FRBR Based Multimedia Digital Library of Popular Multimedia News

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Abstract. In this paper, we propose the development of multimedia digital library of popular news based on Functional Requirements for Bibliographic Records. The main motivation of this paper is to study the digitization of popular news, focusing on the conceptual design of a changeable data model the system is based on. This paper seeks to promote the example of FRBR, shows how it can be used to make use of the characteristic and functionality of the user's experience of using a multimedia digital library.

1. Introduction

Popular news is an important resource for multimedia digital library, especially in the era of internet [1-3]. Functional Requirements for Bibliographic Records [4] is a promising framework because it could rich indexation. The motivation of the work is to assist with the digitization of the entire archive, provide tools for finding the archive and support the ongoing production and postproduction processes that relate to collecting, documenting and archiving news.

In order to make the work valid as a basis and a tool for scientific research work, specific concepts and methods that apply to research of popular news had to be implemented. This is due to the fact that scientists and researchers of the work are active contributors and primary users of the system at the same time. In this paper, we propose a changeable data model that meets these requirements and then describe some applications to realize the related functions.

2. CHARACTERISTIC of FRBR

We focus upon an important element of FRBR in this paper, which is its representation of original works that are indexed in a digital system. Four separate terms are used in regard to original works: work, expression, presentation and entry. It is simplest to start from the work. A work is a unique original piece that has a distinct identity. One example of a work may be Ulysses, by James Joyce. Like any particular work, Ulysses is available in a number of editions, and each edition or variation of the work forms an expression in FRBR. As a result, the Bodley Head and Beach editions of Ulysses are both expressions of the work called Ulysses.

However, there are still variations — a particular expression can be arranged and realized in different formats or presentations. Finally, an entry is a single example of a particular presentation, so the particular copy of Ulysses that sits on my bookshelf is an entry of a particular printing of the second edition. The distinction between work, expression and presentation can be problematic — for example, a revised volume with an introduction and commentary by a second party may be considered in one case as a new work, whilst another may be viewed only as an alternative expression.

Let's see an example of a partial FRBR tree for Ulysses. In addition to the issue of separate works, FRBR also models authors and publishers and these can be related to works, expressions etc. as required. In addition, subjects of books can be similarly represented and associated with the works that is related to them.

Works and their expressions can also be related with each other. For example, a critical user of Ulysses is related to the original work, yet is unquestionably a separate work in its own right. Given

this rich framework for describing works, authors and other persons, FRBR presents an opportunity for rich and interconnected descriptions that support a vast array of user tasks. However, this very complexity results in challenges in making the opportunities it provides transparent to its users. This paper will demonstrate a few introductory examples of these very opportunities.

However, there is another element of the FRBR data is that which ties together different versions of the same work, the construction of the tree of works, expressions, presentations and entries seen above. Two methods can be proposed for creating that data: first, manual encoding, e.g., by a librarian, and secondly automatic creation of the structure by computation.

3. THE PROPOSED NEWS INFORMATION MODEL

One of the nature of popular news is to be orally performed and mediated. Some important points are shown as the following: Non-performing arts products are physical objects that carry conceptual objects; such physical objects are the basic “documents” that are preserved in a collection and described in a catalogue; through such documents, the conceptual objects they carry are preserved and described as well; it is also possible to gather “documentation” about them, their creation, and the way they were perceived. Performing arts products are incidents that convey conceptual objects; there is therefore no basic “document”, but only some “documentation”, which, consequently, becomes primordial, as the conceptual object conveyed by a show can be somewhat preserved and described only by preserving and describing that documentation [5].

News audio recordings are also important scientific source for the research [6]. The representation of particular audio news in a recorded variant is only the representation of its physical characteristics – audio documentation of the incident of singing, not the performance itself. Because of this strong interdependence, the concept of incident represents a core feature of the conceptual design of the proposed changeable data model. It serves as an association between a recorded variant, a person/actor involved and place and time of the recording session.

The concept of incident enables the representation and integration of various production (i.e. field recording session) and post-production processes through time. The proposed data model is therefore a combination of two conceptual models, with the aim to enable: representation of entities and relationships describing folk song and music, based upon FRBR, especially 1st group entities [7]: Work, Expression, Presentation and Entry.

Combining ideas of both conceptual models, the production of an individual audio recording and description of the recorded variant are linked with the overall documentation of a production incident. Not only is each individual recording session associated with other recording sessions, but FRBR entities describing recorded variants are associated as well. Each Presentation is indirectly linked with the production incident through the Entry - the information carrier of the recorded variant produced in a particular production incident. Consequently, performers belong to the presentation level, while recording team, transcribers, collectors belong to the production incident level.

Manuscripts represent the oldest entries in the archive. A manuscript is a handwritten document of a song’s lyrics and musical notation, as well as some accompanying metadata on singers. The handwriting used is far too difficult for current OMR and OCR tools, so the collection was first scanned and then manually transcribed. Sibelius software was used to input music notation, because it’s easy to use characteristic were well appreciated by the researchers at the Institute. Scores are stored in native format, as well as in Audio-XML [8]. Audio-XML is a platform independent score representation format and is used for further parsing and score processing by query-by audio and other applications, while the native format enables simple score visualization and playback in desktop and web applications with plugin. Next to scores and scans of original manuscripts, a large amount of metadata is also stored in the database, ranging from musical properties such as meter, tempo and melodic structure to genre, variant and content types, geographical characteristics and performers.

The main part of the archive contents is the field recordings represent. Researchers are still recording new materials, so support had to be added for archival, as well as collection and annotation

of new recorded materials. As recordings are also being published on CDs and used in various other works, we are also adding support for postproduction processes, which will enable researchers to trace a recording from its initial capture over all postproduction steps to its final issued form. In addition to audio, field recordings are accompanied by a written report that contains recording metadata, which are also included as part of the field recording support built into the project.

In some visual news information data and audio news information data, the field recordings are typically several hours long, as they include all of the audio from a recording session. Audio may be split across several carriers. In our proposed data model, we defined the entire recording session as a recording incident. The tools therefore support metadata related to such an incident, including names of field researchers, technical properties of recording devices, microphone placement, etc. All of these metadata are stored in the database to enable efficient indexing and finding. The digitized audio of a recording session resides on external storage and is linked to the database record of a session by a URI. Field recordings available to researchers for listening and annotation are digitized and down sampled from their original media. Each field recording is segmented into smaller entries by placing markers within the recording. We developed semiautomatic annotation and labeling tools to help researchers with this process. Individual entries have properties similar to manuscripts, including Sibelius transcriptions.

While tools for archive maintenance are only intended to be used by researchers at the Institute, finding and browsing the archive will be made available to a larger audience. We have therefore decided to build a web interface to the archive, which enables browsing, as well as finding through the work contents. Full-text search of textual metadata is supported, as well as melody-based finding, which is currently implemented with standard n-gram techniques [9]. Manuscripts have been converted to PDF format and scores to MIDI to enable users to use standard tools while finding and browsing the archive.

The web interface is built on AJAX and ASP.NET architectures and carries several resemblances to the digital archive. They both gather data from the same database, but due to the large amount of metadata residing in the project, the web application only displays the most common properties such as the contributor, genre and various classifications.

4. Summary

In this paper, we introduce an implemented architecture for FRBR support that can supplement existing digital library systems. The proposed digital archive represents a solid background for further research into news data. We also proposed a news information model for the better using of the FRBR in the digital library systems, which would make promotion on the development of tools for search, analysis, representation and visualization of multimedia data information on the internet, especially in relation to popular news search.

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