

Development of Personal Digital Library for Faculties and Scientists of Indian National Agricultural Research System (INARS): A Practical approach

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Abstract:

In INARS, faculties and scientists have been working for agricultural education and research in about 150 institutions/ universities. In 2007, Consortium for e-Resources in Agriculture (CeRA) was established for providing access of e-Resources to INARS. Access of about 3000 e-journals has been provided to the agricultural institutions/ universities of INARS through CeRA. Use of e-Resources through CeRA and open access have been increased very fast in INARS. Now faculties and scientists of INARS have hundreds/thousands of articles/other documents in digital form related to their discipline. Looking the importance to manage digital collection, an attempt to develop personal digital library through Greenstone (i.e. open source software) has been discussed in the paper. The practical approach for management of digital collection has been explained in the paper.

Keywords: Digital Library, Personal Digital Library, e-Resources, Greenstone, Agriculture, India, CeRA

1. Introduction

Indian Council of Agricultural Research (ICAR) is the apex body to coordinate, guide and manage research and education in agricultural sciences (i.e. agriculture, horticulture, fisheries and animal science) in India. INARS is a largest national agricultural system in the world with 100 ICAR institutes (i.e. 17 National Research Centers, 50 Institutes, 6 National Bureaux, 4 Deemed Universities and 23 Directorates/ Project Directorates), and 70 agricultural universities. There are 641 Krishi Vigyan Kendra (KVKs i.e. Farm Science Centres) working under INARS in almost each district of India for agriculture extension activities (5). The ICAR has Agricultural Extension Division for technology assessment, refinement, and transfer, aiming to bridge the gap between the technologies developed at research stations

and its adoption at field level. Major projects of the extension division are KVKs. All the KVKs have been working with SAUs, ICAR Institutes, NGOs, State Governments and other institutions. (5). Each ICAR institutes/agricultural universities have separate library to fulfill the information need of users i.e. scientists, teachers, students etc. CeRA was established in 2007 to provide the access of e-resources specially e-journals to all scientists, Faculties, students, etc in the INARS (3). Under CeRA, most of the e-resources have been accessed to all the member institutions while some of the e-resources are accessible to selected institutions/universities of INARS. Under CeRA, 143 institutes/agricultural universities of INARS have been accessing about 3000 online journals. Access of e-resources under CeRA has been provided 24x7 on IP basis through J-Gate. J-Gate website (i.e. <http://jgateplus.com>) is developed and managed by Informatics India Limited for providing access to resources of CeRA through single window search system. It is an electronic portal for accessing national and international e-journal (2).

Digital information has been increased very fast in the form of E-Resources (i.e. Electronic Resources or Electronic Information Resources) in the academic and research libraries. E-Resources includes a wide variety of materials i.e. e-journals, e-books, e-thesis, e-indexing and abstracting databases, web sites etc. Yu and Breivold (11) mentioned that the use of e-resources in libraries started in 1960s with the development of the machine-readable cataloguing (MARC) format. In 1990s use of internet was started in education and research with the invention of World Wide Web (11). In the present age of Internet, academic and research libraries have been investing more and more in e-resources as compared to print resources. The fact is that most of the journals are available in electronic form in Indian Agricultural Libraries (IAL) either individual subscription or through CeRA. OCLC (4) predicted that 80 percent of academic library expenditure will be on e-resources by 2020. Earlier, very few journals were published in only digital form now the situation is changed now very few journals are published in only print form.

Developments like, growth of the World Wide Web, fast speed of internet, increased capacities of digital storage media, sophisticated search engines, reduced computer cost and increase in the number of e-resources have been encouraged development of digital libraries. Several definitions of digital library have discussed in the literature. The digital library is the collection of services and the collection of information objects that support users in dealing with information objects available directly or indirectly via electronic/digital means (7). It is a managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network (1). The term digital library is used to refer to a range of systems, from digital object and metadata repositories, reference-linking systems, archives, and content management systems to complex systems that integrate advanced digital library services and support for research and academic communities. A digital Library may offer many technology-enabled functions and services that support users, both as information producers and as information users

(8). Digital library provides access to digital information collections, and includes a combination of structured/unstructured, text/numeric/graphical data, scanned images, and graphics, audio and video recordings. Digital libraries are a set of electronic resources and associated technical capabilities for creating, searching, and using information. In digital library, the information is stored in digital form and accessed electronically using a computer.

2. Why Personal Digital Library (PDL) for Faculties and Scientists?

In the present age of internet, digital libraries have been managed by academic & research libraries, consortia, publishers, aggregators, government organizations, etc for providing access of e-resources to the faculties and scientists. Nowadays, in INARS it is easy for users to search and download full text articles/documents through CeRA. Under CeRA, all the INARS institutions/universities have been accessing thousands of e-resources. Apart from CeRA e-resources, thousands of open access e-resources have been used in INARS. More than 6000 open access full text journals are accessible only through Directory of Open Access Journals (<http://www.doaj.org/>). As a result, faculties and scientists of INARS are having hundreds/thousands of e-articles, e-books, etc on their personal desktop/laptop. This specialised personal collection which is related to their discipline is important for every individual academician and researcher. The faculties and scientists have to spend time for searching and downloading the desired documents form e-resources. It will increase according to the length of service of individuals. In many cases users have to spend time again to find the desired information/document from personal desktop/laptop. Some time it may difficult to locate the document. The digital library system provides the facility to built collection, search & retrieve the full text document, preserve the digital collection and managed digital collection. Therefore, there is an urgent need to develop personal digital library for faculties and scientists to manage, easy search & retrieve and archive of digital collection which is downloaded by them for personal use. It will save the time of users. Storage hardware technology has been also advanced to store thousands of e-resources in a single hard disk (internal or external). The PDL model has been suggested for management of personal digital collection in their desktop/laptop to use individual faculty/ scientists to avoid copyright law.

3. Development of PDL using Greenstone

Popular and well established open source software (OSS) i.e. Greenstone, DSpace, Eprints etc have been used internationally for development of digital library. Looking features and simplicity of OSS, Greenstone Digital Library Software (GSDL) or Greenstone has been used for the development of PDL. Greenstone (9) is a

suite of software for building and distributing digital library collections. It provides facility of organizing information and publishing it on the Internet or on CD-ROM. Greenstone is produced by the New Zealand Digital Library Project at the University of Waikato, and developed and distributed in cooperation with UNESCO and the Human Info NGO. It is multilingual, issued under the terms of the GNU General Public License. The aim of the Greenstone is to empower users, to build their own digital libraries. Greenstone is available for both Windows and Linux/Unix platform. It has following important features (10)

- “Accessible via web browser.
- Full-text and fielded search.
- Flexible browsing facilities: The user can browse lists of authors, lists of titles, lists of dates, etc.
- Creates access structures automatically: Under this facility all searching and browsing structures are built directly from the documents themselves.
- Makes use of available metadata: The Dublin Core metadata scheme is used for most electronic documents.
- Plugins extend the system's capabilities: In order to accommodate different kinds of source documents, the software is organized in such a way that “plugins” can be written for new document types.
- Designed for multi-gigabyte collections.
- Documents can be in any language.
- User interface available in multiple languages.
- Collections can contain text, pictures, audio, and video.
- Uses advanced compression techniques: Compression techniques are used to reduce the size of the indexes and text.
- Administrative function provided: An “administrative” function enables specified users to authorize new users to build collections, protect documents so that they can only be accessed by registered users on presentation of a password.
- New collections appear dynamically: Collections can be updated and new ones brought on-line at any time, without bringing the system down.
- Collections can be published on the Internet or on CD-ROM.
- Collections can be distributed amongst different computers.
- Operates on both Windows and Unix”.

4. Practical steps for development of PDL using Greenstone

The present model of PDL has been developed using latest version of Greenstone on Windows-XP. The following softwares have been used for the development of PDL which can be downloaded from <http://www.greenstone.org/> and other sources.

- Greenstone-2.86-windows
- jre-1_5_0_05-windows-i586-p
- apache_2.2.9-win32-x86-no_ssl-r2

Installation process is very easy just you need click and next in most cases. Select the language for this installation. We choose English as shown at figure-1 than

- Click <Next>
- Accept the license agreement and then click <Next>.
- Choose location to install Greenstone. Leave at the default and click <Next>.
- Set admin password and choose a suitable password and click <Next>.
- Click <Install> to complete the installation.

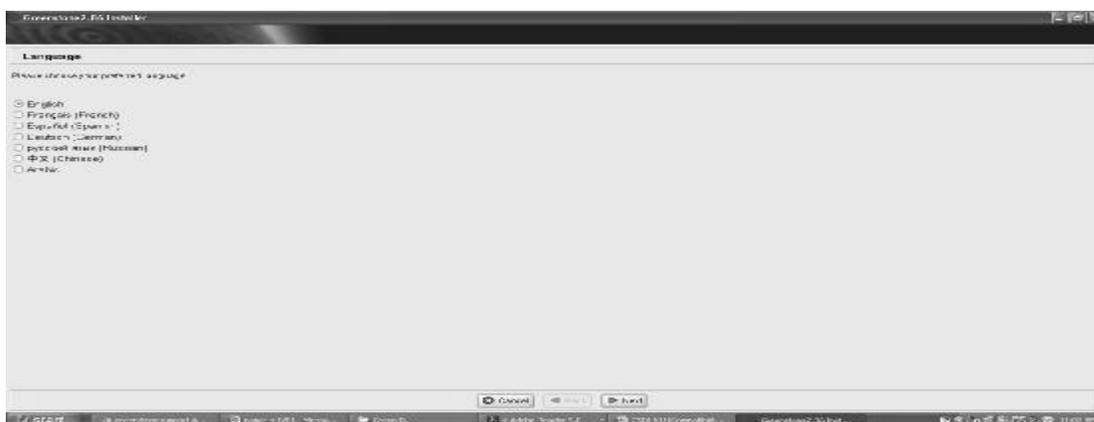


Figure-1: Installation of Greenstone

4.1 Collection Building: After installation of Greenstone start Librarian Interface (GLI) from start menu of windows. Collection Building i.e. building digital library, two popular modes of collection building, viz., Command Line and the GLI (Greenstone Librarian Interface) have been used in Greenstone. The GLI based collection building is quite easy and simple a method. The "Download" view helps you download resources from the internet. First establish new collection, here a new collection GBPant has been created. There are four steps i.e. '**Gather**', '**Enrich**', '**Design**', and '**Create**' for building collection in Greenstone (10).

4.1.1 Gather: In this step, you use to select what files to include in the collection you are building. The Librarian Interface starts with the Gather view. Select files to

include in collection from appropriate path. Files can be copied into the collection by dragging and dropping (Figure-2).

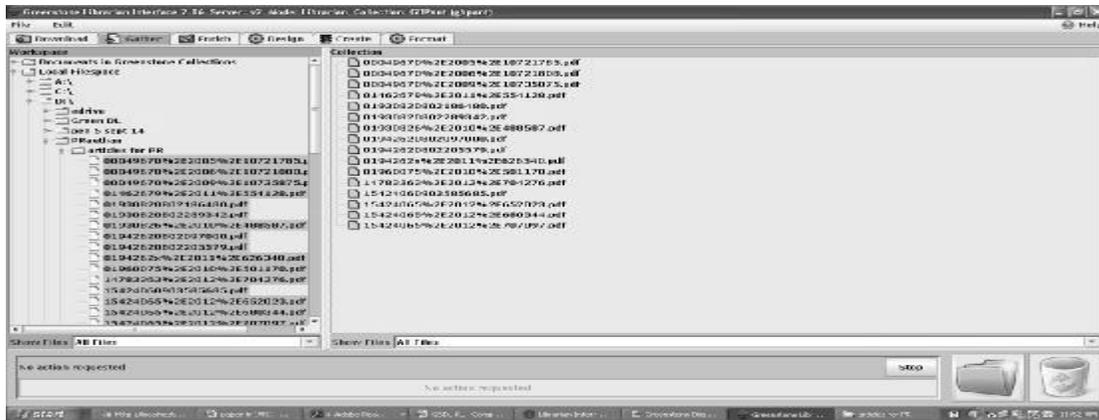


Figure-2: Gather view

4.1.2 Enrich: Having gathered several files into the collection, now enrich them with additional information called "metadata". Use the Enrich view to assign metadata to the documents in the collection (Figure-3). Metadata is data about data - typically title, creator (i.e. author), creation date, and so on. The Greenstone also create necessary metadata i.e. title, filename automatically.

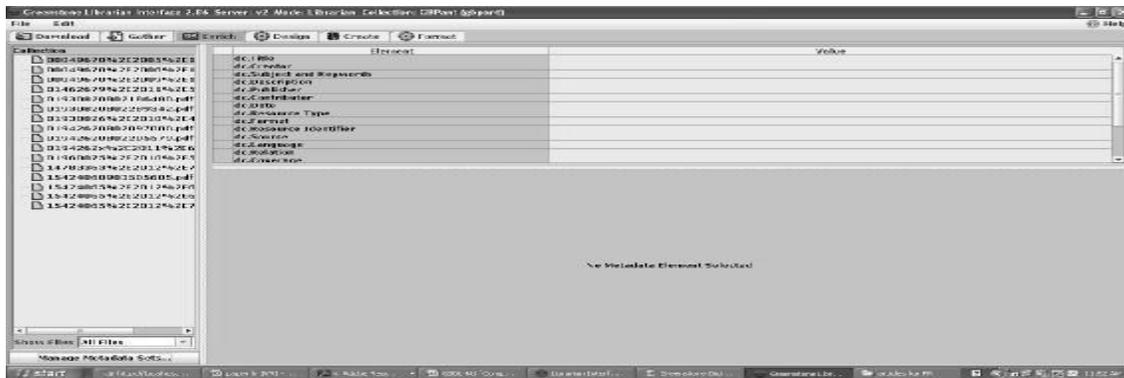


Figure-3: Enrich view

4.1.2 Design: It includes to the design view and explains how to navigate between the various views within this pane. With the GLI, you can configure how the collection appears to the user. It describes how to configure the document plugins the collection uses (Figure-4). Indexes specify what parts of the collection are searchable. One can add and remove indexes, and set a default index.

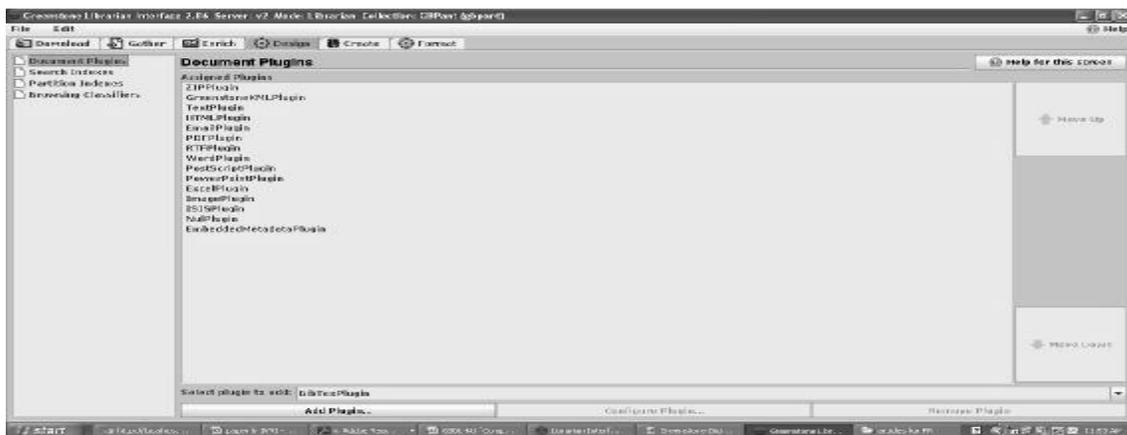


Figure-4: Design view

4.1.3 Create: It is used to build the collection. Clicking "Build Collection" initiates the collection building process (Figure-5). The time this takes depends on the size of the collection and the number of indexes being created.

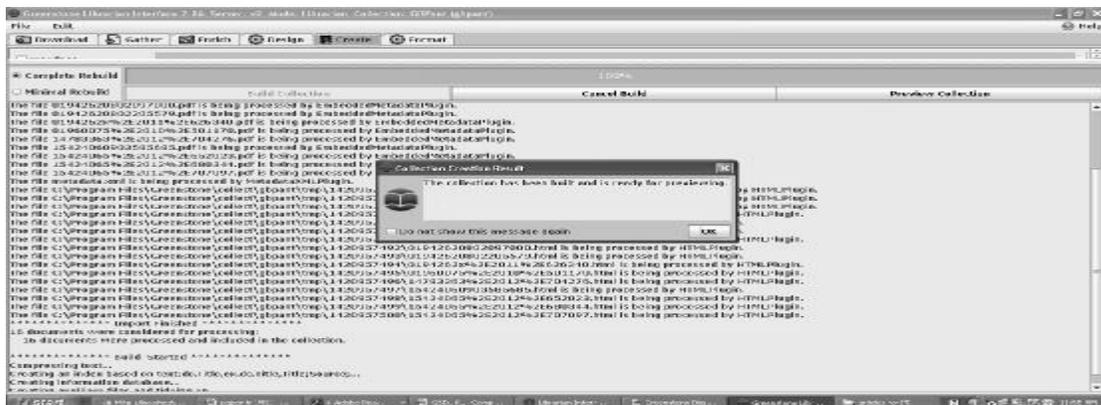


Figure-5: Create view

4.2 Preview and Search: After successfully building the collection, it can be previewed in a web browser showing the home page of the collection as shown in figure-6. Greenstone builds indexes of full text and browsing structures using the files. Various search operations can be performed on the collection (Figure-7). More than one collection can be built and cross search can be performed on multiple collections. It allows the searching from full text.

The collection developed in Greenstone can be exported to a CD-ROM or any local disk. Options for expert and write CD/DVD image is provided in the file menu (10). In the Greenstone format commands are used to change the appearance of the generated pages. Format commands are not easy to develop, it needs to refer the Greenstone Developer's Guide.



Figure-6: Preview Collection

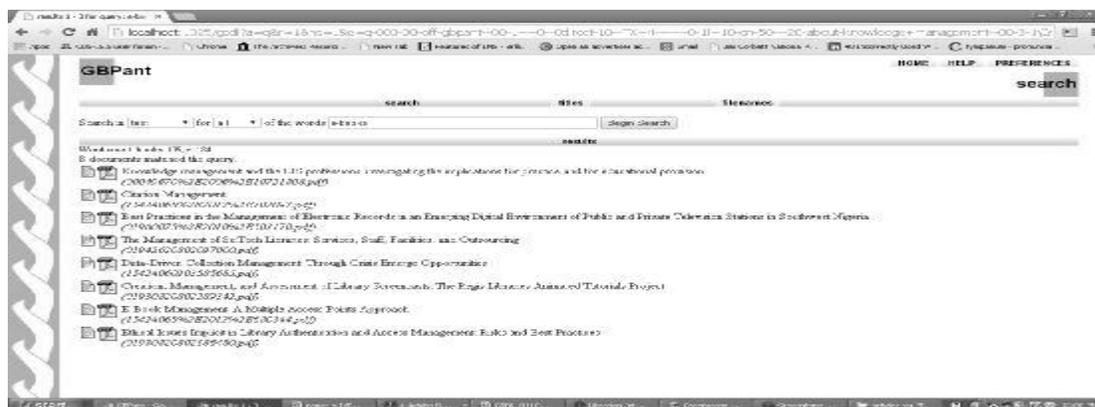


Figure-7: Search collection

5. Conclusion

E-resources of CeRA and open access system have been empowered faculty and scientists of INARS to access the desired digital information at their desktop/laptop for education and research purpose. Libraries have also been continually moving towards subscription of e-resources i.e. e-journals, e-books etc. As a result hundreds/thousands of articles have been downloaded individually by faculties and scientists for education and research purpose. Practical methods for development and management of PDL discussed in the paper will be very useful for academicians and researchers. The PDL will save the time of faculties and scientists. The full text search facility of Greenstone will be very useful for finding desired information. The PDL can be used for class room teaching. Importance of the proposed PDL model will be increased along with the increasing of e-resources.

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