

CHAPTER 9

Computer Lab Monitoring System with ComTrack ver2.0

Nur Athiqah Harron*, Aini Hafizah Mohd Saod, Siti Azura Ramlan,
Faridah Abd Razak & Shahidah Sadimin

Universiti Teknologi MARA (Pulau Pinang), Permatang Pauh 13500, Malaysia

Abstract

A few issues like security, operation management and managerial decision support have to be faced by most of the computer lab management. The factors such as lack of access control and inadequate security have caused a significant direct loss. Most of the academic institutions were provided with computer lab facilities. Usual ways the management will provide a register card hanged beside the computer to record the usage details. However, these will cause a problem to laboratory management to handle computer breakdown or software malfunction when the computer record is not completely precise, and it is important to optimize use of resources and provide required levels of security in a computer lab. Therefore, the aims of this project are to design, develop and evaluate an interactive Windows application named as ComTrack, that can force user to login with the registered user id such as student id or staff number before they can use the computer. These interactive systems also have a capability to trigger the lab owner when there are any issue reported by users. Thus, it is essential for laboratory management to have absolute user login, logout and the issue reported details for each of the computer they are handled. The enhanced function for this version is user can view the lab schedule and do a booking. With an implementation of ComTrack, the efficiency, security, and cost effectiveness of computer lab operations significantly increase.

Introduction

At the present time, most of the institutions provide a computer lab for practical teaching and research activity. The important issue for computer lab management is how to manage and make good use of computer lab resources to better serve the research and practice teaching services (O. Yang and O. Qizhong,2010). The experience in computer labs can be improved dramatically for students and teachers equally, if proper supervision and monitoring tools are available. Due to this reason a number of educational applications and systems are in use these days (S. Sohail, E. Felemban, B. AlThobaiti and A. AlHetairshi, 2011). Joyce and Schmidt has shown that the use of proper classroom management system can enhance learning and improve the quality of experience in labs for students and teachers simultaneously (Joyce, R. and Schmidt., H.,2008).

Currently, lab management use a register card form hanged beside the workstation to record the usage data. However student always neglect to fill the form, and some of them fill the form incompletely, so it is difficult to access user information when there are problem occur such as software malfunction or hardware breakdown. The problem of monitoring the computer access from unauthorized user, make the violator be able to participating in unlawful activities. It is a challenging issue for the lab management because of security and facilities violence.

Most of the computer lab involve in hardware failure or software malfunction problems issued by users. The traditional operation-on the following key issues: user left a notification note attached to a workstation to inform a technician. But later, a janitor might remove the note. So, it will take a long time for a technician to spot the issue. Moreover, it will be hard for a technician to collaborate on the issue if the technician does not have means of tracking report. Worse case is the workstation cannot be marked unavailable for user access. To solve these issues, an innovative system is required for developing an effective fully functional computer room management system.

ComTrack is a windows application specially developed for improving traditional computer lab management operation. This application can be use in any public computer for monitoring but is designed while considering UiTM Pulau Pinang computer labs. It facilitates supervision and control of computer labs by providing means suitable for enhanced user access monitoring and computer report issues interaction.

ComTrack Innovation Design

Fig. 1 show the overall system function designed. The main function of this system is to store user login and logout details such as user id, login time and logout time. The basic idea is to force user login before they can use the workstation with windows freezing technique. The technique prevent user to start other program on the workstation until they are login or registered. The login information automatically recorded into the system database. Thus, the lab management will have a completely precise data for user login and logout.

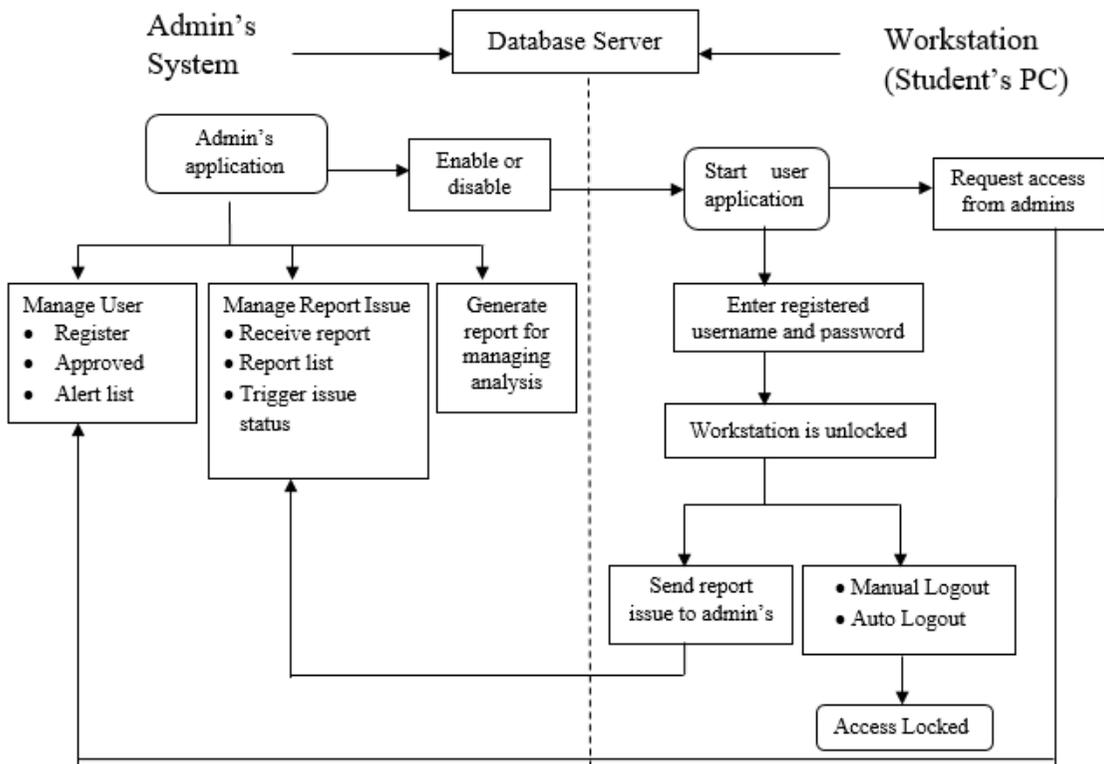


Fig. 1 ComTrack Design

Moreover, this system strictly locks user access until they are registered by the lab owner into the database. After user successfully approve by the admin, they can login to the system with their user id and password. With this features, admin will have a capabilities to monitor and control the user list and validate users against an alert list. Further, admin be able to analyse access logs in order to detect violators and if necessary, add them to the Alert List.

The big challenge for computer lab management is to handle the hardware or software failure report by users. As informed above, conventionally method is inefficient and it will cause time and source waste for both user and management. Thus, this system provide a report issue tracking database allowing admin to log and track the hardware and software malfunction issue. The report issue tracking database is streamline communication the workstation which log issue and admin who address those issues. When users send a report issue, nformation about the reported issue, they can set the issue status as 'need details' to the system which wthe system will trigger admin in real time by sending a notification email. In advance, if admin need more iill trigger a notification emails asking for more information from the user who logged that issue.

Additional function for this system is unoccupied workstation can be locked from user access. Locking or unlocking the workstation can be done from the centre on admin page. Admin also have an ability to view availabilities of workstation since the system database

has all the real-time access data. This is important aspect to enhance ComTrack ver2.0 with booking features. The booking system is design concerned to both of user and admin for workstation occupancy managing and availability.

System Structure

System hardware consists of the database server, monitoring machines and machines for students. Fig. 2 show a diagram of ComTrack structure. Both admin monitoring system and user application system is developed using VB.net and integrate with Sql server database. Sql server is use as database software to store information of all registered students and workstation practice schedule of entire institution. Admin monitoring system is installing on the monitoring machine which is in-charge of real-time monitoring issue report and user access information. User's application system will shared the same database server with admin system, so that all the information is controlled by monitoring machine.

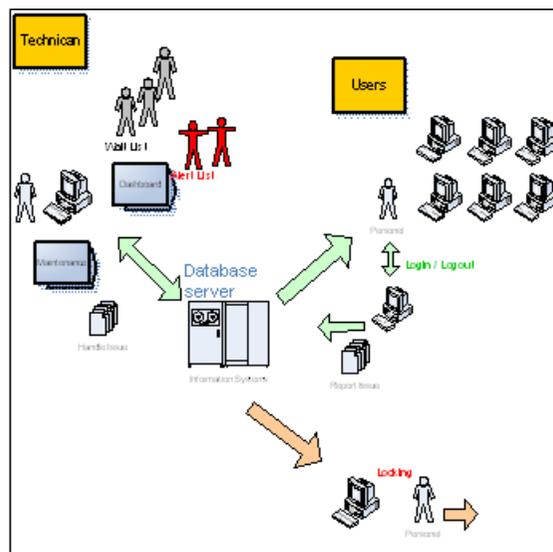


Fig. 2 ComTrack Structure

The database has been connected to ComTrack by using Sql query added in the system program. Some of table is created according to the function that the system will execute. The main table is student or user basic information which to store student id, name and status. Mainly applied in the login system for student and automatically fills in the access log table when they are login. Access log table is created to save user access information such as login time and logout time belongs to which workstation. Using chiefly in automatically completing basic information about computer so that experts can inquire statistics about evaluation indicator.

According to hardware failure and software malfunction feedback from student, it will be fill in the report issue table, so that administrators could find and maintain those issues

in time. This table also have maintenance information such as action taken and the changes of the issue status. This table is related to workstation table which admin can control the workstation availability status base on the issue handled. Using chiefly in maintenance of the management system. Fig. 3 show some sample of the table that have been mentioned above.

i) User Information Table

UserID	FullName	Department	Status
232742	nur athiqah	fxe	approve
245677	sofiyyah	fxe	request
11526946	nurakma	fxe	alert
NULL	NULL	NULL	NULL

ii) Access Information Table

UserID	EqpID	LoginTime	LogoutTime
232742	com01	9/6/2015 1:37:16 AM	9/6/2015 1:37:27 AM
232742	com01	9/6/2015 1:39:12 AM	9/6/2015 1:40:14 AM
232742	com01	9/6/2015 1:41:32 AM	9/6/2015 1:42:01 AM
NULL	NULL	NULL	NULL

iii) Workstation Status Table

EqpListID	EqpID	Lab	EqpStatus
1	com01	Lab2.04	up
2	com02	Lab2.04	up
3	com03	Lab2.04	down
4	com04	Lab2.04	up
NULL	NULL	NULL	NULL

iv) Report Issue Table

EqpID	IssueDesc	UserID	ReportTime	status
com01	software failure (matlab)	232742	9/6/2015 1:35:23 AM	received
com01	software failure (matlab)	232742	9/6/2015 1:40:08 AM	solve
NULL	NULL	NULL	NULL	NULL

Fig. 3 ComTrack Database Table

Conclusion

This article presents a solution that can turn a primarily manual lab management into a flawless automated and highly efficient operation. Moreover, it solves a series of problems such as collect a complete precise workstation use record and report issues record. With these problems solved, the management of computer lab gets a new progress such that reform monitoring better. The project is collaboration with Technical Lab Management Team from Intel Sdn. Bhd. The industrial version has been developed and implemented to the lab's computers to track the access record. Lastly, the system can be enhanced with integration of LDAP or MSAD for automatically logs sign on/off events.

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