is the acquisition of knowledge and skills using technologies such as computer and internet based courseware and wide area networks. Electronic education centered on teaching students the use of computer programming languages like BASIC. The realization that learning a computer programming language was diverting valuable time away from conventional subjects matter such as paradigm shift in the 1980s and the current trend of application packages began.

In the lifelong learner market, self help books grew at a 21% rate from 2006 to 2009 and a good percentage of the internet population are there majorly to pursue information and learn one thing or the other. This prompts the basic need for the development of e-learning to facilitate the learning and experience of the learners. In some couple of years, the educational facilities would stretch to its limits to contain the geometric progression in people willing to learn.

E-learning is currently very similar to the traditional classroom learning in the way its educational tools are being used. However, it has begun to evolve by providing an environment that facilitates broad based content creation, sharing, reuse and distribution.

E-learning is generally supported by computer and communication technology. Computer technology is essential in the processing and presentation of the educational contents and the communication technology is mainly used in the delivery of the contents.

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II. OPERATIONS OF THE SYSTEM

This learning system operates between two workstations. One of them is on the lecturers' site (or master site), while the other one is on the remote site (or slave site). The master site is composed of several parts: an audio encoder, an audio decoder, a browser that can run C# and a central transmission handler. The audio encoder performs the group special mobile encoding algorithm. This method have been chosen because it represents a good compromise between compression rate and audio quality: good audio quality is essential for distance learning sessions. The browser e.g. explorer is used as a graphical user interface for both sites at the same time and his/her pointer is mirrored by the remote one. Because of limitations in the visual studio development settings, the remote pointer handling has to be performed by an ad-hoc remote process which in turn interacts with the remote browser. Image transmission passes through the transmission handler which decides how much bandwidth can be allocated to it. The role of the central transmission handler is to receive audio and image streams and to decide how to share a given capacity C (tunable) among them. Its purpose is not only to keep the sum of the three features below C but when possible, to maintain an output as close as possible to C.

Also of importance is the data management technique employed in this system. The e-learning system uses a Structured Query Language (SQL) to access its data base on the SQL server 2005 Express edition. This database files can hold multiple tables. Each table viewed as a spreadsheet with rows and columns. A table adapter handles retrieving and updating and updating the data. The table adapter automatically generates SQL statements that can be used to access or update our data in the database.

Web applications are designed to run on computer networks. This applications are based on the concept of client/server architecture which is an arrangement used on Local Area Networks that makes use of "distributed intelligence" to treat both the server and the individual workstations as intelligent programmable devices thus exploiting the full computing power of each.

The fields required to accommodate the users are shown in details in the figure below. The system is designed putting into consideration the end users convenience; hence navigation through the entire program is easy and understandable to users of little computer operation knowledge. This page is the first entry form common to all categories of users, therefore it has a side bar with which users could select and perform their various specific actions. The side bars l access to the functionalities of this system as shown in figure 1.

TABLE 1 USE CASE DESCRIPTIONS

Actor	**Use CASE Name**	**Use CASE description**
Users	Registers	-User ID -User Password -User Role
Student	Initiates	-login into system -login into live chat
Lecturer	Initiates	-login into system -login into live chat
Administrator	Initiate	-login into system -view registered users -edit registered list Delete registered list
Student	Login into system	The student will login into the system using his/her matric number
Lecturer	Login into system	The Lecturer will login into the system using his/her identification number
Administrator	Login into system	The administrator will login into the system using his/her user name and password
Student	Change login information	The student can change his/her loin information to access the system

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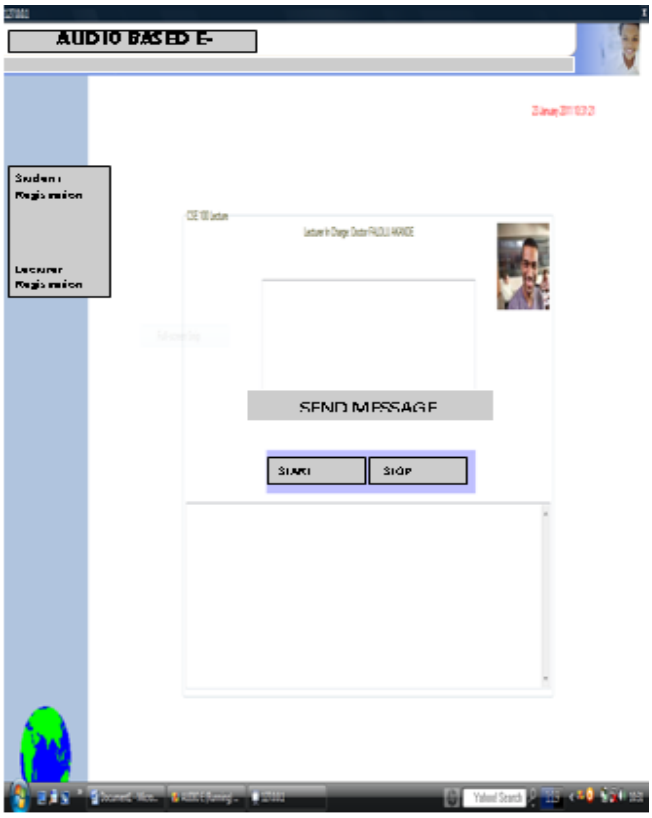

Fig I The Home Page

Fig III Lecturer ‘s Lecture Page

Fig II The Lecturer Registration Page

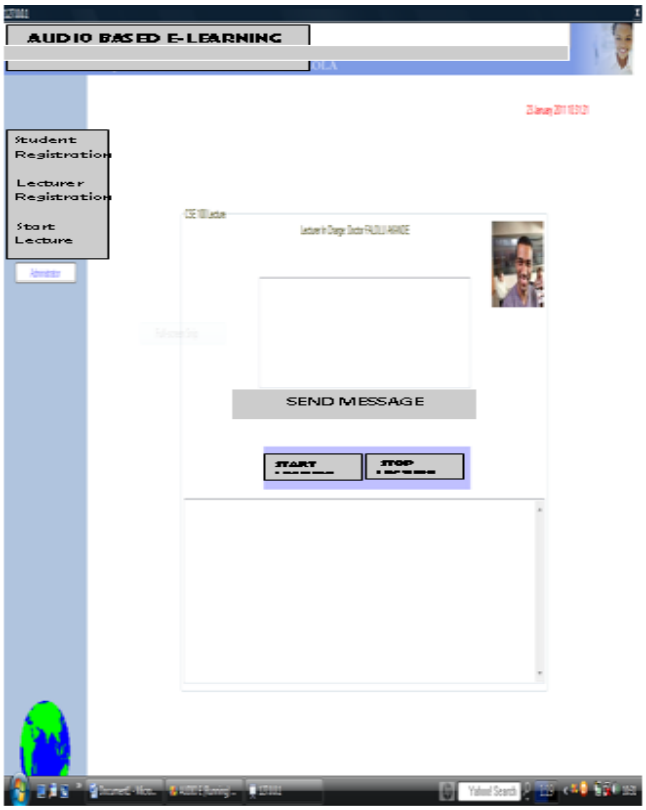

Fig IV Student’s Lecture Page

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III. USER REGISTRATION

The learning system is designed to cater for registered users only. To this end, all categories of users are expected to register before gaining full access to the functionalities of the system. The administrator performs all registrations.

The lecturer being part of the users would have to pass through the registration process just like other forms of users; however the fields required are quite distinguishable and specific to their category as a user.

IV. LECTURERS LECTURE PAGE

In this page, the lecturer meets with the student and establishes a communication link with the student via the "start lecture" button as shown in Figure II. The "start button" initializes the audio forum and the virtual classroom is established immediately. However, the lecturer should posses some hardware components such as a headphone and a microphone through which audio is transmitted from the student system to the lecturer and transmitted to the students system respectively. The lecturer could also enhance his or her audio communication with text based communication through the text box provided in the form. The text sent to the student appears immediately in the student's message text box indicating the lecturers name and the text sent. Lectures could be brought to and end by clicking on the "stop lecture" button as shown in figure III.

V. CONCLUSION

Within the limitless boundaries of the audio-text based learning system, this system have been developed to adequate functionality and hence catered for the three major categories of users; The Administrator, The Lecturer and The Student.

Since end users of the system are going to have much more interactivity with the system, the system have been developed putting into the highest priority the ease of usage by the end users. The roles of each user category have been specified explicitly. To this end users with little or no computer experience can use this system to the fullest of its functionalities with little or no assistance. Conclusively, this system in its own unique way opens another window to the unlimited boundaries of electronic learning.

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