Digital Music Library for Instrumental Music

An Interactive Qualifying Project Report

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by

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Abstract

This project looked at an existing system for documenting a music library for vocal music and extrapolated its use for instrumental music. This included implementing the input of two different instrumental music scores, writing a manual on how to do so, and giving suggestions for improving the current system so as to be easily and efficiently used for documenting an instrumental music library.

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Executive Summary

The current music library for instrumental music the Worcester Polytechnic Institute (WPI) Music Department is lacking in any organization outside of storing the scores of music in alphabetical order by composer. No list of available music even exists for this library. This project examined the usefulness of an existing digital music library that was created for managing musical scores for vocal music groups at WPI in the use of the digital library as one for instrumental music groups at WPI. This was done by exploring the system by means of inputting the data and score of two pieces of instrumental music. A user's manual for the system was compiled during this process. Issues of ease of use and compatibility with current music distribution methods were addressed and recommendations for improving the usefulness of the system were made.

1. Introduction

Musicians have to be flexible in the way they play, changing key signatures, time signatures, and even clefs. There are many types of music with different purposes and different vocalizations and instrumentations. As a musician must be flexible, so must be the method by which they store and have access to their library of music. It is not very useful to a musician to have their entire library of music thrown haphazardly into a closet. Even arranging the stored music into some system of order does not really help the musician find an appropriate piece of music for the situation at hand unless the musician knows what music is contained within said closet. So some sort of list must be generated. Lists, however, can only go so far in presenting the information available about the music a musician owns. It is difficult to search through a list of hundreds or thousands of songs for one that fits the musician's need without extra tools. The purpose of this project was to take a look at one such tool and examine its usefulness in developing a music library for instrumental music. The tool was an online, interactive music library, designed for use by choral groups at Worcester Polytechnic Institute (WPI). We wanted to explore the vocal music library to see if it could be used as an instrumental music library as well. This project also looks at what changes could be made to the digital music library to better accommodate instrumental music. The intent was to work toward a master digital music library for the Music Department of WPI that is efficient, easy to use, and works favorably with the use of the various methods of music distribution that different groups use.

The library of instrumental music at WPI currently consists of an unknown number of pieces stored in boxes made of a thin cardboard-like material. Each piece, usually held together by a folder, has its own individual box (or boxes if needed). These boxes are then placed on shelves in a series of closets in the basement of Alden Memorial in alphabetical order by the composer's last name. There are not any lists, written out or typed, of the instrumental music stored this way. No single closet has its own list and there is certainly not a master list of the music owned by the department.

Distribution of music to the musicians in the instrumental groups is handled by students paid to work in the Music Department (work-study students) and occasionally by a volunteer or two. Usually, the conductor of a particular group will go searching through the closets for a piece that seems appropriate for whatever performance or rehearsal that the group is doing. When they find the box of music, they will hand it over to the work-study students for distribution and possible copying. Each instrumental group has a series of folders that are instrument specific that the students then fill with the chosen music, making extra copies if necessary for the number of musicians. At the end of a performance season, the Work-study students will then remove the unneeded parts from the folders and return them to the appropriate shelf in the appropriate closet from whence it came.

One of the problems with having all the paper copies of music stored in a closet is that it takes up a great deal of space and if accidentally incorrectly labeled, can be hard to find. One of the purposes of the digital music library is to store an electronic copy of the various parts of a piece of music. Eventually, with the implementation of digital music

stands[1] for each musician, paper copies of scores will be obsolete and the only source of

the music will be in the digital music library. This project looked at the capabilities of

the current music library to handle such a burden. The primary purpose of this project,

however, was to explain, by means of a user's manual, how to utilize the features offered

by the library system.

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[1] Digital Music Stands are thin, touch screen monitors that store the scores of pieces of music and allow musicians to 'write' notations on them as they would a normal paper score without the worry of permanently damaging the score and to ignore the hassles of turning paper pages, pressing a button instead.

2. Methodology

In order to write a users manual for the music library, the various functions and commands available in the library had to be explored. Two pieces of instrumental music, West Side Story Selection by Leonard Bernstein and An Outdoor Overture by Aaron Copland, were selected at random from the closets of Alden Memorial to introduce to the system. Each instrument's score had to be scanned into a computer and recreated in a Portable Document Format (PDF) file and all the files combined into a single music PDF before being able to upload the music to the database. This was surprisingly difficult to accomplish, as most musical scores do not fit on a standard sized scanner bed. Also, the limitations of file size in sending PDF files from a public scanner create excessive trouble in generating the files. Once the scores were scanned and combined, all the information on the music pieces had to be discovered via online music publisher databases before copying it to a new music file in the library database. While exploring the capabilities of the digital music library and the process of adding a new piece of music to the database, a users' manual was created. During this process, there were several problems in the design of the music library that was not conducive to its proper use as an instrumental music library in its current form. A series of improvements to make to the library system are thusly presented later in this paper.

3. User's Manual

The WPI Digital Music Library has two main systems for access to the database: General Access and Administrative Access. General Access to the library allows a basic search for pieces with the possibility of narrowing the list with search parameters. Administrative Access to the library allows the editing of users, pieces of music, folders, and borrowers. It also has the ability to communicate to the borrowers on what pieces they are missing.

General Access: Anyone with an internet connection may access the library by going to the library website: <http://audiolab.wpi.edu:3000/library>.

> **Filter by keyword**: The library has the potential to be very large, so this function allows for the easy sorting of the pieces. One can enter any keyword of piece title or composer name. Matches are displayed after clicking the 'filter' button. Only part of a name is necessary for a match. For example, 'Moz' will match all pieces by Mozart, or any piece that has 'Moz' in its title.

> **Remove Filter**: Clicking on this button will remove the current search filter and once again display the entirety of the music in the database.

> **Advanced Search**: This method of searching allows a user to narrow down the list of pieces with several filters including title, composer, arranger, part spread, publisher information, and piece difficulty.

Administrative Access

Login: Users who are granted administrative access must first log in using a users name and password. Once logged in, any administrative task may be performed by the user.

> **Log Out**: Logging out prevents other users that were not given administrative access from utilizing it and should be done after every session.

> **Add User**: This is used to grant administrative access to new users of the system. A user name and password must be specified for the user to be added.

> **List users/Delete users**: This is used to view a list of the users that are currently registered in the system. From here, users who are no longer to have administrative access can be deleted.

Manage Pieces: This section of the Digital Music Library allows administrative users to keep track of all the pieces of music in the database. Pieces can be added and removed as well as edited for data about the pieces themselves and the locations of where physical copies are kept.

> **Filter by keyword**: The library has the potential to be very large, so this function allows for the easy sorting of the pieces. One can enter any keyword of piece title or composer name. Matches are displayed after clicking the 'filter' button. Only part of a name is necessary for a match. For example, 'Moz' will match all pieces by Mozart, or any piece that has 'Moz' in its title.

Remove Filter: Clicking on this button will remove the current search filter and once again display the entirety of the music in the database.

Details: The main mange pieces page only shows the title and composer of each piece. Clicking on 'details' shows the remaining fields of information known for the pieces such as voice parts and choir type. Additionally, the details page shows the current physical locations of the pieces (whether checked out to a borrower or checked into the library).

Edit: The edit command is used to edit the information contained in the database about a piece. All field of information are offered for editing. Clicking the 'Edit' button will save the new information into the database. Note: All pieces must have a title; all other fields can be blank.

Destroy: This command removes all information and record of a piece from the database. It should rarely be used as its main purpose is for deleting a record that is hopelessly inaccurate.

Create Copies: This command registers new physical copies of a piece of music. Each copy should be given its own unique barcode. By scanning the barcode into the box provided by this command, the user registers that copy of the piece of music. Copies are only deleted from the system if the entire piece is deleted.

Previous Page/Next Page: These commands are used to navigate through the displayed pieces.

New Piece: Use this command to add a new piece of music to the library database. All fields are provided and should be filled in with the proper

information. When the 'create' button is clicked, the information is added to the database. Note: All pieces must have a title; all other fields can be blank.

Manage Folders: This section is used to browse and edit the information available for the physical folders for music. This consists primarily of associations between folders and the copies of music they are assigned. A user is able to use this section to assign music to folders, to scan folders to assure that the proper copies are present, and to check copies of music back into the library. The user should first enter the barcode or folder number before selecting the action to be performed.

New Folder: This command allows the user to add a folder to the system. Each folder must have a unique barcode. Since each borrower must have a folder, this command will generally be used when a borrower is added to the system for choral music, but not often at all for instrumental music. Folders are numbered automatically by the system in increasing order.

List All Folders: This command brings up a list of tall the folders in the system accompanied by the borrower to whom it is assigned. Links to all of the actions of the main section are also provided.

Folder Details: This command lists all the details of a specific folder including the borrower to which it is assigned and the music currently contained in it. It is useful when determining what music is supposed to be in each folder.

Re-Barcode/Unassign: This command allows the user to give a folder a new barcode. It is useful if a folder is ever lost. For instance, if folder 4 is lost, it still exists in the system. The user should then obtain a new folder, calling it folder 4 and enter it into the system with its new unique barcode. Additionally, music may be checked in or the folder unassigned from the borrower.

Assign Music: This command is used to keep track of which copy of a piece of music is in a folder. The barcode of the piece is simply scanned and when the 'assign' button is clicked, the piece is associated with the particular folder.

Check in Music: This command is the opposite of assigning music. Music taken out of a folder and returned to the physical library is said to be checked in. Once done, the music will no longer appear in the borrower's or folder's details.

Scan Music: This command is used for the checking of assigned music, ideally on a regular basis. The user simply scans all the music in a folder. The system then reports if any music is missing or misplaced (a piece should be in a different folder). The system allows the user to double check and then confirms that the piece is missing. Missing music will then show up as lost on the "Show Lost Music' page in the borrower view. If the 'price' field for that piece is filled, then the system will be able to keep track of how much a borrower is to be charged to replace the missing music.

Manage Borrowers: This section allows the user to create and edit the lists of borrowers of the library system. A borrower is a single person in a WPI music group (such as Men's Glee Club or Concert Band). Each borrower can be assigned a folder. A borrower can be in more than one group.

Group Browse: This brings up a list of all the groups in the system. Clicking on the name of a group will provide a list of the borrowers in the group along with commands to list all the music that the group has checked out or that the group has lost.

Edit Groups: This command allows the user to add or remove groups from the system.

New Borrower: This command allows the user to add a new borrower to the system. Each borrower must have a first and last name and can be assigned a folder. There are also fields for e-mail address and group assignments. The folder assignment field can be automatically filled with the lowest numbered folder available or left blank to fill later.

Listing Borrowers:

Music Out: This command lets the user see what music is currently checked out to a specific borrower. This includes lost music, when the music was lost, and the charge of replacement. The field for charge will be '0' if there is no price for that piece.

Edit: This command allows the user to edit the information of a borrower. The name, e-mail, and assigned folder are all possible to change if needed. Unassigning a folder should be done by

leaving the folder field blank in this screen. The group a borrower is in may also be changed, but each borrower must be in at least one group.

Delete: This command is used to delete a borrower from the database. The folder assignment to the borrower is also lost. Recovery of a deleted borrower is not possible so this command should be used with caution.

Show All Assigned Music: This command brings up as list of each borrower in a group, followed by the music that has been assigned to that borrower. Copies that are lost are NOT indicated on this list.

Show All Lost Music: This command brings up a list of each borrower in the group, followed by the music that has been lost by that borrower.

Email Holdings Reminder: This command is used to send an e-mail to each member of the group that reminds them of which holdings they have in the music library.

4. Recommendations

The current system for the WPI Digital Music Library is designed for use with only vocal music groups. In order for the system to be used for instrumental music groups, several changes need to be applied. Some of these changes include which information and the method by which that information about music pieces is entered as well as the system for assigning folders to borrowers and borrowers to folders.

With the way system is currently programmed, there is no way to produce as list of the instrumentation available for a piece of music. One of the fields of music piece information offered is the vocal parts called for in the piece. It is a pull down list of part combinations such as Soprano, Alto, Tenor, and Bass (SATB) or Tenor, Tenor, Baritone, Bass (TTBB). Instrumental scores usually call for twenty to thirty different instrumental parts and there is no way of listing all of the instruments a piece calls for with a simple pull down list system. There could however be a simple listing of the general type of instrumentation. For instance, a piece can be arranged for an orchestra (many strings), a symphonic band (few strings and more brass), jazz or stage bands (small numbers and guitars), or individual instrument groups (string quartets, brass quintets, etc.). A pull-down listing of these types of instrumentation would be an excellent way of searching for pieces, but a separate full listing of instruments would still be needed.

One method of listing the instrumentation of a piece would be to have a list of all possible instruments and ranking (such as listing Solo Bassoon, 1st Bassoon, and 2nd Bassoon rather than just Bassoon) with checkable boxes next to each during data input. Or possibly, having each instrument with an optional sub-list of multiple parts (listing the

fact that Bassoon is necessary and then that there is a Solo Bassoon, 1st Bassoon, and 2nd Bassoon). This method of listing available parts would also be extremely useful when giving information for music which is written for vocalists with orchestral accompaniment.

Another feature lacking in the current setup of the Digital music Library is an easy and useful method of storing Portable Document Format (PDF) versions of the scores. One of the purposes of the library is to eventually be able to connect with digital music stands, so digital copies of the music must be available. Currently, the only way to view PDF files is to be an administrator and to find them in the 'Edit Piece' section. Also, there is only one space for PDF files per piece in the system. To have the PDF files of the scores for all the instruments in a particular song, one must first create a rather large, and unwieldy, file that contains all of them instead of having links to each instrument separately. Adding a method of linking PDF files to the each of the instruments on the list of instruments for a piece would allow the librarian to quickly make extra copies of a piece if necessary or for the quick download to a digital music stand when available.

One of the biggest problems with the current system for use with instrumental music is the method of assigning folders to borrowers and borrowers to folders. With the current system each borrower is assigned a single folder, and each folder can only be assigned to one borrower. However, the folders used for WPI instrumental music are group and instrument specific. There is a folder for 1st Trumpet music used in Concert Band and a separate folder for 1st Trumpet music used in Orchestra as well as another for Trumpet music used in Stage Band. A single instrumental folder often will have multiple

musicians using it, just at a single musician will use several folders by being in different groups. For instance, a musician may play 2nd Violin in Orchestra, sharing one folder with one other violinist, and play Percussion in Concert Band, sharing three folders among eight other percussionists. It would be advisable to allow folders to exist in the system as separate entities with music assigned to them and then have a list of musicians that use them at least for instrumental folders. It would then be the responsibility of all the borrowers assigned to a folder to pay for replacing any lost music.