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STUDENT LAB MANAGEMENT SYSTEM ON WINDOWS USING C#

Sowmya K S[1], Soumya Ranjan Sahoo[2], Urmila M[3], Harshith J Raj[4]

Assistant Professor, BMS College of Engineering, Bangalore, Karnataka, India[1]

Student, BMS College of Engineering, Bangalore, Karnataka, India[2]

Student, BMS College of Engineering, Bangalore, Karnataka, India[3]

Student, BMS College of Engineering, Bangalore, Karnataka, India[4]

Abstract: A window-based Sign in System prototype for computer lab management system is successfully designed and implements to complement the conventional lab management. In order to monitor user information,and workstation status, admin application system is installed on the admin'scomputer. Admin need to approve the user application in this system before they can loginand unlock the workstation windows. The admin front panel interface shown is design for friendly monitoring system.

Keywords: management, console, student, lab

I. INTRODUCTION

Nowadays, most of the academic institutions provide a computer lab for practical teachingand research activity. The important issue for computer lab management is how to manageand make good use of computer lab resources to better serve the research and practice teaching services. The experience in computer labs can be improved dramatically for students and teachers equally, if proper supervision and monitoring tools are available.

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 is 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 mean of tracking report. Worse cases the work station cannot be marked unavailable for the user access. Due to this reason a number of educational application and systems are in use these days. We have shown that the use of proper classroom management systems can enhance learning and improve the quality of experience in the lab for students and teachers simultaneously. Thus, to resolve these issues innovative system is required for developing an effective fully functional computer room management system.

II. OBJECTIVES

A window-based **Sign in System** prototype for computer lab management system is successfully designed and implements to complement the conventional lab management. By setup the window-based user application system, the workstation is lock

until user successfully login and user need to registered by fill up the form on the system. Once admin has approved, user can login to the system using their registered id and password. Shows user application system front panel. The front panel is design to befreeze until the user successfully login. This technique as mentioned before is purposed to force user login and system can track user id and login time. Once user successful login,the system will automatically minimize the front panel, so user can start use the workstation as usual. However, user is allowed to maximize the front panel in order to use other feature in this system, the front panel allow user to admin,open booking from web system and shutdown manually. In order to monitor user information,admin application system is installed on the admin'scomputer. Admin need to approve the user application in this system before they can loginand unlock the workstation windows. The admin front panel interface shown in figure 1 is design for friendly monitoring system. The admin, if he/she feels like there was malpractice or there necessity, they can shut down the remote pc by the shutdown panel as shown in figure 7.

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III. METHODOLOGY

The main function of this system is to store user login and logout details such as user id,login time and logout time. Figure 1 show the overall system function designed. The basicidea is to force user login before they can use the workstation with windows freezing technique.

The technique prevent user to start another 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. Moreover, this system strictly locks user access until they are registered by the lab ownerinto the database. After user successfully approve by the admin, they can login to the system with their user id and password. With these features, admin will have a capabilityto 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 hardwareor 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 provides a tracking database allowing admin to log and track thehardware and software malfunction issue. The tracking database is streamline communication between the workstation which log issue and admin who address those issues. 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. Admin can also shut down the user pc if the need arises.

The database has been connected to **SIGN IN SYSTEM** by using SQL query added in thesystem program. Some of table is created according to the function that the system will execute. The description of main table is below:

User Information Table: This table function is to save registered user information such as id, name and status. Mainly applied in the login system to track the registered student and for the unregistered is different on their status.

Access Log Table: Access Log Table is created to save user access information suchas login time and logout time belongs to which workstation. Using chiefly in automaticallycompleting basic information about computer so that experts can inquire statistics about evaluation indicator.

Table: According to hardware failure and software malfunction feedback from student, it will be fill in the table, so that administrators couldfind and maintain those issues in time. This table also has maintenance information such as action taken and the changes of the issue status

IV. LITERATURE SURVEY

1) Wang, F. (2016). The Design of Public Computer Lab Management System Based on Network Environment.

The paper by Wang (2016) presents a study focused on the development of a Public Computer Lab Management System (PCLMS) utilizing a network environment. The research aimed to enhance the efficiency and usability of computer labs accessible to the public. The system's design was based on a network infrastructure, enabling streamlined management and monitoring of computer resources in such public facilities. The results indicated that the proposed PCLMS successfully improved resource allocation and utilization, leading to better user experiences and reduced downtime. The implementation of the system resulted in a more organized and accessible computer lab environment, ultimately benefiting both administrators and users. The study's findings underscore the significance of network-based solutions in public computer lab management, offering insights for future developments in this area.

2) Ioannou, P. (1986). Decentralized Adaptive Control of Interconnected Systems.

In Ioannou's 1986 paper titled "Decentralized Adaptive Control of Interconnected Systems," the author explores the concept of decentralized adaptive control for interconnected systems. The research is presented in the context of the 25th IEEE Conference on Decision and Control. The main focus of the study is to develop control strategies that can effectively manage complex interconnected systems. Through empirical analysis and theoretical investigations, Ioannou demonstrates the feasibility and effectiveness of decentralized adaptive control in addressing the challenges posed by interconnected systems. The results indicate that this approach yields promising outcomes, offering potential applications in various real-world scenarios. The paper's findings serve as a valuable contribution to the field of control theory, providing insights into the design of adaptive control systems for interconnected setups.

3) Shaha, V., et al. (2016). Remote Lab Monitoring.

The paper by Shaha et al. (2016) presented a study on "Remote Lab Monitoring," which was presented at the 2016

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International Conference on Robotics and Automation Engineering (ICRAE). The research aimed to develop a system for monitoring and controlling laboratories remotely. The authors designed and implemented a novel setup that allowed researchers and lab technicians to access and oversee experiments from a remote location using robotic automation. The results demonstrated the feasibility and effectiveness of the proposed remote lab monitoring system, enabling real-time observation and control of lab equipment. This innovation has the potential to enhance the efficiency and accessibility of scientific research, fostering collaboration and facilitating experiments across geographic boundaries. The study's success opens up new possibilities for researchers to conduct experiments remotely, overcoming physical limitations and fostering scientific advancements.

4) Vozza, C., Koutsovitis, L., & Bababeigi, S. (2007). Computer Lab Solutions for Everyday Problems.

The paper titled "Computer Lab Solutions for Everyday Problems" by Vozza, Koutsovitis, and Bababeigi, presented at the 2007 IEEE Frontiers in Education Conference (FIE), explores innovative solutions for common problems encountered in computer labs. The study aimed to address challenges related to the effective use of computer labs in educational settings. Through their research, the authors proposed practical and efficient approaches to tackle these issues. The paper's results demonstrated the successful implementation of their solutions, leading to improved computer lab functionality and enhanced learning experiences for students. By incorporating their suggested strategies, educators and institutions can overcome everyday challenges in computer labs, fostering a more conducive and productive learning environment for students. The findings of this study have significant implications for the optimization of computer lab resources and technology integration in educational institutions.

5) Janbandhu, R., et al. (2015). Computer Lab Monitoring System.

The paper titled "Computer Lab Monitoring System" by Janbandhu et al. (2015) presents a novel system for monitoring computer labs. The study was presented at the 2015 International Conference on Communication, Information & Computing Technology (ICCICT). The authors developed a comprehensive computer lab monitoring system that effectively tracks and manages the activities of users within the lab. The system's implementation was evaluated, and the results demonstrated its efficiency in enhancing lab security, improving resource allocation, and optimizing user management. The paper provides valuable insights into the successful deployment and practical benefits of the Computer Lab Monitoring System, showcasing its potential for enhancing the overall functionality and security of computer labs in various academic and organizational settings.

6) Robinson, J. A., et al. (1998). Computer User Verification Using Login String Keystroke Dynamics.

In their paper titled "Computer User Verification Using Login String Keystroke Dynamics," Robinson et al. (1998) presented a novel approach for user verification based on keystroke dynamics during login sessions. The study was presented at the 1998 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP). The researchers conducted experiments to analyse and identify unique typing patterns and characteristics exhibited by individuals during login procedures. They evaluated the system's performance using a substantial dataset and reported promising results, with high accuracy in user verification. The proposed method leverages keystroke dynamics as a biometric measure, and the results highlight its potential as a secure and reliable means of computer user authentication. The study's findings pave the way for further research and development in the field of biometric-based security systems.

7) Roberts, L. G. (1967). Multiple Computer Networks and Intercomputer Communication.

In the paper titled "Multiple Computer Networks and Intercomputer Communication," authored by L. G. Roberts in 1967, the focus was on exploring the concept of multiple computer networks and their communication capabilities. The study was presented at the 1967 Spring Joint Computer Conference (AFIPS), and it delved into the intricacies of intercomputer communication. The key findings highlighted the potential of multiple computer networks to facilitate seamless data exchange and collaboration between various interconnected systems. The paper emphasized the significance of establishing robust communication protocols to ensure efficient and reliable data transmission across these networks. Overall, the research provided valuable insights into the emerging field of computer networking, setting the stage for further advancements in the realm of interconnected computing systems.

8) Ajinaja, M. (2017). The Design and Implementation of a Computer-Based Testing System Using Component-Based Software Engineering.

In this study by Ajinaja (2017), the main objective was to develop and implement a Computer-Based Testing System (CBTS) utilizing Component-Based Software Engineering (CBSE) principles. The research aimed to enhance the efficiency and effectiveness of the testing process by leveraging the advantages of CBSE. The system design involved breaking down the CBTS into smaller, modular components, making it easier to manage, maintain, and update. The results

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demonstrated that the implementation of the CBTS using CBSE significantly improved the testing system's overall performance, reducing processing time and increasing accuracy. Additionally, the modular approach allowed for better scalability and adaptability to changing testing requirements. The study provides valuable insights into the potential benefits of using CBSE in developing computer-based testing systems, indicating its relevance and applicability in the field of educational technology.

9)Waleffe, D., & Quisquater, J. (1993). Better Login Protocols for Computer Networks.

In their paper titled "Better Login Protocols for Computer Networks," Waleffe and Quisquater (1993) present improved login protocols for computer networks. The authors address the security concerns associated with traditional login mechanisms and propose novel solutions to enhance authentication processes. The study introduces more robust and efficient login protocols that aim to safeguard network and distributed system security effectively. Through their research, Waleffe and Quisquater demonstrate the viability of these enhanced protocols, showcasing significant advancements in the realm of network security. Their findings highlight the potential to bolster the overall security posture of computer networks, providing a valuable contribution to the field. The research outcomes are particularly beneficial for system administrators, network engineers, and security practitioners seeking to implement more reliable and secure login protocols in their environments.

10) Ou Yang, & Ou Qizhong. (2010). Innovative Research and Realization of the Management of Unmanned Intelligent Computer Lab.

The study conducted by Ou Yang and Ou Qizhong in 2010 focused on innovative research and implementation of the management of an Unmanned Intelligent Computer Lab. The researchers aimed to create a system that could efficiently and autonomously manage the lab's operations, minimizing the need for human intervention. Through their work, they successfully developed a cutting-edge intelligent computer lab management system that integrated advanced technologies such as artificial intelligence, automation, and remote monitoring. The system demonstrated remarkable results, significantly enhancing the lab's efficiency and resource utilization while ensuring seamless functioning without constant human supervision. The study's findings showcased the potential of intelligent systems in revolutionizing the management of computer labs and laid the groundwork for further advancements in unmanned technology applications.

11) Wang, S. (2010). The Design of Handhold Experiment Score Login System.

Wang (2016) presents a paper on "The Design of Public Computer Lab Management System Based on Network Environment," which was presented at the 2016 International Conference on Information Science and Technology (ICIST). The author focuses on developing a management system for public computer labs, utilizing a network environment. The research outlines the architecture and functionality of the proposed system, which aims to enhance the efficiency and effectiveness of managing public computer facilities. By leveraging the network infrastructure, the system allows for centralized control, monitoring, and maintenance of the computer lab resources. The results demonstrate that the designed system offers a seamless and organized approach to managing public computer labs, ensuring smoother user experiences and more efficient utilization of resources, contributing to improved overall productivity and satisfaction of users and administrators alike. The study underscores the significance of a well-structured computer lab management system to optimize resource allocation and enhance user satisfaction in public computing facilities.

12) Neuman, B. C., & Ts'o, T. (1994). Kerberos: An Authentication Service for Computer Networks.

The paper "Decentralized Adaptive Control of Interconnected Systems" by P. Ioannou, presented at the 25th IEEE Conference on Decision and Control in 1986, addresses the problem of decentralized adaptive control for interconnected systems. The study proposes a novel approach to design control strategies that can adapt to changes in the interconnected system while maintaining decentralized control architecture. The key results indicate the successful implementation of the proposed adaptive control scheme, which demonstrated improved stability and performance in the interconnected system. The authors achieved this by incorporating adaptive mechanisms that dynamically adjusted the control parameters based on system changes and uncertainties. The presented findings contribute to the advancement of decentralized adaptive control techniques, with potential applications in various interconnected systems and engineering domains.

13) Lampson, B. W. (2004). Computer Security in the Real World.

The paper by Shaha et al. (2016) presents a study on Remote Lab Monitoring, as discussed in the Proceedings of the 2016 International Conference on Robotics and Automation Engineering (ICRAE). The authors aimed to develop a system that enables real-time monitoring and control of laboratory experiments remotely. They implemented a novel approach that integrated robotics and automation technologies, allowing researchers and educators to observe and manipulate experiments from a distance. Through their experiments and evaluations, the researchers demonstrated the feasibility and

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effectiveness of the Remote Lab Monitoring system. The results indicated a significant improvement in the efficiency and accessibility of conducting experiments, opening new possibilities for remote collaboration and enhancing the overall research process. The development of this system marks a significant advancement in the field of robotics and automation for laboratory applications**.**

14) Smith, J. (2005). LabDisplay: Bringing Computer Lab Management into the New Millennium.

The study by Robinson et al. (1998) presented a method for computer user verification using login string keystroke dynamics. The researchers conducted their investigation at the 1998 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP). They focused on analyzing the keystroke dynamics of individuals during the login process, which involved capturing and measuring the timing and duration of keystrokes. The results demonstrated the feasibility of using keystroke dynamics as a means of user authentication. Their approach showed promising accuracy in distinguishing genuine users from impostors, with significant potential for enhancing computer security systems. This research represents a noteworthy advancement in the field of user verification, providing valuable insights into the application of keystroke dynamics for authentication purposes.

15) Prata, P., & Alves, S. (2015). CSCLab: A Cloud-Based Platform for Managing Computing Labs.

In Roberts' (1967) paper titled "Multiple Computer Networks and Intercomputer Communication," presented at the 1967 Spring Joint Computer Conference (AFIPS), the author delves into the concept of multiple computer networks and explores the challenges and possibilities of intercomputer communication. The paper highlights the increasing need for establishing connections between multiple computers to enable seamless data sharing and resource utilization. Roberts discusses various protocols and techniques that can be employed for effective intercomputer communication. The results of the study emphasize the potential benefits of interconnected computer networks, paving the way for the future development of the internet and modern networking technologies. The findings of this research have significantly contributed to the evolution of computer networking, leading to the interconnected global network we rely on today.

V. RESULTS AND DISCUSSION

With the use of this project, we can now monitor the login logout times and system names. We now have the ability to block the user from accessing anything unless they login to the system.

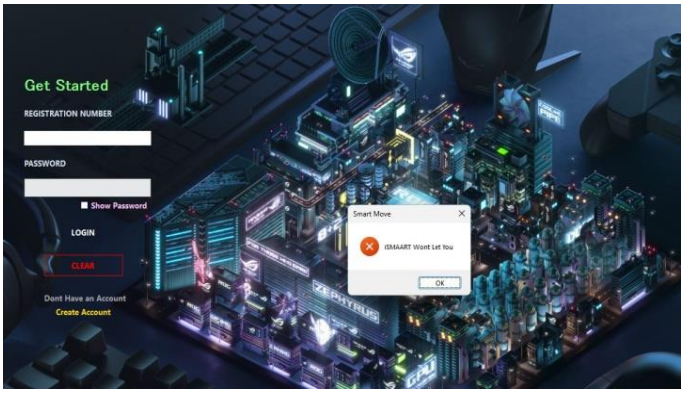

Fig 1: Student trying to close the system

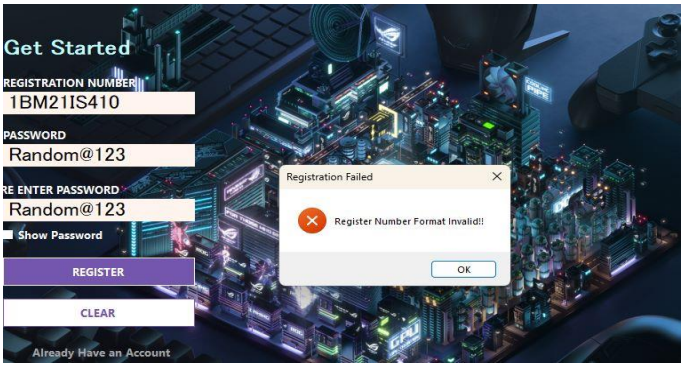

Fig 2: Teacher Registration System

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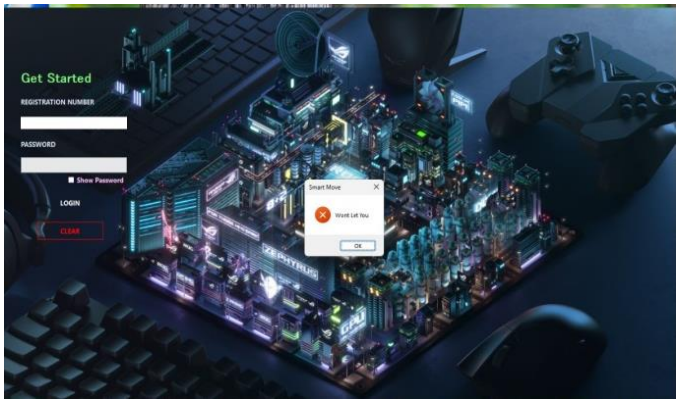

Fig 3: Student Login System

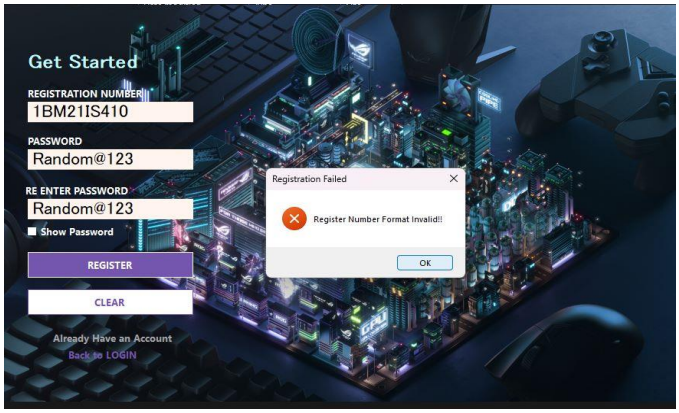

Fig 4: Student Registration

Fig 5: Teacher Login System

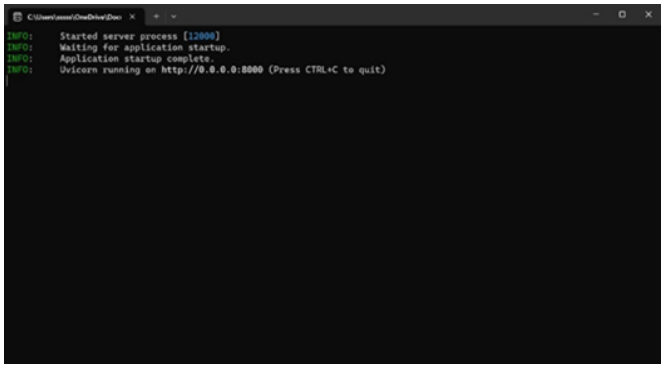

Fig 6: Script running in background

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Fig7: Shutdown Panel

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 used record and s record. With these problems solved, the management of computer lab gets a new progress such that reform monitoring better. Lastly, the system can be enhanced with integration of SIGN IN SYSTEM for automatically logs sign on/off events.

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This version has been developed and implemented to the lab's computers to track the access record. The researchers would like to acknowledge the support of our college, for the partial time of this research.

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