COMBINING EXPERT SYSTEM AND DATABASE TECHNOLOGIES
WITH THE SAS® SYSTEM

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ABSTRACT

This paper presents the Contractor Information System, a menu-driven computer system for the United Illuminating Company, an electric utility located in New Haven, Connecticut. The System integrates the UI Contractor Insurance System, a PC-based Expert System using VP-Expert® (an Expert System shell) and dBASEIII PLUS®, with the UI Contractor Rates System, using the SAS® system. This system provides an easy access to all authorized personnel for checking the contractor's insurance coverage and current billing rates. The interfaces between these three technologies show that Expert System and database technologies combined with highly interactive systems built with fourth generation such as the SAS system, can be effectively employed to improve productivity.

INTRODUCTION

The United Illuminating Company is an investor-owned electric utility located in Southern Connecticut. We are engaged principally in the production, purchase, transmission, distribution and sale of electricity for residential, commercial and industrial customers. The United Illuminating Company has the need to use a lot of outside contractors. Some of these contractors are used at our generating stations during routine overhauls and for emergency repairs, or during large storms such as hurricanes and ice storms. We needed an automated system to keep track of both the contractor's insurance coverages and their current rates. The Contractor Insurance System, a menu-driven computer system, was developed to do the task of contractor information keeping. This system integrates three technologies: expert system, database, and a fourth generation language, the SAS system. The contractor information system consists of two main parts, the Contractor Insurance System and the Contractor Rate System. The Contractor Insurance System is micro-based and contains the expert system and the database file. The Contractor Rates System is mainframe-based and uses the SAS system. These two systems were being developed separately for the Purchasing and Stores department. The question was then asked, "can we make the insurance information available to the entire company?". We decided to combine all the contractor information, creating the Contractor Information System. We found the best way to control this system was by using SAS/AF®. The SAS/AF menus make the system easy to use by both the system administrators and the users.

THE SYSTEM

The Contractor Insurance System is a micro-based system. It consists of two parts, the expert system and the database. An expert system is a computer program that is designed to capture the knowledge and decision-making capabilities of an expert and make this knowledge available to others. Our expert is the Director of Purchasing and Stores. The knowledge that is in our expert system is the amounts and types of insurances. The specific amounts needed depends on the types of work to be done by the contractor. VP-Expert is the software we chose to write the expert system. The expert system determines if a contractor's insurance coverage is sufficient.

A database is an organized collection of related information. The database file holds the types and amounts of coverage and the dates of expiration for each company we deal with. We chose dBASEIII PLUS to hold this information because our expert system shell, VP-Expert, is able to read and modify dBASEIII PLUS files.

A consultation with the expert system is run which interacts with and, if necessary, updates the dBASEIII PLUS file. A consultation consists of a series of questions asked by the expert system. The answers to these questions along with the information in the database allow the expert system to reach a decision using the expertise programmed into the expert system. The output from the consultation shows the types of coverages, whether or not the amount of insurance is sufficient for our needs, if the coverage is current, and what amount of additional insurance, if any, is needed. A dBASE extract program is then run to pull off the insurance information results from the expert system consultation. The file is then uploaded so it can be read in by the Contractor Information System in the SAS system.

The contractor rate system is a mainframe-based system using the SAS
The system is menu-driven, using SAS/AF, making it easy to use. SAS/FSP® is used to enter and update the contractor's rates. The SAS/FSP screens make the data easy to read and understand. This system originally contained only rate information for contractors and equipment rentals. By adding the contractor's insurance information to the contractor rate system, we make the output from the expert system along with this rate information available for the entire company.

The Contractor Information System is the Contractor Rate System along with the Contractor Insurance Information. This system is also mainframe based using the SAS system. There are two versions of the Contractor Information System: the administrator version and the user version. The administrator version of the system gives the administrator read/write access to all the data, via FSEDIT. The administrator can add and update the data, upload a new insurance file, and run expiration reports to maintain the currentness of the data. The user version gives all users read only access to the data, via FSBROWSE. The users may view the contractor's rates, the equipment rental rates, and the insurance information. Both versions allow for reconciling contractor's invoices. To avoid redundancy, I will only describe the administrator's version.

The main menu is the first screen the user will see. From this menu, the user can choose any of the options that he will need. Adding new contractors and updating the rates of current contractors is done using SAS/FSP®. When option one from the main menu is chosen, a SAS/FSP® screen appears which includes the company name, type of contractor and the rates for different time periods.

One of the features that makes this system so valuable to areas other than the purchasing and stores department is the ability to reconcile invoices that are sent to the United Illuminating company from the vendors we do business with. Choosing option two from the main menu allows the user to choose which company and contractor type to check the rates for. A SAS/AF program screen appears which the user enters the company, the rates for temporary help employed by the United Illuminating Company, this system also allows the user to access equipment rental rates for the companies that we rent from. A SAS/AF program screen displays the names of all the companies we currently have a rate structure for. From this screen the user can choose the company he is interested in. A SAS/FSP screen is used to display and update this equipment rental information. This section does not calculate automatically, due to the large amount of equipment from each vendor.

Selecting option four from the main menu brings up a menu for insurance maintenance. From this menu the user can choose to examine insurance information, bring in a new insurance file or run an expiration report. Bringing in a new insurance file is the option chosen to read the cms flat file extract of the dBASE® III file into the SAS system. The insurance expiration report allows the user to choose a date to use as the expiration date. This is done with a SAS/AF program screen into which the user enters the date. SAS/AF then passes the date to the program as macro variables, allowing the user to enter any date without having to modify the program.

The CONCLUSION

Benefits from this system will be realized in the purchasing and stores department as well as company-wide. The purchasing and stores department will derive benefits from the expert system portion in two ways. First, a clerk may now run the expert system consultation to determine if the insurance coverages are sufficient. The director of purchasing and stores normally has to determine if the insurance amounts are sufficient, therefore using this expert system frees up his time. Additionally, this system will give consistent responses, that is, everytime the system receives the same input it will give the same response. The database portion of the system allows for the maintenance of insurance information. It also saves modifications made by the expert system consultation. Detailed reporting on insurance information is done with dBASE® III PLUS programs. The SAS system component allows for maintenance of contractor rates and equipment rental costs. Detailed reporting on contractor information is also done in the SAS system.

Many benefits from this system will be realized by the entire company. One benefit from the SAS system is the integration of all contractor information. By having all this information together, reconciliation of invoices from contractors will now be possible. Because the system is mainframe-based, the entire company will have access to it.
system technology, database technology and the SAS system to do the task of contractor maintenance.

SAS/AF makes it easy to pull all of the parts of this system together. The menus make the system easy to use for both the users and the administrator of the system. By having SAS/FSP screens incorporated into the system, updating and adding data is made easy. In addition, the screens make the presentation of the data much nicer and easy to read. Whether you are combining different technologies into one system, or building a system entirely in the SAS system, SAS/AF is an effective tool to control your system through user-friendly menus.

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CONTRACTOR INFORMATION SYSTEM

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