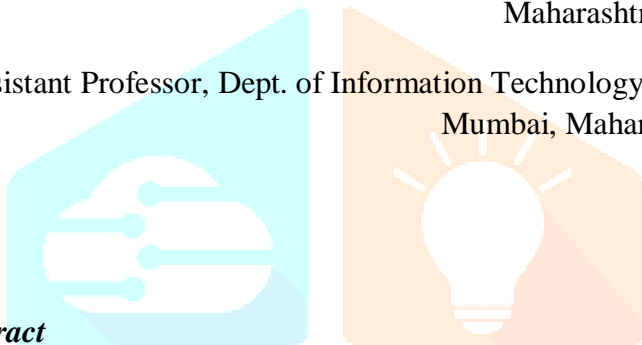# Lab Security Application

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Abstract

Lab Security is about lab monitoring. It is implemented to overcome problems faced by teachers during practical sessions. The source of inspiration for this project is the need for a remote monitoring system in educational and office environments. This project objects to manage LAN by implementing software that carries various actions by which the entire lab can be monitored by sitting at one place. Whenever a student logs in into the system then his activities are automatically stored and the connected student's desktop will be shown to the teacher's machine. They can view activities done by each student, send message to student's system, detect the use of USB devices and is also capable of freezing, unfreezing the mouse of student's system and can also shut down the client system by performing remote operations. This system monitors the lab by giving a live stream of each PC of the student to the teacher.

Keywords – monitoring, LAN, USB, PC, remote

1. Introduction
1.1 Background :

In present situations, each college has its labs which contain many PCs connected over a LAN but the only drawback is there is no client-server connectivity, so in this type of environment students can do their work apart from academic practices such as internet browsing, chatting on social networking sites. A single teacher cannot handle the entire lab and control the activities of students each time and cannot keep watch on every single PC at a time. Enormous information contains delicate and private data, so as to secure this huge volume that put away at various product equipment, important to actualize confirmation to check client or framework personality [7].

Aim and Objective :

This project aims to manage LAN by implementing software that carries various actions by which the entire lab can be monitored by sitting at one place.

By the Lab security system, the server can identify the work done by the client.

a. Continuous monitoring of the student- machine.

b. Get the live desktop of every connected student's machine.

c. It also performs remote operations to control student machines: Mouse Control, Mouse freeze/ unfreeze, Shutdown PC.

1.3 Motivation

The lab security system monitors each student's PC in a lab connected with a LAN. In this system, only one machine acts as a server and all others as a client.

There is no monitoring system to manage students in a practical lab and a teacher can't manage the entire lab at a time. During practical students can do their work apart from academic practices such as copying data from USB, internet

browsing, chatting on social networking sites which are not needed in practical times. The teacher has to visit every student to check practical work.

Lab security is a system to monitor the entire lab by accessing the live desktop of a student's PC. To monitor all the activities of students and to maintain decorum and discipline this system is very much essential. The proposed system can be implemented in any school, college, or any government organization where computer labs are there.

Using this system admin can handle the entire lab by sitting in one place. We are making Lab Security application mainly for college use.

2. Literature survey

2.1 Related work

According to this paper [1], the remote monitoring system concept was running on localhost which means that the server and client both are running on the same system. But in this both the machines can perform their task on the same system itself but simultaneously and only single client and server. According to this paper [2], regular screenshots of the client's desktop were sent to admin at regular intervals and there was no shutdown or restart of the client machine. According to this paper [3], this monitoring system was based on a microcontroller that receives signals from several sensors connected to the system to be monitored, so range problems can occur. According to this paper [4], the built framework provides an instructor-friendly remote monitoring of lab, effective evaluation, and grading methodology, and the framework is built on a bandwidth-efficient client–server model-based backend system written in Java. According to this paper [5], the lists of clients connected with the server are shown on the server machine rather than showing the student's desktop it will list the currently running process. According to this paper [6], a design solution of an embedded web-based remote monitoring system for the environment in the laboratory is developed but the cost is too high.

Our project is mainly focussed on college use for keeping an eye on student's practical work by monitoring them efficiently with remote operations

2.2 Problem statement

Nowadays misuse of computer applications like YouTube, Browser & other applications during the practical session; so, there is a need to inspect what the students are doing during practical. Monitor student's activities during the practical time are difficult also teacher has to visit each student's machine to check his practical work. Also, it will help the students to concentrate on his/her work properly and not to get distracted from their work.

3. Proposed System

Our project "Lab Security" is implemented using client-server model using Java Programming, JavaScript, and Microsoft SQL Server for the database; where all PC are in LAN and in that one PC act as master and other connected PC acts slave.

Through this master/server will maintain the security, the master will monitor the slave/client PC. The server will monitor the client's screen and if any unauthorized work is seen then the server will restrict them by using features like mouse hang, send warning messages, shut down the PC. Also, USB detection features enable so that if a client will connect USB so these details will be stored in database make lab monitoring during practical exams in college more secure. Hence, this system will help improve student's practical performance.
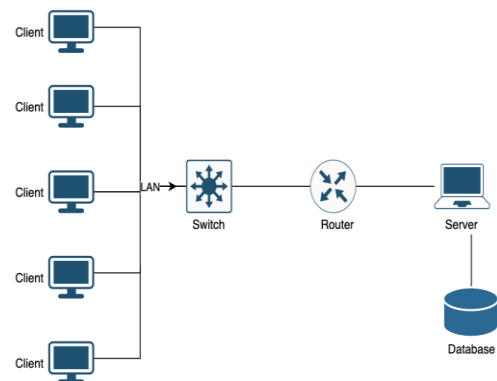

Figure 1: Proposed System

4. Working methodology

4.1 Client Server connection

In Lab Security System, the teacher will log in on the server-side by entering the set port no, and the student will enter the IP Address of the server and teacher's selected port no. and the student's PC will be connected to the teacher's PC. In practical sessions, the teacher has the facility to see what students will do on PC.

4.2 Module Description

a. Remote Monitoring

Live monitoring of each client/student's system which is connected in LAN to Sever/teacher machine. A teacher can easily monitor the student's work in the practical session.

b. Remote Operation

In this multiple client/student's PC will be connected to server/teacher has facility when a student does not do assign work that time teacher will select particular student/client and

perform remote operation like mouse operations, shutdown PC.

c. Message passing

When students do not do assign work in practical sessions so that time teacher will send a warning message to the student/client and also any work will assign to the student they also send teacher through message.

d. USB Detection

In practical exams, students do an illegal activity like take the program on USB and connect with a PC. This feature will prevent this activity as when the student will attach a USB that time a notification will pop-up on the server-side and this USB log record is also stored on the server PC.

5. Module Implementation

5.1 Admin-Side Login

As our project Lab Security is about remote monitoring of practical lab in colleges, therefore login is provided only at the admin side. Username and password are required to be entered by the supervisor to log on to the system. In this, the admin needs to enter the port number to get connected to the client's machine. Hence, the server(supervisors) machine gets connected to the client's machine.
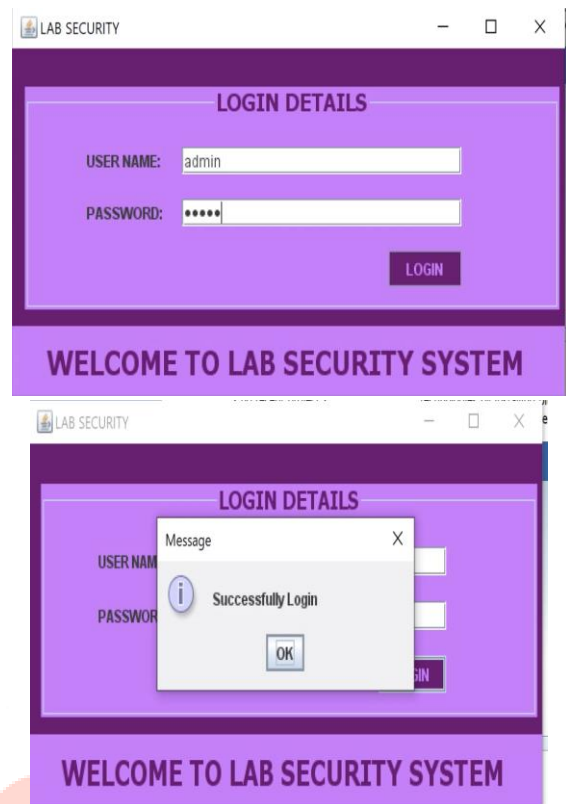

Figure 2 :Splash Screen

Figure 3 : Admin-side Login

5.2 Client-Side

To connect the multiple clients (i.e., students) to the server machine, on the client side the user needs to enter the IP address of the server machine and the port number to get connected with the server.

Figure 4: Client-Side

5.3 Live Monitoring

After successful login, the admin can view each connected client's screen as a new frame appears for every client connected showing the current client's desktop screen.

The following information about the connected clients is displayed on the left side of the admin's screen:

a.   Display of PC name and IP address of the client.
b.   Display of the username of the client
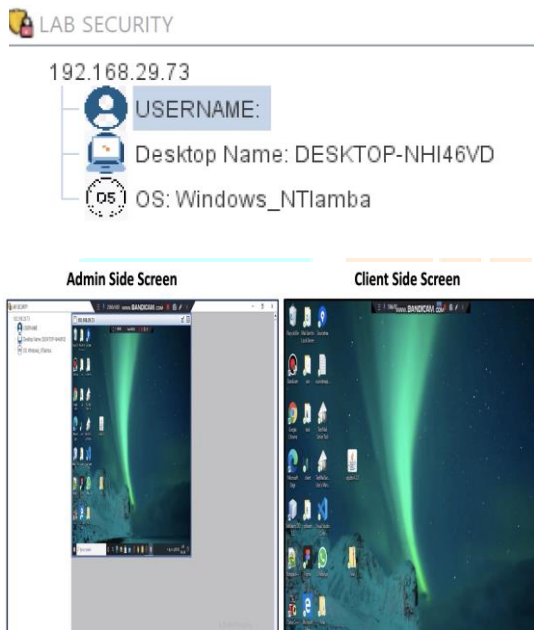c.   Display of the operating system: Windows, Linux

Figure 5: Live Monitoring

5.4 Performing Remote Operations

The admin who is supervising the connected clients in the network can perform control functions on the client. The Supervisor can select a client and can perform remote operations by selecting the desired control operation from the power control menu.

Figure 6: Power Control Menu

a. Mouse Control:

The admin can control the mouse of the connected client and thus help the student if they face an issue.

b. Mouse Freeze

In this, the admin can disable the usage of the mouse on the client-side if the client is misusing the computer during a practical session.

c. Mouse Un-Freeze

After freezing the mouse, the admin can un-freeze the mouse and the client can now use his mouse and perform the said work properly.

Figure 7:: Mouse Freeze: "Your mouse is disabled contact administrator

d. Shutdown PC

If the client neither listens to admin messages nor stops after mouse freeze, the admin has the power to switch off the client's computer remotely.
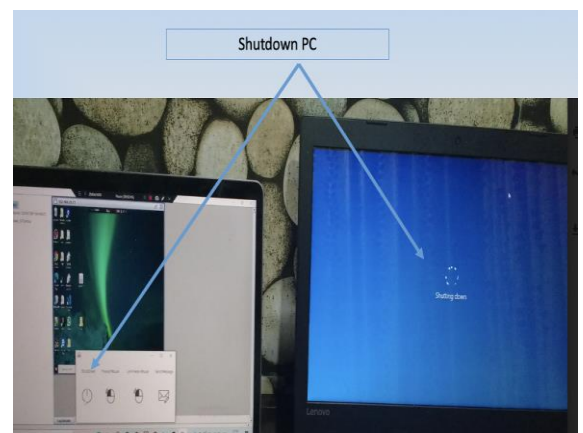

Figure 8: Shutdown PC

5.5 Message passing from admin to client

As the supervisor is live monitoring the client's screen, he can view the client's activities. If any student is doing other activities then the supervisor can send a warning message to a student to stop his activity and perform the given task. For example, if the client opened YouTube during a practical session then the admin can pass a message to a client to 'Stop Work' and this message is displayed on the client's screen.
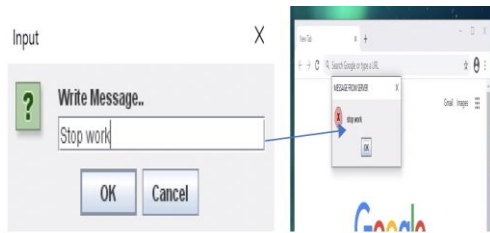

Figure5.5: Message passing from admin to client

5.6 USB detection and USB log record

If the client connects USB to his machine then an alert message is displayed on the admin side that USB is detected along with IP address: "USB detected at 192.168.XXX.XX"

USB log record: The admin can view the list of USBs attached on multiple client PC through a click and can view the USB log record.

Figure 9: USB detection and log record

6. Results

Our project Lab Security is all about monitoring labs in college during the practical session. We have achieved the following points :

- ✓ Live monitoring of multiple clients is done.
- ✓ Admin can zoom the client's screen accordingly.
- ✓ Admin can use the power control options to monitor the client remotely.
- ✓ USB detection is captured on a particular client PC.
- ✓ USB plugged in the record can be viewed by the admin

7. Conclusion

This paper puts forward an innovative idea of monitoring by using Java programming language and with various functions of remote operations which helps the supervisor to monitor the students effectively during practical lab and thus reduces the work of the supervisor and also allows the students to concentrate on their practical session.

8. Future Scope

This software application is designed mainly for college use to monitor students during the practical session but can be used at an advanced level in organizations by inculcating more advanced features which may be useful in a company or organization.

9. References

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