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Intranet Solutions for Research Organization

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Summary

The present study is an attempt to design and develop software for Interactive Intranet Solutions for Research Organization (IISRO). It may serve as an effective solution for the organizations like ICAR, where all research activities and related information can be pooled at a central place and would be utilized by all research Institutions and State Agricultural Universities in India. The algorithm used for the development of IISRO is similar to those of standard dynamic web based solutions. Proper software engineering practices, the standard architecture and design are adopted for the development and implementation of the software. The relational approach and normalization theory has helped in enforcing security and organizational standards. This Intranet solution would allow the research organizations to maintain an ace of information at a central location, which can be used by the authorized person in a decentralized fashion. It will allow quick and timely retrieval of information. Since, the Intranet can virtually cover the globe and therefore, with such solutions a research organisation regardless of its geographic distribution and size can take advantage of its functionality.

Key words: Internet, Intranet, Intranet solutions, Web, Managing research organisation, Project management, Seminar management, Electronic bulletin board, Activity calendar, Courses/Training management, Active server pages (ASP), IIS, LAN.

1. Introduction

The net technology available to users for a close group is given the name Intranet. Formally, an Intranet [4] can be defined as a network connecting an affiliated set of clients using standard Internet protocols like TCP/IP and HTTP. In other words it is an IP-based network of nodes behind a firewall or several firewalls connected by secure and possibly virtual networks. Intranets are complete networking solutions that provide all the information management for organizational needs through the processes, protocols and standards available on the Internet. Intranet is a new breed of information services having potential for revolutionizing the private network and the Internet. It has a direct impact on the corporate and organizational needs. Thousands of organizations have visualized

that internal network i.e. Intranets can help empower their employees through more timely and cost effective information flow. This empowerment bolsters an organization's competitive advantage, through improvement of employee morale. The organizations under tremendous pressure to empower employees with internal information resources, Intranets are being seen as the solutions. Till now a lot has been done for the business corporations, but not much attention has been paid towards the research organizations. In the present study an attempt has been made to develop an Interactive Intranet Solutions for a Research Organization (IISRO), which will serve as an "information hub" for the entire organization.

2. Development and Designing of IISRO

The generic software types such as e-mail packages, HTML authoring or document management systems, database management system - SQL Server, Oracle, or Sybase, the DBMS-to-Web gateway and other common applications are typically associated with Intranets. These components are not complete solution unless all the parts are brought together to gain access to important information across the organization's Intranet for the user's. The distinction between an empty vessel and a useful Intranet component depends entirely upon adding organisation or task-specific information to the basic capabilities of some kind of networked application. The resulting databases are populated with required essential information, and a web interface is established, so that the users can access the web document as per requirements. This leads to an interesting calculus as follows:

Network + Hardware + Software + Organizational data = Intranet solution

In research organizations delivery of seminars, teaching of different courses, organization of training programs, and working on research projects are common activities. For seminars some emerging and latest topic is chosen and the related information is gathered from different journals, books, and Internet etc. for the presentation. The benefits of the efforts put in by a scientist in gathering information and presenting in the form of a seminar really does not reach the community as a whole. It benefits hardly the persons who physically attend the seminar. By manual system, it is practically impossible to manage the distribution of seminar's write-up for all the disciplines. Therefore, the efforts are made to save and manage information centrally and retrieve it in a decentralized manner according to the need of the organisation. In the present study viz. Intranet solution for research organization, the different needs were categorized under separate modules for the seminars, research projects, various academic courses and training programs and other information related to day to day activities of a research organisation.

2.1 Methods

The architecture of the IISRO is designed in three layers as Client Side Interface Layer (CSIL), Server Side Application Layer (SSAL) and Database

Layer (DBL). The CSIL is implemented using Hyper Text Markup Language (HTML) [1] and JavaScript. It contains reports and forms required for presenting the data to the user and accepting information and other required functionality. The IISRO can be run through standard browsers namely Internet browser or Netscape Navigator from any node defined on the network of Intranet. The design of CSIL enables the organization to build highly consistent database with minimum redundancy. It is done by enforcing the user to select the items rather than entering it through keyboard. The use of browser as front-end removes the need of installing separate client side software at each node of the network. Browser, as front-end also relieves the user from learning a new environment. Thus it also saves recourses that go into the training of users for learning a new environment.

The Server Side Application Layer (SSAL) encapsulates the entire interaction with the database and hides the details from the Clients Side Interface Layer (CSIL). The SSAL is implemented using Microsoft® Active Server Pages (ASP) [3] installed on the Internet Information Server (IIS) 4.0 web server at Windows NT server 4.0. The SSAL can also be implemented on Personal Web Server (PWS) at Windows 9X. ASP is a server-side scripting environment used to create and run dynamic, interactive, high-performance Web server applications compared to the other parallel technologies like Common Gateway Interface (CGI) programming [2]. Use of ASP gives the independence of writing CSIL in any scripting languages like VBScript, JavaScript or their combination in a page. Any browser that can contact web server, regardless of its support for VBScript or JavaScript, can work with ASP and its dynamic output.

The DBL has been implemented using standard Microsoft Access tools. It is used for designing the tables, relationships, referential integrity rules and queries. The fundamentals of normalization theory are used to normalize the different tables of the database. ADO is used for integrating the DBL with the SSAL. The use of ASP/ADO provides independence to the SSAL from particular database that can be replaced by any other ODBC/ADO compliant database. Architecture of this type makes the core application independent of backend as well as front end.

3. Results and Discussion

The IISRO is structured in four application modules for Seminar Management, Activity Calendar, Projects Management and Courses / Training Management.

Seminar Management

The Seminar Management module allows online addition, deletion and modification of seminars activities of a research organisation. It includes the abstract and complete write-up of the seminars along with other necessary information like title of the seminar, speaker name, date of delivery, venue, speaker category and seminar type. It displays list of scheduled and current

seminars and provides search capabilities for archived seminars on the basis of criteria like seminar date, keyword, discipline, speaker category, seminar type and research type.

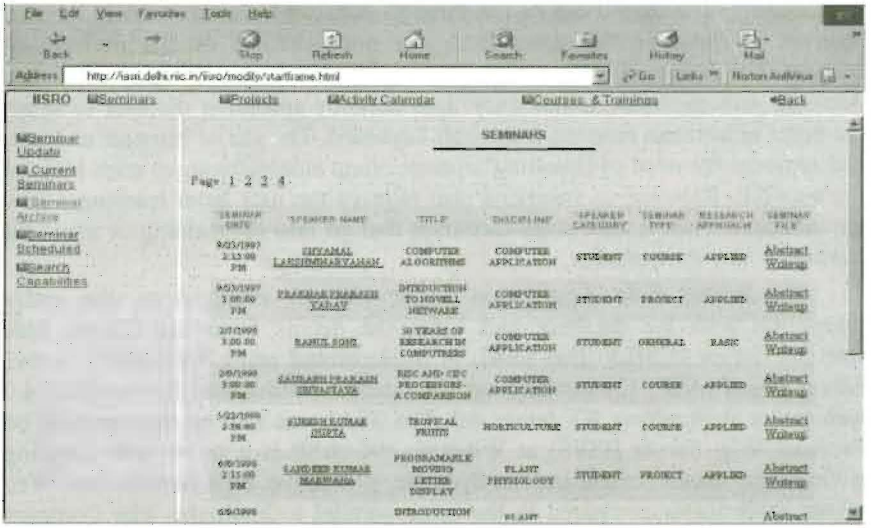

Fig 1. Listing of Seminars Archive of the Seminar Management Module.

Activity Calendar

The Activity Calendar module manages other information needed for routine administrative and organizational work in a research organisation. It has the facility to display list of scheduled, archived and current bulletins. The current bulletin displays the information, which are scheduled for that day. The scheduled bulletin displays the information about scheduled future events for which, date and timing is already allotted. The archived bulletin displays all the information about those events, which has already occurred. This module provides flexibility for targeting the information to a particular user category.

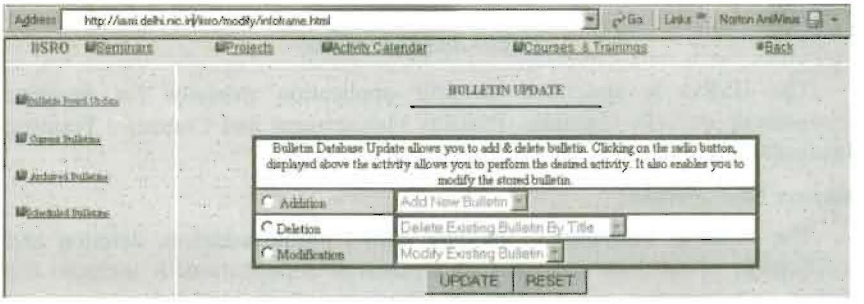

Fig 2. Addition, Modification & Deletion Options for Bulletins under Activity Calendar Module.

Projects Management

The Projects Management module is structured to manage the information of the research project running in the organisation. It is developed for organization like ICAR, which has a large number of research institutions working for different disciplines of agriculture. These institutions are physically located in different cities around the country. Project module manages the projects undertaken by research workers in different disciplines at different organizations. It does so by collecting the information in a decentralized manner and storing it centrally. It has the capability of dissemination of information as and when required in a decentralized manner. It allows online addition, deletion and modification of research projects information. Under this module the information about financing agencies, resumes of research workers along with area of specialization and their achievements are maintained. It also provides search capabilities for retrieval of project information on the basis of search criteria like starting and completion date, project location, project cost, project leader, keywords, financing agency and research type.

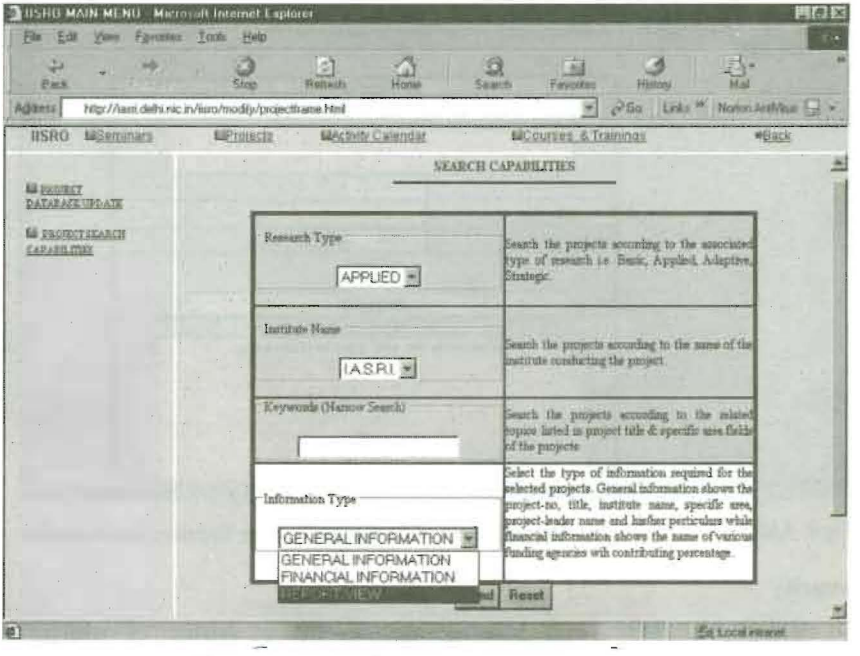

Fig 3. Some of the Project Search Options of the Project Management Module.

Courses / Training Management

The Courses / Training Management module manages the information about the various academic courses taught under different programmes and different training programs undertaken by an institute in an organization. The

search capabilities allows to search the database according to different search filters such as starting date, completion date, course leader, course member, institute name, keywords and course / training. The courses and training programmes can be searched by choosing one search filter, the unique search or by choosing multiple searches. The searched result may be viewed in two formats as tabular view or report view. The tabular view shows the title, institute name, starting date, completion date, course / training leader name and his/her particulars where as in report view the total information along with course or training programme contents and particulars of all the members involved in the programme are displayed. Thus, the tabular view can be used to view for monitoring purpose and report view for technical help as it contains all details along with course contents.

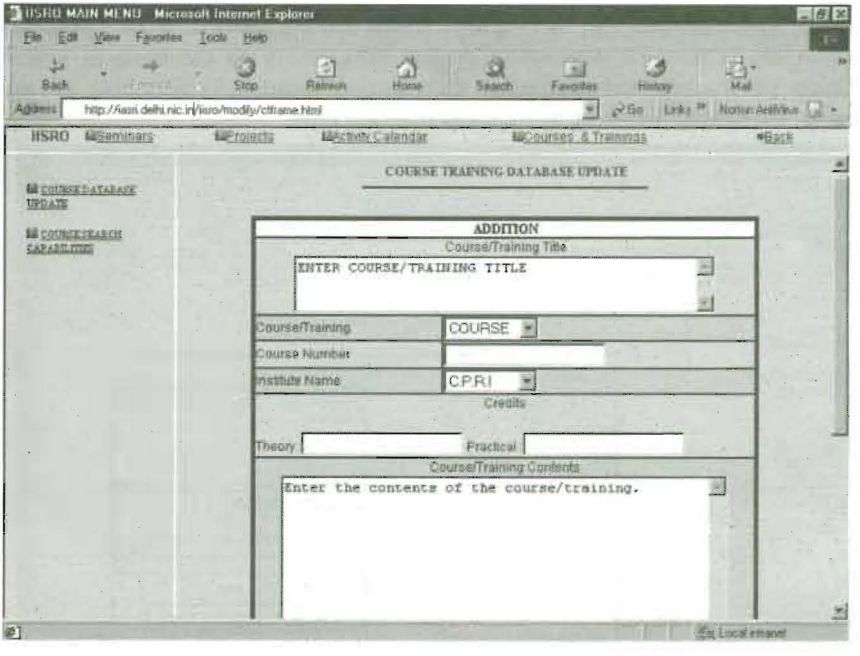

Fig 4. Addition of a new Course/Training screen of the Course/Training Database Update section.

Security

IISRO has three level security mechanisms by virtue of which an authenticated user can be an end user, super user or administrator with rights for a particular module or for all the modules. End user is only entitled for browsing the information. Super user is authorized for addition, modification and deletion of the information regarding each module. Administrator is authorized to create or destroy users along with all the rights of super user.

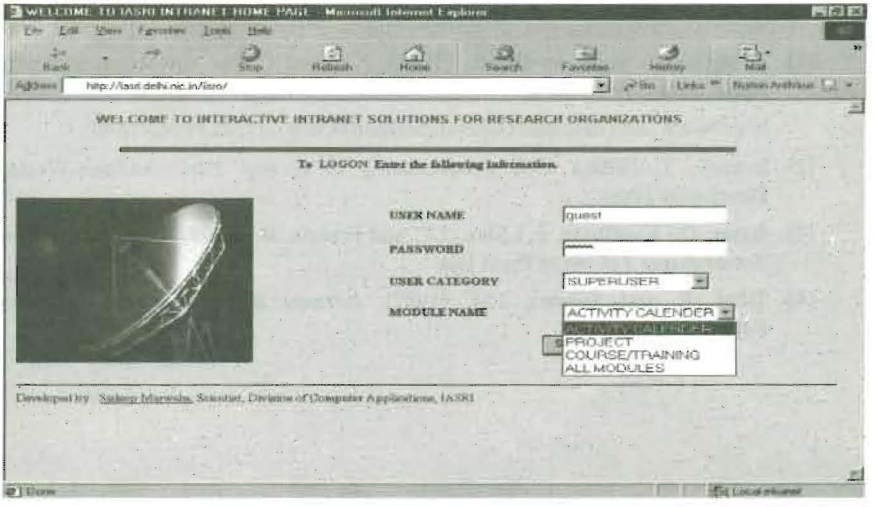

Fig 5. Title page of the Intranet Solutions for Research Organisation showing security authentications

Implementation

For installation and working of IISRO, the Hardware and Software components that go into the building of an Intranet are local area network (LAN), network servers that support TCP/IP, IIS 4.0 Web server on a Windows NT 4.0 and a web browser as a client software.

The IISRO software can be easily installed in the IIS/PWS server environment using standard installation procedures and can be activated by creating Data Source Name (DSN) for the IISRO database and viewed through any standard Internet browser. The homepage displays the linkage tags to various modules as discussed above.

Conclusions

In designing and development of IISRO the relational approach and normalization theory has helped in enforcing security and organizational standards. These Intranet solutions would allow the research organizations to maintain an ace of information at a central location, which can be used by the authorized person in a decentralized fashion. It will allow quick and timely retrieval of information. The duplicity of research efforts can be avoided and hence would lead to better utilization of resources. This will act as an effective solution for the organizations like ICAR, where all the information can be pooled at a central place and would be utilized by all research Institutions and State Agricultural Universities in India. Since the Intranet can virtually cover the globe and therefore, with such solutions a research organisation would have its presence and interaction on the globe.

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