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Decision Sciences Institute has embraced IT-based processes for its own institutional functions. It also offers an impressive set of services that are deployed over the Internet to its members. In this column, Jit Sengupta updates us about some of the latest IT innovations that the Institute is providing.

Information Technology Innovations in the Decision Sciences Institute

by Arijit Sengupta, Indiana University

The advances in technology have reached almost all areas of academics, and most academic communities are embracing technology to provide better services and support to the members. The Decision Sciences Institute started an Information Technology Committee with the charge of using the currently available technology to serve the members better, and many of the current services that were less technologically advanced were targeted for improvement. In this article, I describe some of these projects and how technology has impacted these projects and improved the services provided to the users.

Overview

Information technology has a major impact on the perception of all communities, industrial and academic alike. Although the idea of "if it ain't broken, don't fix it" works well for some aspects of our daily lives, most of our day-to-day activities are affected by technology, and such activities need to keep up with the highly volatile and changing technology. Many of the services provided by DSI used outdated technology, and the need was felt for using the currently available advanced technology to improve the services DSI renders to its members. A number of these areas were identified. Here I provide information on four of these projects affected directly or indirectly by the emerging technology. These four projects are:

1. Home Office Database
2. Online Membership Directory
3. DSI Placement Services
4. DSI Conference Information System

Home Office Database

The Home Office Database (HOD) is a database of DSI members. This database is used to track members, both current and past, and keep basic information on members, including names, current addresses, contact information, primary region of affiliation and special research interests, etc. The database also tracks whether or not members have paid their membership and other fees, if any. Although not directly usable by DSI members, all membership functions are performed using this system.

The Past

The DSI home office database has typically been a single-user database, handled by the DSI accounting and membership services personnel. It was originally implemented in Dbase IV and then later rewritten in Paradox, and most of the data entry was performed by specific administrative persons of the database. Retrieval was performed using ad-hoc queries and reports. Support was very limited, and new functionality was not easy to add.

The Present

Currently DSI is using a networked database system developed in Microsoft Access. Although mostly single-user by design, this database resides on a networked share, and hence can be accessed over the network by multiple users (although not at the same time). The database is password authenticated, and includes all typical actions such as queries and reports commonly per-

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formed by the home office. The system also includes functionalities for generating mail-merged letters that are periodically sent out to the members.

Some of the functionality of the Home Office Database has now been moved to the Internet (more information on this follows). However, the database system continues to be an offline system. An attempt was made to move the data completely to a networked database server at the Decision Sciences Institute ISP site, but the move was abandoned because of the poor network response. Many of the important functionalities were implemented in Microsoft Access, so the Access-based system was upscaled to the ISP's Microsoft SQL server database, and the Access functionality was redirected to access the new networked data. However, the speed of access of the data from the home office to the database server was dismal, and a decision was taken to keep the data locally in the home office and replicate a part of the database on the SQL server (more details in the next section).

The Future

Although the initial efforts for moving the database online did not materialize, the eventual goal for this project is to be available securely online for use by all members of DSI administration team at various levels. More portions of this database will be moved online as and when required by other DSI projects.

Online Membership Directory

The Decision Sciences Institute Membership directory is a listing of current DSI members and their contact information. The data forms a core part of the Home Office database, and includes the mostly accessed portions of the membership information.

The Past

Formerly, DSI mailed its members a printed booklet containing the contact information of all its members. Although adequate for most purposes, this method was expensive to the Institute, and frequently the data was outdated and inaccurate.

The Present

One of the technology-assisted improvements to the membership directory was the move of this information online, available from the www.decisionsciences.org Web site. One of the problems, as mentioned before, was that the data was stored in a Microsoft Access database on a local network. Although sufficient for the basic functionality required at the home office, Microsoft Access is not capable to handle multiple concurrent accesses. An attempt to move the data to a networked database, keeping the home office functionality in Microsoft Access could not materialize because of the slow network access from the home office. Hence, a decision was taken to replicate the membership directory information (consisting of only a portion of the data in the HOD) to the SQL server on the DSI Internet Access Provider site. A web-based application (see http://www.decisionsciences.org/directory) was built on top of this database to provide full keyword-based, as well as structure-based searches on the membership information. This system allows users to search the directory by keywords, as well as by last name, first name, city, state, country, regional affiliation and research interests. In addition, persons with administrative privilege to the system can retrieve information using more private information such as the dues year and member position.

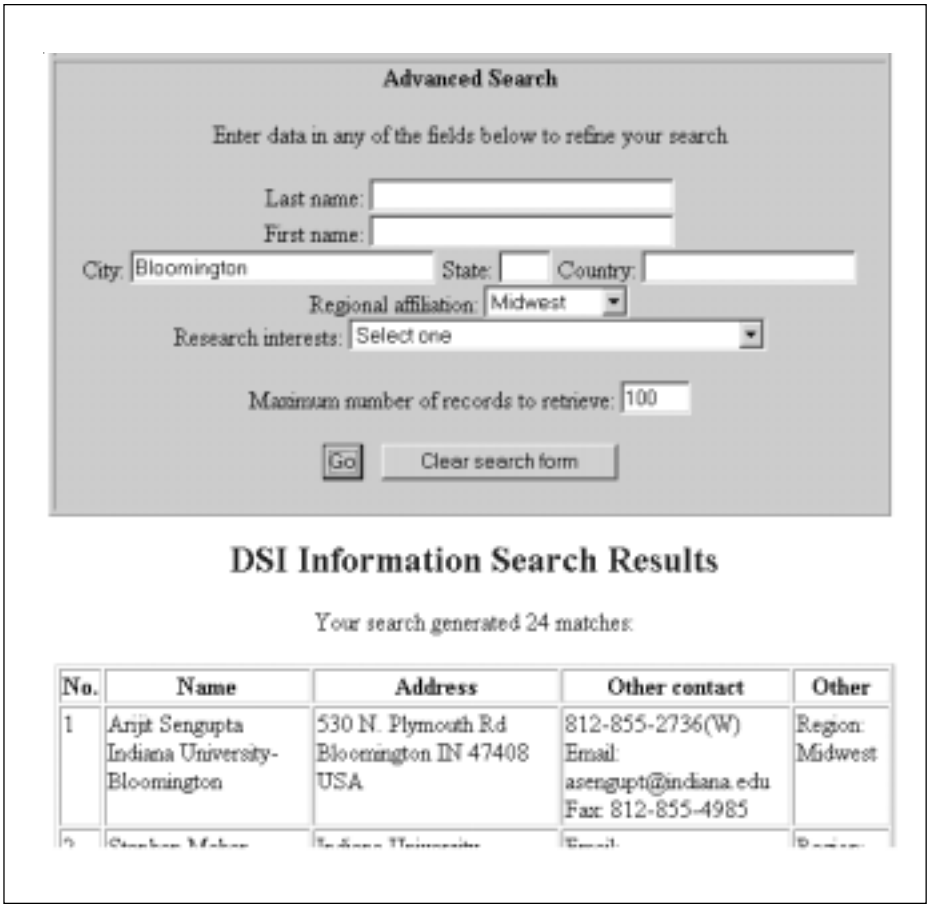

Figure 1. A search on the DSI online membership directory for city and region.

In addition to the search feature, the online membership directory also allowed members to view and update pertinent information. This feature allows members to log in to the system and update their contact information such as institution, address, phone number, email address, regional affiliations, research interests and passwords. The updated information is then synchronized with the home office database on a schedule.

The Future

This system would greatly benefit from the complete migration of the home office database to a Web-based system, since it

would then eliminate the need for manual synchronization, and be an instant change to the membership database. An online membership renewal feature would also be a great future functionality of this service.

Service to members: Did you know you could search for other members in the same geographical region as you using this system? See Figure 1.

Placement Services

The Decision Sciences Institute provides a placement service to attendees of the DSI annual meetings. Employers (typically consisting of universities and research institutions) can use this service to interview annual meeting attendees at the conference site. This provides a low cost option to both employers as well as prospective applicants to meet each other before an actual on-site interview.

The Past

During the first few years of this service, employers had to submit information regarding available positions to DSI. This information was manually collected by the placement services coordinator in a Microsoft Word document, and made available from the Web site to be downloaded as one big file, or broken down into separate categorized files. Similar information was also available for job applicants.

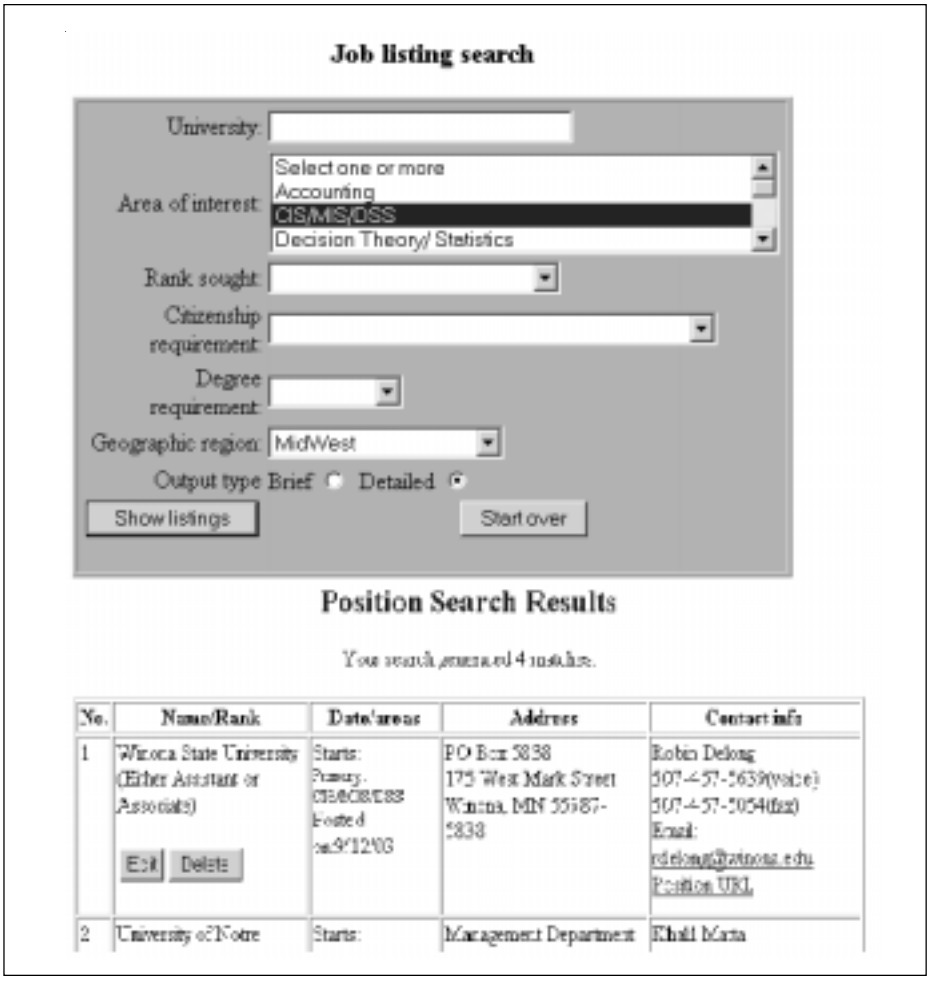

Figure 2. Searching the placement system for all CIS positions in the Midwest.

The Present

The placement services were significantly improved for the 2002 Annual Meeting. A complete placement services Web site was designed which allowed employers to log on and enter information on positions, and applicants to log on and enter their contact and background information. The system was first put to test during DSI 2002, and based on feedback of the users, the system was vastly improved for the upcoming DSI 2003.

In a nutshell, the placement system allows employers to post information on job openings for a fee. The information gathered from employers include basic contact information, URL containing details of the position, and other relevant information regarding the position such as rank, interest areas, citizenship and work authorization, and degree requirements. Applicants can also enter information regarding themselves such as their contact information, interest areas, and degree and immigration status. Both employers as well as applicants can log on to the system and change information that they have entered. The system also provides a search interface for anyone (with or without a DSI membership) to search the database on institution, rank, degree requirements, citizenship requirements, and interest areas.

The Future

Although the placement system adds significant value to the placement services provided by DSI, it certainly is only a step towards a complete online placement service. Although there are no current plans for significant changes to this system, in the future the placement system could incorporate scheduling of on-site interviews, tracking the interviews, storing and compiling vitas for prospective candidates, etc.

Service to members: Did you know you could register yourself in the placement system as well as search for suitable positions even during the annual meeting? See Figure 2.

Conference Information System

One of the Institute's latest IT projects, the Conference Information System (CIS), is the administration component for the DSI annual meetings. Every year the program chair of the annual meeting has created a method for managing various components of the conference. Often this requires the

program chairs to hire people to develop customized applications to maintain the various components of the conference. At a minimum, tasks performed by the CIS include setting up a basic conference site, creating the tracks and sessions in the conference, setting up information regarding the meeting rooms where the sessions will take place, scheduling the sessions, and generating the preliminary and final conference programs. In addition, the information in the CIS could also be used to develop the conference Web site, coordinate conference registration, coordinating the paper submission and review process, and other pertinent functions related to the conference.

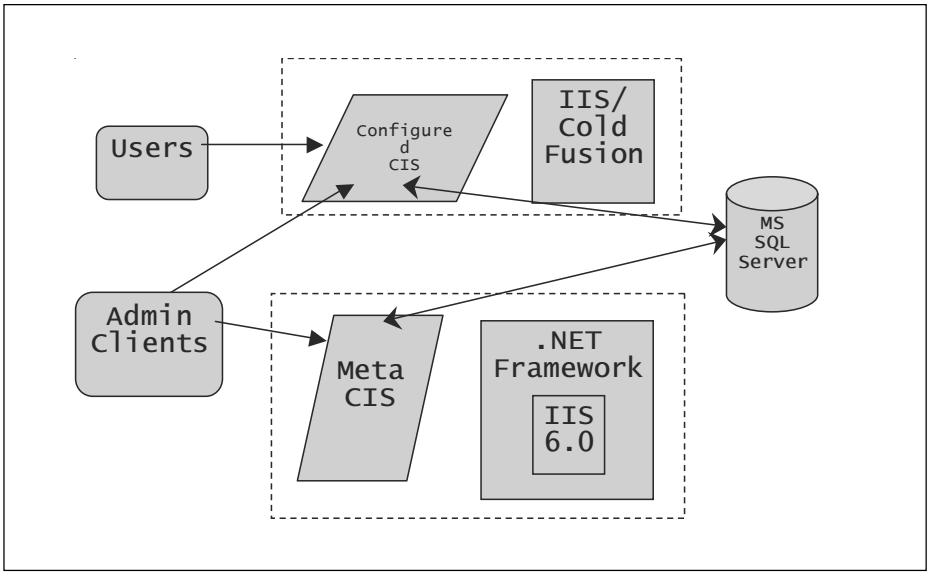

Figure 3. An architectural overview of the new Conference Information System.

The Past

Unfortunately, there was no single CIS used by the Institute. Each year the new program chair and his/her team developed a method for coordinating that year's system. A number of systems have been developed over the last few years with mixed success:

1. 2000 and earlier: A Paradox-based database system was developed by Al Avery and his team for coordinating the CIS tasks. This system was a single-user offline system that was capable of tracking the conference components, but most of the online activities were manually created.

2. 2001 Annual Meeting: Vicki Smith-Daniels and her team developed a system with a database backend in Microsoft Access and an HTML/Cold Fusion frontend. The database connectivity through Cold Fusion was used mainly for extracting demographic and other informational data for displaying on the Web sites. Most of the conference administration tasks were performed in Microsoft Access, which also generated the conference reports. This system, however, did not have an online paper submission and review component.

3. 2002 Annual Meeting: Tim Smunt and his team developed a conference Web site which had one major innovation for accepting paper submissions online, and for conducting the paper review process. To facilitate this, a system built with Cold Fusion, using an SQL Server database backend, was used, which performed fairly well and was well received.

The Present

For the 2003 Annual Meeting, Program Chair Mark Davis and his team have again used a custom-developed system for some of the CIS functionality, like paper submission and review, scheduling, and generation of preliminary and final programs. This system is written in Perl and runs on the developer's server.

The Future

Although the current solution of putting together new customized systems for every year's conference seems to work fairly consistently, the amount of time and effort needed on the part of the program chair seems to be mostly unnecessary. Moreover, most functionalities of the system are typically redesigned and created from scratch. This causes problems with consistency between the Web sites from year to year. In addition, many of the design functionalities are performed manually. There is also a problem with the ownership of the sources of these systems—the source code for all the systems being used is not always available. We are now in the process of developing a system aimed at addressing most of the above problems.

The new CIS being proposed combines the functionalities developed in earlier annual meetings. The two main systems that we are integrating include the CIS developed for the 2001 Annual Meeting by Vicki Smith Daniels and the 2002 Annual Meeting developed by Tim Smunt. See Figure 3 for an architectural overview of the CIS. The users only get to see the "finished product" that the administrators develop using the CIS builder.

The proposed new CIS will have the following functionalities:

1. Reusability—Reusability is the most important of the functionalities in the new proposed CIS. The primary goal of the system is to provide the program chairs a consistent method for setting up the conference components without having to configure and perform all the tasks manually.

2. Online presence—The CIS needs to be accessible online so that committee members and others involved can access the system from anywhere at anytime.

3. Configurability—The system should be configurable to generate different layouts.

4. Functionality—The system should provide all the basic functionality of an ideal CIS (such as paper submission/review, basic Web site creation and maintenance, management of the tracks, meet-

ing rooms, track and session chairs, scheduling, generation of preliminary and final programs).

The new CIS is currently in the requirements gathering and design phase.

Service to members: Once completed, the CIS would serve as a portal to the annual meeting—a consistent Web address, a system to create personalized conference schedules, and more!

How Does DSI Measure up?

DSI has advanced immensely technologically over the last two years. DSI members now enjoy the same level of technology-assisted services as many other technically advanced communities such as ACM and AIS. Services such as online membership directory, online secure conference registration, online paper submission and review has placed DSI technically at par with these other organizations. In fact, some of the services that DSI members enjoy are highly innovative and not available in many other organizations. These services include online placement services and the ability to provide preferences to help schedule the conference sessions. Once the new CIS is completed, DSI should be one of the premier technically advanced organizations.

Summary

The projects mentioned here are only some of the advances in information technology in DSI. Recent developments in the Decision Sciences Institute have shown the commitment of the Institute to keep up with the challenges of the growing IT community, and certainly newer projects will be undertaken in the immediate future to strengthen the IT infrastructure of DSI. ■

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expanded to include more representation from outside the U.S.

Second, I would ask the Institute to consider expanding its objectives to not only disseminating new knowledge through its journals and conferences, but also to sponsor the discovery of new knowledge through large, global research initiatives. For example, many in the U.S. are discussing the continued "hollowing" of U.S. manufacturing, especially as companies continue to move or develop new manufacturing in China and software development in India, for example. Perhaps, if we took a global view of this phenomenon, we might see more advantages than disadvantages. (Again, I am asking the question, not suggesting the answer.) Possibly, DSI could take a leading role by sponsoring research activities in areas such as this. At the very least, it could consider sponsoring such activities and/or providing linkages between interested faculty and businesses who might be interested in such a pursuit. I am certain that the membership, if surveyed and listened to, could come up with many more ways that DSI could "Build and Sustain a Stronger International Presence and Acceptance." ■

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tained by writing the code in C or Fortran and compiling it with "optimization" turned on. Attached as extra files with this article on the Web site are codes Russ wrote for Perl and C.

Conclusion

The whole purpose of this Excel simulation exercise is to show students how much variation exists with even a simple simulation, and that it takes a long time for the Law of Averages to be effective. This spreadsheet can be changed to expand the number of runs and also the number of replications to demonstrate the error in even a large number of trials and the variation inherent in Monte Carlo simulation. Crystal Ball or @Risk could also be used with the spreadsheet to show how many trials are needed to make the estimate of pi more accurate. ■

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