Nikolina Vukša Popović, Žarko Mijajlović,
Nenad Mitić, Saša Malkov
Faculty of Mathematics, University of Belgrade, Serbia

DIGITAL ARCHIVE REPOSITORY FOR DIGITAL LEGACIES

Abstract: We are developing Digital Archive as a digital web repository of materials about, and by, some of the most important Serbian scientists. It preserves books, manuscripts, photos, letters and various important papers that belonged to Anton Bilimovič, Bogdan Gavrilović, Đuro Kurepa, Jovan Karamata, Mihailo Petrović Alas and Milutin Milanković. Open source software DSpace is used for building this repository. DSpace is used by over 1000 organizations worldwide and it has the largest community of developers among all of the repository software platforms. It is completely customizable in many ways, including the look of the web interface, metadata used to describe fields, browse and search criteria, local authentication mechanisms and multilingual support. We present the usage of some of the DSpace features on the   sub-repository dedicated to Milutin Milanković.
Keywors: Digital Repository, DSpace, Digital Archive

Introduction

In order to preserve materials about, and by, some of the most important Serbian scientists, we are developing Digital Archive (http://digitalnilegati.matf.bg.ac.rs), as a digital web repository of their legacies. It contains books, manuscripts, photos, letters and various important documents related to: Anton Bilimovič (1879-1970, mechanist, the founder of the leading Serbian mathematical journal Publications de l'Institut Mathématique, 1932), Bogdan Gavrilović (1864-1948, mathematician, one of the founders of the University of Belgrade), Đuro Kurepa (1907-1993, mathematician, known for his important contributions to set theory), Jovan Karamata (1902-1967, famous for his theory of regularly varying functions), Mihailo Petrović Alas (1868-1943, the founder of Belgrade mathematical school) and Milutin Milanković (1879-1958, geophysicist, astronomer, mechanist and civil engineer, best known for his theory of ice ages).

In the begining of our work we have developed sub-repository dedicated to Bogdan Gavrilović. It preserves his books, doctoral disertation, speeches and scientific papers. In colaboration with Society Milutin Milanković (http://milutinmilankovic.rs) we are currently working on the legacy of Milutin Milanković. It contains original documents that witness about his education, research and recognition.

1. DSpace

Open source, Java based software DSpace (version 1.8) [1] is used for building the repository. DSpace is used by over 1000 organizations worldwide. It has the largest comunity of developers among all the repository software platforms. It is completely customizable in many ways, including the look of the web interface, metadata used to describe fields, browse and search criteria, local authentication mechanisms and multilingual support. The usage of

some Dspace features will be presented on the sub-repository dedicated to Milutin Milanković.

1.1. User Interface

DSpace has two different user interfaces: one based on JavaServer Pages (JSP) technologies [2] and another one based upon Apache Coocon framework (XMLUI) [3]. We use XMLUI interface which is often called Manakin.

Manakin interface can be customized by using different themes. Single theme can be applied to entire repository, sub-repository or a single page. The user can make his own themes, which may consist of one or more of: an XSLT stylesheet, CSS stylesheets, images, other static resources. In our repository we use customized classic Manakin theme (Picture 1.), but there are several built-in themes (Kubrick, Reference, Mirage) that can be used without any sort of customization (see Picture 2.).

1.2. Metadata

Metadata is used to describe different objects in repository: communities, collections, items and bitstreams. There are two types of metadata: descriptive metadata, used to describe properties of objects and administrative metadata, which helps with administration of objects. Dublin Core XML schema [4] is used to encode metadata. User can add custom metadata schemas. We have created our own schema with custom fields that describe document's pages count, subject area, editor-in-chief, image resolution, etc. (Picture 3.). Also different kinds of items, like books and images could be described by different kinds of metada (see Picture 4. for image desciption).

1.3. Submission

In order to add objects to repository we use submission forms. In specific configuration file we describe submission steps and metadata fields that describe repository object. For each object type, a different kind of form can be specified.
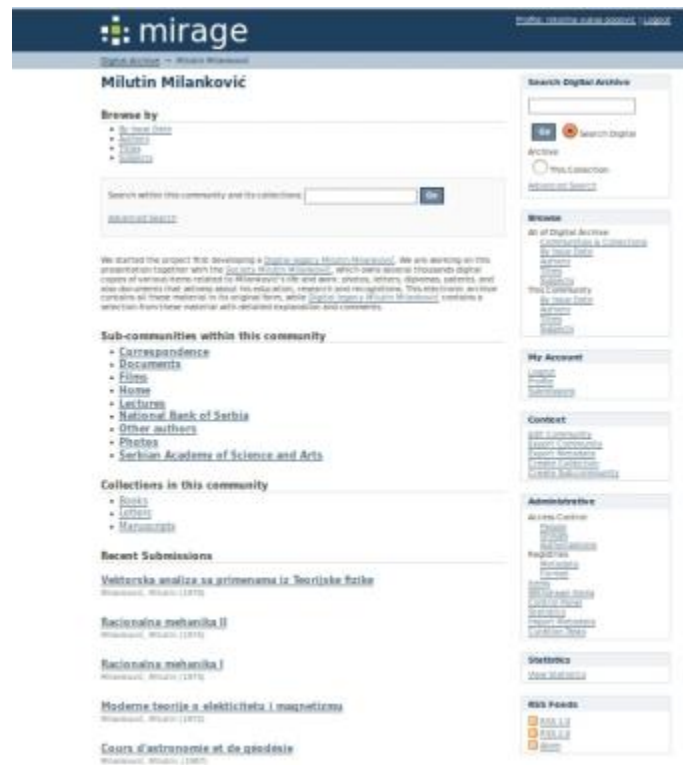
1.4. Browse and search criteria

DSpace search is based upon Apache Lucene full-text search engine library [5]. There are two types of search: basic and advanced. Search criteria for basic search are set in configuration file and they describe metadata upon which search is made and what kind of logic operators are used. For advanced search, one can choose his own criteria (see Picture 5).

1.5. Local authorization

The repository users in DSpace can be organized in groups, based on theirs roles in repository. There are two special roles: Administrator (aministrators of repository) and Anonymous (anyone). For each object in repostitory we can specify authorization for every group. In that way some object could be made visible to some privileged users only. In our repository all items are visible for Anonymous group, but only members of Administration group can change objects in repository.

Picture 1: Customized classic Manakin theme

Picture 2: Mirage theme

Uspomene, doživljaji i saznanja posle 1944 godine

Show simple item record

dc.contributor.author	Milanković, Milutin	
dc.date.accessioned	2012-12-01T20:14:44Z	
dc.date.available	2012-12-01T20:14:44Z	
dc.date.issued	1957	
dc.identifier.uri	http://hdl.handle.net/123456789/57	
dc.language.iso	other	en_US
dc.publisher	Naučno delo	en_US
dc.title	Uspomene, doživljaji i saznanja posle 1944 godine	en_US
dl.contributor.editor-in-chief	Mišković, Vojislav	
dl.document.pages	194	en_US
dl.subject.area	Biography	en_US

Picture 3: Book item with customized metadata

Crtez kafana i radna soba

Show simple item record

dc.contributor.author	Milankovic, Milutin	
dc.date.accessioned	2013-10-30T20:57:20Z	
dc.date.available	2013-10-30T20:57:20Z	
dc.date.created	2009-01-22	
dc.date.issued	2013-10-30	
dc.identifier.uri	http://hdl.handle.net/123456789/100	
dc.subject	drawing	en_US
dc.title	Crtez kafana i radna soba	en_US
dc.type	Image	en_US
dl.format.resolution	300x300 ppi	en_US

Picture 4: Image item with customized metadata

Picture 5: Advanced search criteria

2.   Future work

First, we plan to add more objects to our repository. With help of Society "Milutin Milanković" we will increase number of items related to Milutin Milanković. Upon reaching that goal, we intend to add items to sub-repositories dedicated to other scientists.

Our second goal is to make repository objects visible to different search engines (Google, Yahoo, etc.). DSpace software has this feature and we will use it as soon as we increase number of items interesting to search for.

We shall also use another feature of DSpace software which allows users to customize workflow. Submission process is divided into steps and after each step privileged user can approve submitted data and allow user (the same as in previous step or another) to submit data in the next step. This way we can let non-privileged users to partially add items to our repository, but all data will have to be verified by our administrator.

3. Conclusion

The advantage of DSpace over other similar software is well documented installation and configuration process. It has large community of developers that is well organized, so one can easily find answer to almost every question about DSpace development. Another DSpace advantage is its relatively easy customization.

One of the things that could be found difficult by an average DSpace user is its relatively complex implementation. When a user needs some customization beyond common configuration it can be difficult to implement it without substantial knowledge of several technologies (Java, XSLT, CSS, Javascript). Also, the process of upgrade between non consecutive versions of software is not straightforward and many users may find it highly demanding.

Acknowledgments

References

[1] DSpace : http://dspace.org, https://wiki.duraspace.org/display/DSDOC18/
[2] JavaServer Pages (JSP) Technology:
http://www.oracle.com/technetwork/java/javaee/jsp/index.html
[3] Apache Cocoon Framework: http://cocoon.apache.org/
[4] Dublin Core XML Schema: http://dublincore.org/schemas/xmls/
[5] Apache Lucene Search Engine Library: http://lucene.apache.org/

nikolina@matf.bg.ac.rs
zarkom@matf.bg.ac.rs
nenad@matf.bg.ac.rs
smalkov@matf.bg.ac.rs