Digitized Audio Reserve System for CCM Music Library

By

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Abstract

The Digitized Audio Reserve System is an application the enables students enrolled in the College Conservatory of Music to listen to music reserved by their instructors via the Internet. Currently, in order to listen to reserve music, a student has to request selections by the instructor's name or course number. The student then sits in a carrel that is supplied with headphones. Since only one student can sit in a carrel at a time, only one student can listen to a given selection at a time. Also, the listening room is only open during library hours further limiting the amount of time students have to access reserve material. The Digitized Audio Reserve System will enable multiple student access to reserve music on-site and remotely. The Digitized Audio Reserve System also enables 24-hour access to reserve music, which gives students control of the listening process. From the Web site instructors will be able to request music selections to be added to their course reserve material. The Digitized Audio Reserve System extends the walls of the classroom by enabling learning materials to be utilized remotely without time constraints.

Digitized Audio Reserve System for CCM Library

1. Statement of the Problem

Students in the College Conservatory of Music are required to listen to music that is reserved by their instructors for critical analysis. The present method for listening to the reserve material is limited and antiquated in that only one student at a time can listen to a given selection in a carrel supplied with headphones. Library personnel have to play the record or CD for students; they also control the volume. This system does not allow for multiple or remote access to reserve material, which results in a very inefficient use of library material and personnel.

1.1 Definition of the Need

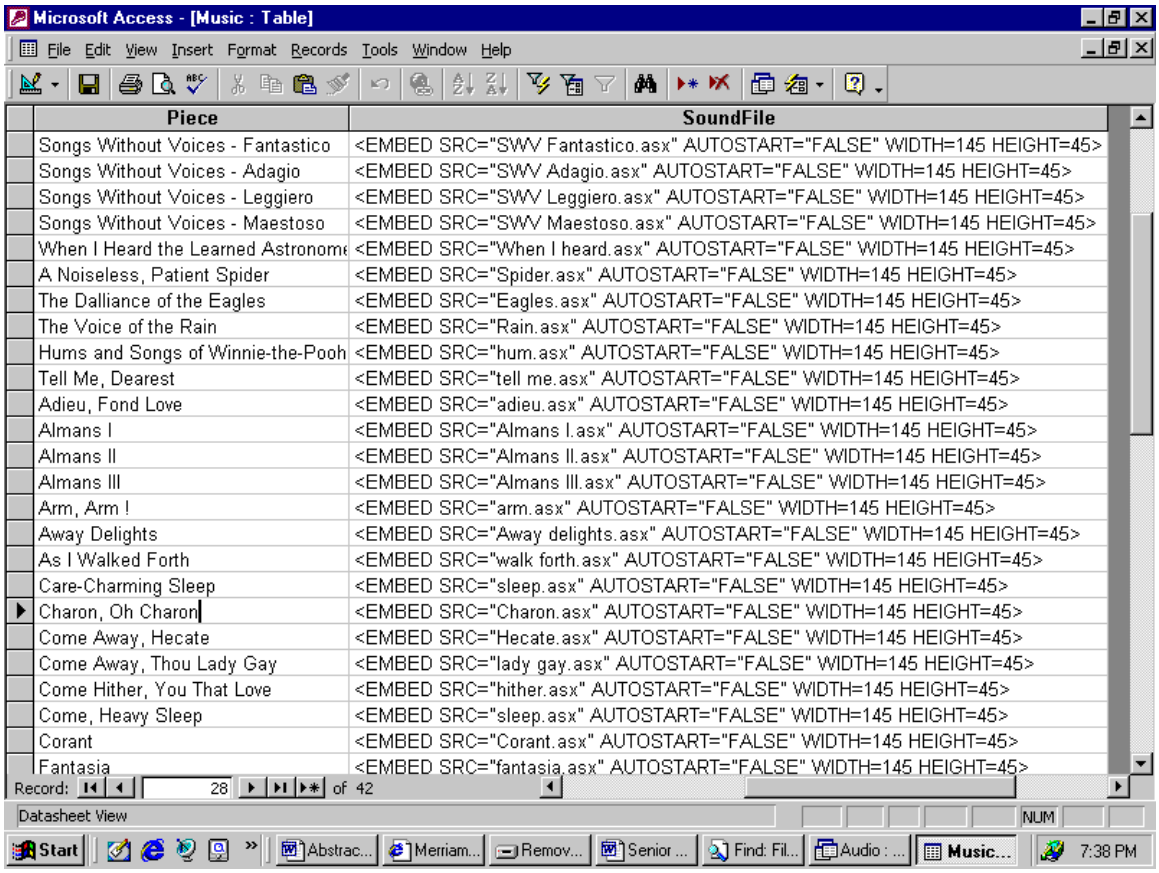
When a student is assigned reserve music to listen to by an instructor, the student must go to the circulation desk of the CCM Listening Room. The student then requests reserve music by supplying the instructor's name or course number to library personnel. The library personnel then instruct the student to go to a carrel with supplied headphones. The requested music is then played. If the sound of the music is too low or high, the student asks for the sound to be adjusted to the desired volume. Also, if for any reason the student needs to listen to a particular segment of a piece it is impossible for them to pause or rewind the music selection. If another student in the same class arrives during this time, they will be unable to listen to the reserve material because it will already be in use. This becomes a much greater problem in that students are limited in the amount of time they have access to reserve material because the Listening Room is open during library hours, which varies throughout the quarter. When instructors want to turn in the

list of music selections they want to reserve, they have to either call in the request or hand deliver a typed or hand written list. An audio system is needed that will allow students access to reserve music in a way that enables them to be in control of the listening process.

The Digitized Audio Reserve System is a database driven web-based multimedia application that multiple students can easily use to listen to reserve music at any time of day. It utilizes of three areas of information technology emphasis: Database, Networking, and Multimedia.

1.1.1 Database

An Access database, which consists of the Courses, Instructor, and Music tables. The Music table contains the redirector metafiles with dimensions for Windows media player control buttons as seen in **Figure 1**.



1.1.2 Multimedia

Audio files are captured and converted into Windows Media Advanced Streaming Format (ASF) using SoundForge 4.5.

1.1.3 Networking

There is a Windows 2000 Server to host web site, and a Windows Media Server to host the ASF root files that are streamed back to the client.

2. User Profile

The user of the Digitized Audio Reserve System will be of two types: the instructors that will submit music selection to be reserved, and the students that will use the system to search for and listen to the reserve music. Both types of users should have

rudimentary technical skills and computer knowledge. The professors should be able to log on and submit a request for selected music to be digitized and posted on the web site. Students should be able to log on and search for the reserved music with the least amount of difficulty.

3. Design Protocols

a) **Interface Design/Navigation**:

Navigation will be accomplished with the use of command buttons.

User interface will consist of text boxes and command buttons.

b) **Icons/Graphical Symbols**:

Music icons will be used that reflect purpose of site.

Color Scheme

4. Objectives of the project (Deliverables)

The user interface of the Digital Audio Reserve System project will consist of an authentication screen, instructor request form, student query page, copyright guideline page, and a page of generated music files. All music files will be stored on Windows Media Server with each redirector metafile stored in an Access database.

Authentication Screen: Where users will log on using a user name and password. Used to restrict unauthorized access to web site.

Instructor's Request Form: Instructors will be able to submit requests for audio files to be digitized and posted on the site.

Student Query Page: Students will be able to search for the requested music that a particular Professor has reserved by selecting the course number or instructor's name.

Generated Page of Music Files: Results of student query page with music files that will be able to be streamed by multiple users remotely.

Database: Will contain data such as Instructor's name, course name, composer, and link to music files.

Music Files: Music selections saved in Microsoft's Advanced Streaming Format and stored on a Windows Media Server.

5. Design and Development

The development of the Digital Audio Reserve System was relatively inexpensive mainly because the Information Services Division in the Langsam Library made the software and hardware used available. The staff in the Information Engineering Technology Program allowed sufficient time for the conception, development, and completion of the project. Subsections 5.1 and 5.2 contain information about the budget and timeline of the project.

5.1 Budget

Books:	
Inside XML	$ 50.00
XML By Example	$ 26.00
SQL Server 7.0	$ 70.00
Software:	
Windows 2000 Server	$599.00
Sound Forge	$499.00
Windows Media Player	FREE
Windows Media Technologies 7	FREE
Hardware:	
Pentium III Processor 500mhz or faster	400.00
Head Phones	$ 75.00
Total:	$1719.00

5.2 Timeline

Senior Design I	**Start**	**Finish**
Project Proposal	3/08/00	3/22/00
Advisor Assignment	3/22/00	3/23/00

Project planning	3/23/00	5/30/00
Independent Consultation	4/06/00	5/30/00
Research	3/22/00	5/31/01

Senior Design II	**Start**	**Finish**
Independent Consultation	1/10/01	1/17/01
Progress Report 1	1/22/01	1/24/01
Independent Consultation	1/29/01	2/01/01
Independent Consultation	2/05/01	2/08/01
Draft of Design Freeze	2/14/01	2/15/01
Progress Report 2	2/28/01	3/01/01
Quick Prototype/Oral Presentation	3/07/01	3/08/01
Final Presentation	3/14/01	3/15/01

Senior Design III	**Start**	**Finish**
User Interface Design	3/26/01	4/12/01
Testing	4/13/01	4/15/01
Progress Check 1	4/19/01	4/20/01
Revisions	4/16/01	4/27/01
Progress Check 2	5/03/01	5/04/01
Final Testing	4/28/01	5/17/01
Final Presentation	5/24/01	5/31/01
Documentation	4/12/01	5/22/01

6. Proof of Design

The Digital Audio Reserve System was conceived because there was a demonstrated need to improve the process of listening to music reserved by instructors at the College Conservatory of Music. The Digital Audio Reserve System had to be tested to ensure that it meets the needs of its' users. This testing was done using the usability report shown in Appendix B. Library personnel in the Library System Support Office and the College Conservatory of Music were the focus group of the usability testing. The most important aspect of the project that the focus group was asked to evaluate was the user interface. This was done to ensure ease of use.

The functionality of the streaming components of the project was tested and demonstrated earlier in the Senior Design sequence as shown in subsection 5.2. This phase of the testing was done to ensure that multiple students could access the same reserved music selection simultaneously. Information Engineering Technology seniors were asked to search by course number or instructor name. They were able to view the composer of the piece of music, the name of the each piece that was reserved for the specific course. Controls buttons were also provided to give the user the ability to play, pause, forward, reverse, and stop the music selected. The control buttons were important because the user should to be in control of the listening process.

The deliverables of the project were met in the following ways:

Authentication Screen: Login screen that redirects instructors to an input request form, and students to a search page. Refer to Figure 2.

Instructor's Request Form: Instructors input form that enables sends requests to the database and confirms the data input. Refer to Figure 3.

Student Query Page: Students query page that enables a search for the requested music that a particular Professor has reserved by selecting the course number or instructor's name. Refer to Figure 4.

Generated Page of Music Files: Results page of student query page with music files that will be able to be streamed by multiple users remotely. Refer to Figure 5.

Database: Contains data such as Instructor's name, course name, composer, and link to music files. It also contains the username and password information.

Music Files: Music selections are saved in Microsoft's Advanced Streaming Format and stored on a Windows Media Server in the ASF Root directory.

7. Conclusions and Recommendations

The Digital Audio Reserve System is a web-based application that provides students multiple and remote access to the College Conservatory of Music's reserve material. It is easy to use and practical. Students and faculty that were asked to test the system were extremely satisfied and thought that the project was a necessary step towards extended the classroom beyond the confines of the physical university.

The Digital Audio Reserve System could be improved to make it easier for instructors to have music selections reserved. This could be accomplished by using some sort of audio ripper and converter to digitize, convert, and store requested music from the instructors' workstations directly into the database. If this was done in a viable way, it will increase the ease of use for instructors immensely.

Appendix A.

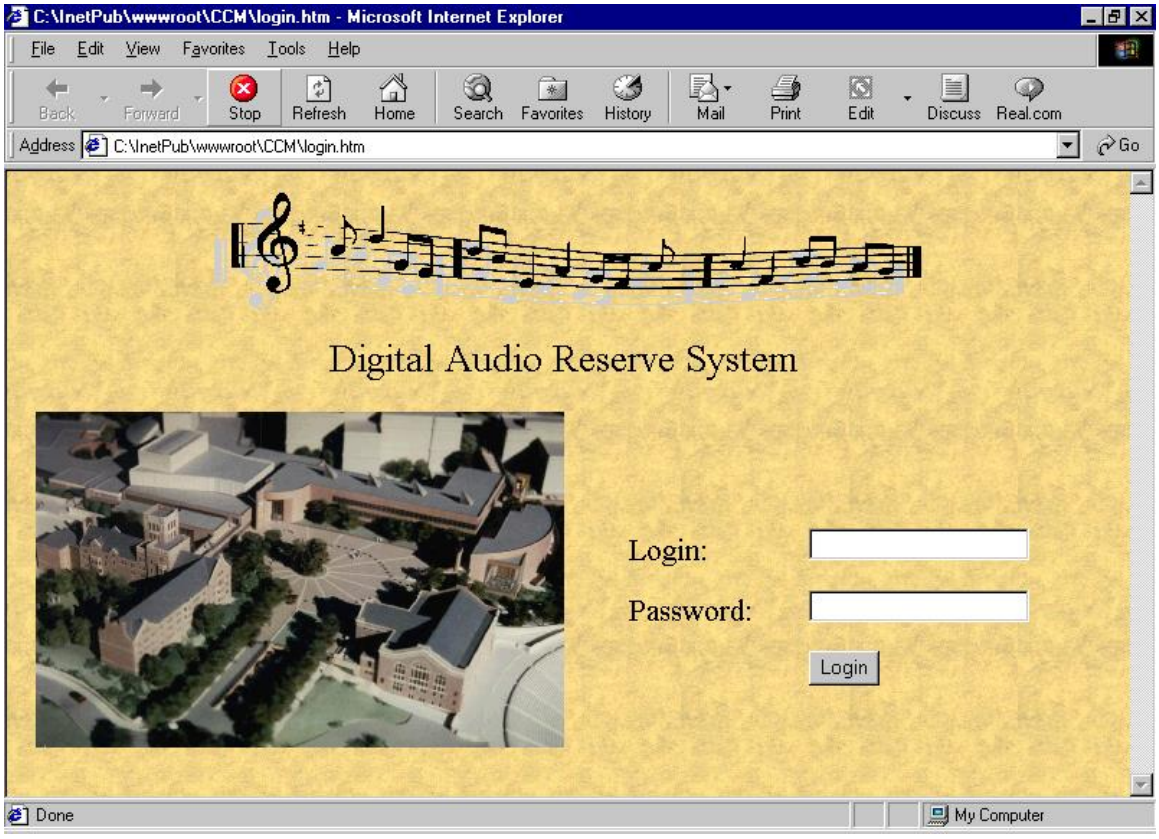


Figure 2


Digital Audio Reserve System - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Real.com
Address http://129.137.61.6/Gerald/index.htm
Go
Digital Audio Reserve System
Listening assignments are only available for the duration of the class for which they are intended. Patrons can search for reserve material by the Instructor Name or Course Numbers.
Search by Instructor
Search by Course Number
Login Page
About
Done
Internet

Figure 4

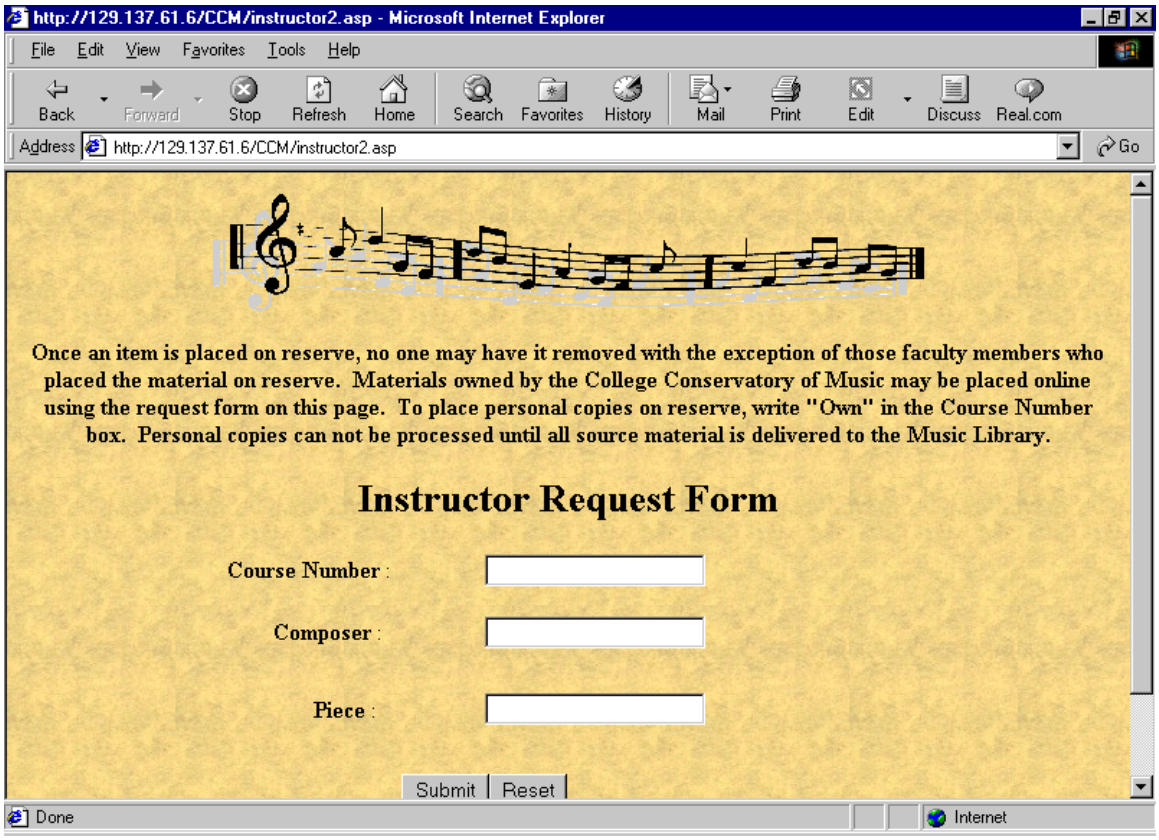

http://129.137.61.6/CCM/instructor2.asp - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Real.com
Address http://129.137.61.6/CCM/instructor2.asp
Go
Once an item is placed on reserve, no one may have it removed with the exception of those faculty members who placed the material on reserve. Materials owned by the College Conservatory of Music may be placed online using the request form on this page. To place personal copies on reserve, write "Own" in the Course Number box. Personal copies can not be processed until all source material is delivered to the Music Library.
Instructor Request Form
Course Number :
Composer :
Piece :
Submit
Reset
Done
Internet

Figure 3


Digital Audio Reserve System - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss Real.com
Address http://129.137.61.6/Gerald/instructordrop.asp
Go
Digital Audio Reserve System
Instructor
Instructor
Submit Query
Instructor
Piece
Composer
SoundFile
Yong
Hums and songs of Winnie-the-Pooh - Hum
Knussen
Yong
Songs without Voices - Adagio
Knussen
(9 items remaining) Opening page http://129.137.61.6/Gerald/instructordrop.asp...
Internet

Figure 4