



Australian Cotton Cooperative Research Centre

SUMMER SCHOLARSHIP - 2003/2004 SEASON

Project title :Delivering HydroLOGIC to the Australian Cotton Industry

Commencement Date :January 2004

University Student :Mr Andrew Traves

Organization : University of New England

Project Supervisors : Mr Dirk Richards and Mr Darren Linsley
: CSIRO Plant Industry, Cotton Research Unit
Telephone : 02 67991500
Facsimile : 02 67931186
Postal Address : Locked Bag 59 Narrabri NSW 2390

Aims and Milestones

- Support the HydroLOGIC Help Desk, and providing assistance to growers and crop consultants.
- Analysis, documentation and implementation of a contact management system (cotton industry database) for HydroLOGIC registration and support.
- Work alongside programmers developing decision tools for the cotton industry that are delivered via the Internet and handheld PDA's.

Project Summary

Background

Andrew Traves is currently a student at the University of New England, studying a Bachelor of Computer Science, majoring in Information Technology. Andrew commenced his Scholarship on the 5th of January, 2004. The CSIRO Cotton Management Support Systems Team delivers a wide range of decision support tools to the Australian cotton industry. This cotton CRC scholarship has allowed work on a wide range of software and internet applications that the CRC/CSIRO produces, supports and maintains. During the seven week period of Andrew's work experience, he assisted in many projects. These projects were not limited to providing support to HydroLOGIC users but covered a range of software development challenges.

Project Outcomes

HydroLOGIC Support

The HydroLOGIC software was officially launched in September 2003, with Dirk Richards and Sandra Deutscher conducting a travelling workshop series throughout the industry. Due to reduced water allocations and much reduced cotton cropping areas in most valleys, grower demand for HydroLOGIC support has also been reduced. Andrew has provided support to users in uploading and downloading weather data.

The user friendly nature of the program and descriptive on-line help would indicate that users are not experiencing problems with the current software.

Cotton Industry Database

This objective was not achieved, however this allowed work to be completed on other software development objectives. On further analysis, the current cotton industry database is operating effectively and was not perceived to be a high development priority, and hence was not considered a priority for Andrew.

Bug Tracking

During the development and subsequent use of the CottonLOGIC software, there are numerous bugs found. To assist in the debugging phase and ongoing product development, the Bugzilla bug tracking program has been used since June 2001 to collate and develop reports on software errors and development opportunities by software product. This bug reporting program was doing an adequate job, however a more efficient program became available.

The Mantis software is a bug tracking program, similar to Bugzilla. The main difference between Bugzilla and Mantis is that the latter uses visual elements to better understand the status of a bug. This simple difference allows users to track development issues from bug reporting to resolution, and there makes Mantis a much more effective bug tracking program. However the implementation of Mantis as the new bug tracking program did have unforeseen problems. Once the program was installed, Andrew was given the task of testing Mantis, during which several problems were found. Ironically, Mantis had several bugs in its programming, which were subsequently resolved by Mr Darren Linsley. Andrew's next task was to transfer the data from Bugzilla to Mantis. All relevant data in Bugzilla was copied to Mantis. The task was performed by copying the relevant information from Bugzilla into Mantis. The information included the bug's description, priority and who the bug was assigned to. This task was completed quickly and without any further problems

Insect record database

Databases have become one of the worlds most effective and popular data storage programs. They can store data in almost any format, store massive amounts of data and analyse the data. For these reasons, databases have become a popular way for researchers to store large amounts for data from experiments.

Dr Melina Miles, an Entomologist with the Department of Primary Industries, had large amounts of data which she wanted to analyse. This data related to pests on several property's over several growing seasons. The data and related documentation was passed on to Andrew. With the assistance of Scott Johnston a design for a relational database was made. The design chosen was a 3rd normal form relational database. This design would allow the user to perform the functions of a database without requiring extensive knowledge of databases.

The design was changed several weeks after the initial design was planed. The change in design was made to give greater flexibility for the user and to give more accurate analysis of the data. The new design would make the database easier to analyse and more flexible. The new design involved moving data from one of the tables into several new tables. This design will cause the user to spend slightly more time inputting data. However it will make modifying the database far easier. The last stage of making the database was to input data into the different tables. Unfortunately, due to the nature of the experiment, the data was not consistent or had some data missing. Making the data consistent was an extremely time consuming exercise.

Due to the short time that Andrew was employed, he was unable to complete the database, however all relevant information was passed on to the other software developers.

Assessment of the CottonLOGIC Website

Andrew was given the task of looking at the current CottonLOGIC website and giving recommendations for improving the site. In website design, much of the changes are dependant on the individual's opinions. Andrew's opinions are from an exterior view and limited due to the fact that his work experience is 7 weeks. His recommendations, combined with the opinions of the programmers should produce a more efficient and worthwhile website.

Andrew viewed not only the current CottonLOGIC website, but also other popular websites and various websites giving advice on how to design a successful website. From the information gathered, Andrew was able to make recommendations to the other members of the Cotton Management Support Systems Team. These recommendations ranged from the content in the pages to the architecture of the site itself. The majority of Andrew's recommendations were to make the website more user friendly. Andrew had the opinion that majority of users would not have much experience with the internet, therefore the site needed to be easy to navigate and have more consistent explanations of hyperlinks. The major difference was the architecture of the site. Currently each page in the site is only accessible directly from the home page. Using frames, Andrew designed a menu which resides on the left of screen throughout the site which gives far easier navigation. Other recommendations for the site included removing some page which are no longer relevant and making the site more appealing by using multimedia.

Diapause Calculator

The final task assigned to Andrew was to write a program to estimate the percentage diapause of the heliothis moth at a particular site. The program was to ask the user for:

- The latitude of the diapause site
- The date of estimation
- The Maximum and Minimum temperatures for the estimation date and the previous 4 days

This information was then used to determine the percentage diapause of the heliothis moth. This uses research information from Dr Melina Miles, which she provided in an Excel spreadsheet. Andrew's task was to analyse the processes used in the spreadsheet and convert them into programming language. Andrew chose to use the C++ programming language because that is the language which he has had the most experience in. Coding the program was a simple task. Essentially all the program had to do was to receive the data from the user, use 2 mathematical functions to calculate the answer and display the answer on screen. The only difficulty in the coding process was determining how to find the 'sin' and 'cos' of a number.

The program was completed as a 'command line' style .exe program which is small enough to fit on a floppy disk. The values are not completely accurate as there are many variables which can affect the result. Some of the variables can be weather conditions, abundance of predators and population from previous season. The program is intended as a guide for farmers and researchers.

Conclusion

The 7 weeks Andrew spent working with the Cotton CRC has made a positive impact on his life and career. Andrew is firmly focused on a career in Information Technology. He has enjoyed the friendships with co-workers and the intellectual challenges of his work. His work was beneficial to enhancing a range of products being developed by CRC/CSIRO.

Plain English Summary

The CSIRO Cotton Management Support Systems Team delivers a wide range of decision support tools to the Australian cotton industry. This cotton CRC scholarship has allowed work on a wide range of software and internet applications that the CRC produces, supports and maintains. During the seven week period of Andrew's work experience, he assisted in many projects. These projects were not limited to providing support to HydroLOGIC users but covered a range of software development challenges. This summer scholarship was unique in focus, as rather than achieving scientific aims, it provided on the job experience in IT and software development within the cotton industry. The primary aims and achievements for the scholarship were:

1. Support the HydroLOGIC Help Desk, and providing assistance to growers and crop consultants.
 - This objective was achieved with all support requests being answered and solutions provided. The majority of requests were related to weather information and formats required to use HydroLOGIC to predict future irrigation requirements.
2. Analysis, documentation and implementation of a contact management system (cotton industry database) for HydroLOGIC registration and support.
 - This objective was not completed as it was deemed to be less relevant. The absence of this objective allowed of greater focus of the remaining objectives.
3. Work alongside programmers developing decision tools for the cotton industry that are delivered via the Internet and handheld PDA's.
 - A wide range of topics and development was achieved in this objective which included; the implementation of a software bug recording system for the tracking and reporting of software problems; design of an insect check recording database for Cotton CRC researchers, an assessment and recommendation on the CottonLOGIC web site; and the compilation of a heliothis diapause prediction tool.

The 7 weeks Andrew spent working with the Cotton CRC has made a positive impact on his life and career. Andrew is firmly focused on a career in Information Technology, and he has enjoyed the friendships with co-workers and the intellectual challenges of his work. His work was beneficial to enhancing a range of products being developed by CRC/CSIRO.