

10th Italian Research Conference on Digital Libraries, IRCDL 2014

An Integrated Management System for Multimedia Digital Library

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Abstract

Contemporary libraries have changed quickly their social role and function due to the proliferation and diversification of multimedia digital documents, becoming complex networks able to support communication and collaboration among the various distributed users communities. Technologies have not grown in step with the needs generated by this new approach, except in specific areas and implications. Hence the need to design an integrated digital library architecture that covers by advanced techniques the whole spectrum of functionality, without which the same social and cultural function of a modern digital library is at risk. This paper briefly describes an architecture that aims to bridge this gap, bringing together the experience, expertise and software systems developed by university and companies researchers. A prototype of the system is under development.

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Peer-review under responsibility of the Scientific Committee of IRCDL 2014

Keywords: Digital Library; Digital Library Management System; Digital Recognition; Layout Analysis

1. Introduction

Here Librarianship has evolved and taken new study and research fields in order to conceive and design new systems able to renew the management of information and, at the same time, to promote both cooperation between users and integration of heterogeneous information resources, ushering in the era of *Digital Libraries* (DL)¹. Over the years, DL considerably has evolved from simple digital interface of public libraries' physical collections in

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complex networks, able to support communication and collaboration among different users communities worldwide. By contemporary DL citizens can access, discuss, evaluate and develop different types of information content². Facing to the progress in research aimed at creation of DLMS able to support DL containing homogeneous digital collections and metadata, there are still hard difficulties in designing and implementing DL effectively integrating, managing and making accessible multimedia digital objects and related metadata. This paper proposes an “integrated” DL architecture, designed as a prototype for the project D_ISRAELI, an approved project under the “Living Labs Smart Puglia 2020” call by Apulia Region, presented by University of Bari Aldo Moro and CeRDEM – Center for Research and Documentation in Judaism in the Mediterranean. The prototype, under development, aims at creating a DL on Jews history and culture in Apulia designed especially for librarianship and archival areas. The paper is structured as follow: section 2 presents a comparison about the major open source Digital Library Management Systems (DLMS) finalized to choose the best one to our aim. Section 3 details the components that should be integrated or enhanced in the chosen DLMS architecture in order to realize the set of innovative features identified by the component itself. Section 4 gives an overview of the major characteristics of the proposed DLMS, in particular the management of different types of metadata and text extraction and indexing from scanned digital objects. Section 5 gives the conclusions.

2. Open-Source Technological Base

The definition of the proposed architecture has required an analysis of available open source DLMS³ in order to choose the one more suitable to our aims. Among the most known and used we have considered and compared *dSpace*, *EPrints* and *Greenstone*⁴. *Fedora Commons* has not been taken into account in this comparison because fundamentally it is a repository oriented to the digital data preservations rather than to the fruition. Furthermore, MARC protocol and the bibliographic data exchange protocol Z39.50 are not adequately supported by *Fedora Commons*, both non-negligible characteristics for the purposes of the DL to be realized. From the comparison between the three identified DLMS, the common features are: 1) OAI-PMH is supported, 2) storage and management of any type of content, 3) Multilingual Interface-oriented capabilities to the end user, and 4) production of statistical reports based on the count of records. Instead, they differ on the following characteristics:

- As unique identifier for the DL objects, dSpace uses CNRI Handle System (www.cnri.reston.va.us), Greenstone uses OAI Identifier (www.openarchives.org/OAI/2.0), while Eprints does not rely on any standard convention.
- In addition to the Dublin Core and METS metadata, common to all three DLMS, dSpace supports MARC/MODS too, while Greenstone NZGLS and AGLS.
- The search functionalities supported by dSpace (Field Specific, Boolean Logic and Sorting options) are a superset of those of EPrints and Greenstone.
- For the browsing functionality, EPrints and Greenstone allow the use of any field, while only Author, Title, Subject and Collection can be used with dSpace.
- User authentication in dSpace is possible via LDAP or Shibboleth, in Eprints only via LDAP, and User Groups in Greenstone.
- The databases that can be used are Oracle and PostgreSQL by dSpace, also MySQL and Cloud by EPrints, while Greenstone has an its own implementation.
- OAI-ORE, SWORD, SWAP are supported by dSpace (which adds SRW/U as extension of Z.39.50) and EPrints (which adds RDF), while Z39.50 by Greenstone.

The choice has fallen on dSpace essentially for the following three factors: 1) it supports better than the others the various metadata standards and protocols for interoperability, 2) it has been developed using only one programming language, and 3) it has a more complete documentation and there are various communities that provide support.

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