



Dr. Sutapa Chatterjee
Assistant Librarian
Presidency University
Sutapa02chatterjee@gmail.com

A report on various tools, techniques and strategies used for safeguarding the Library building, collection and human resources: Future scope of AI integration

Sutapa Chatterjee

Abstract:

This study explores the adoption of various library security tools and techniques at Presidency University Kolkata, Library to ensure the protection of its building, collection, and human resources. With the increasing dependence on digital infrastructure and the growing size of physical collections, modern academic libraries face multiple security challenges. The study aims to analyse the effectiveness of the security measures in place, the types of threats faced, and the strengths and weaknesses of the existing systems. It also highlights the latest trends in library security, AI driven tools available, and potential improvements. Recommendations are provided to enhance the security framework with application of various AI dependent tools.

Keywords: Library security, Library security tools, digital security, physical security, library management

1. Introduction:

Academic libraries are vital component within university system, serving as repositories of knowledge and canters for research and learning. As the size and scope of library collections grow, both in terms of physical books and digital resources, the need for comprehensive security measures becomes paramount. This study investigates the security tools and techniques adopted by the Presidency University, Kolkata Library to protect its assets and human resources, providing a detailed analysis of its strengths, weaknesses, and opportunities for improvement. This study will provide an in-depth analysis of the security strategies adopted by the Presidency University, Kolkata Library and explore opportunities for further strengthening its protection systems.

2. Literature Review:

The literature review for this study focuses on previous research and publications related to the use of security tools and techniques in libraries. (Chuan, 2016), has reviewed historical development and application of RFID technologies in libraries. The study explored the technical challenges of RFID deployment, such as system maintenance and integration with existing digital infrastructures. Chuan advocated for the adoption of hybrid security systems to increase overall efficiency. (Collins, 2015) Analyzed the impact of digital security systems in university libraries,



focusing on how CCTV surveillance and digital access controls have contributed to a safer environment. The study found that while security systems are generally effective, user privacy concerns regarding CCTV usage must be addressed, especially in areas where surveillance may be seen as intrusive. (Patel, 2018), performed a cost-benefit analysis of RFID and other security technologies. The study revealed that while the upfront costs of RFID systems are high, their long-term benefits in terms of operational efficiency and theft reduction outweigh the costs, especially for larger libraries with extensive collections. (Raman, 2019), explored user privacy concerns associated with CCTV surveillance in university libraries. The study discussed how libraries can implement surveillance systems without infringing on user privacy by restricting the areas under surveillance and anonymizing data where possible. (Sangwan, 2015), emphasized the need for RFID and digital access control systems in modern libraries. The paper examined the role of these tools in preventing unauthorized access and ensuring resource security, while also highlighting the importance of user-friendly interfaces for both staff and users. (Sharma, 2017), explored the emerging trends in library security tools, such as AI-based monitoring systems and automated resource management technologies. Sharma's study highlighted how advances in technology could further enhance the efficiency of security systems in libraries. (Tripathi, 2016), discussed the balancing act of providing user access while maintaining resource security. The study highlighted how libraries must adopt a multi-tiered approach, integrating both physical and digital security measures to meet evolving user needs. (Namdev & Naik, 2023) Explored the introduction of RFID technology in academic libraries, the study discussed application, implementation, and its various components and also discussed about advantage disadvantages in relation to library security.

In a very recent study researcher, investigated the possible uses of AI within India's academic library system. The study discussed several areas of library services where AI can be implemented like, technical domains, indexing, and acquisition processes etc. (Kumar & Yadav, 2023). Another similar investigation tried to find out the usability of AI integrated chatbots in several library operations to reduce the workload of the library staffs. The study recommended integration of Chatbots to enhance library user related services also. (Peter & Idris, 2024)

The above literature review shows that, there is a research gap related to comparative study of 'existing security system' with the 'current technology available for library security system', Hence, this area needs special attention from the researchers of library Science.

3. Aims and Objectives:

The aim of this study is to evaluate the security measures implemented by Presidency University, Kolkata Library and assess their effectiveness in protecting the library's building, collection, and human resources. The objectives of the study are -



- i) To identify the security tools and techniques adopted by Presidency University, Kolkata Library.
- ii) To analyse the strengths and weaknesses of the existing security measures.
- iii) To examine Current Trends in Library Security
- iv) To suggest improvements and recommendations for enhancing the security framework.

4. Research Methodology:

This study adopts a descriptive research design to explore the existing security tools and techniques used in university libraries. Descriptive research is suitable for this study as it provides a detailed account of current security measures, their effectiveness, and the challenges faced in their implementation. This involved reviewing published materials such as academic journals, books, and reports on library security tools, technological advancements in library management, and case studies of similar institutions. Previous literature, research papers, and official documents from the university library were also examined.

5. Analysis: Library security:

Historically, library security primarily focused on preventing theft and vandalism of physical collections. With technological advancements, the focus has shifted toward protecting digital assets. Kind of Threats of library are Physical theft and vandalism, Cyber-attacks targeting digital resources, Natural disasters like fires, floods, or earthquakes, unauthorized access to sensitive areas within the library.

Tools and Techniques Available for Library Protection: RFID (Radio-Frequency Identification): Used for tracking the movement of books and preventing theft. CCTV Cameras: Surveillance of all areas within the library. Biometric Access Systems: Controlled access to sensitive sections. Fire Suppression Systems: Automated systems to extinguish fires without harming the collection. Cyber security Software: To prevent hacking and protect digital archives.

5.1 Security Measures Adopted by Presidency University, Kolkata:

The Presidency University, Kolkata Library is a multi-storeyed facility equipped with both physical and digital resources. It has dedicated reading rooms, computer labs, archival sections, and staff offices. The Library has CCTV cameras, fire alarms, and access control for restricted areas. Each floor is equipped with surveillance systems, security persons, and fire prevention equipment. Security personnel are on duty during library hours, Library building is earthquake protected and the library collaborates with IT departments for digital asset protection.

5.2 Strengths and weaknesses of the existing security measures:

Some strong Points of the library are - Comprehensive surveillance system with CCTV cameras, regular training for staff on security protocols, secure access points with entry only for



authorized personnel. Few Challenges are also there like, Budget constraints limit the ability to upgrade security systems, Lack of trained personnel to manage and maintain sophisticated security systems, Difficulty in integrating new technology with existing systems, Resistance to change among staff in adopting new security protocols. While some weak points are there, like- Lack of an integrated digital security system to prevent cyber-attacks, RFID tags for digital tracking of books, Inconsistent maintenance of surveillance systems and insufficient measures for handling natural disasters like floods or earthquakes.

5.3 Current Trends in Library Security: Below are the key trends shaping the future of library security-

5.3.1 Digital Security and Cybersecurity:

As libraries shift towards digital resources, the protection of digital assets has become a top priority. Encryption and Data Protection: (Libraries are increasingly employing encryption technologies to secure sensitive data, such as user information, research data, and digital collections. These includes - Multi-factor Authentication (MFA), Firewall and Network Security, Cloud-based Security Solutions etc.), Radio-Frequency Identification (RFID) Technology, Biometric Security Systems.

5.3.2 Artificial Intelligence (AI) and Machine Learning: The integration of AI and machine learning into library security systems is a growing trend that offers enhanced monitoring and predictive capabilities. These includes AI-powered Surveillance Systems, Predictive Analytics for Threat Prevention, Chat bots for Security Support

5.3.3 CCTV Surveillance with Advanced Analytics: It has facilities of Video Analytics and Object Recognition, Facial Recognition Integration and Remote Monitoring and Mobile Access

5.3.4 Fire Detection and Suppression Systems: It can enable Smart Fire Detection Systems and Waterless Fire Suppression.

5.3.5 Emergency Preparedness and Disaster Recovery: These include staff training, evacuation procedures, and the implementation of backup systems for digital assets) and Cloud-Based Backup and Recovery.

5.3.6 Collaboration with IT and Security Professionals: These includes - Cross-Disciplinary Security Team, Third-Party Security Audits etc.

The current trends in library security indicate a growing reliance on advanced technologies and a more integrated approach to safeguarding both physical and digital resources.

5.4 Suggestions and Recommendations:

- i) Upgrade the surveillance systems to include AI-powered threat detection.
- ii) Provide training for staff on new security protocols and tools.



- iii) Adopting RFID technology for inventory management, automated checkout systems, and theft detection.
- iv) Implement advanced digital security measures such as firewalls and data encryption.
- v) Increase the frequency of security audits.
- vi) Allocate a higher budget for maintaining and upgrading security infrastructure

6 Findings:

The study reveals that while Presidency University, Kolkata Library has made significant strides in implementing security measures, there are areas that require improvement.

- i) The physical security systems are generally effective, but digital security needs strengthening. Moreover, there is a need for regular audits and updates to ensure the library stays ahead of evolving threats.
- ii) Presidency University, Kolkata Library's deployment of encryption protocols, multi-factor authentication, and advanced firewalls reflects the on-going efforts to mitigate these risks. The use of CCTV surveillance, and computer-based authentication systems at Presidency University, Kolkata, Library demonstrates how libraries are embracing modern tools to safeguard their physical holdings and infrastructure.
- iii) At Presidency University, Kolkata Library, the emphasis on staff training and awareness programs serves as a reminder that technology alone cannot guarantee security, human oversight, expertise, and preparedness are equally vital.

7. Conclusion:

Presidency University, Kolkata Library has established a good foundation for library security, particularly in its handling of physical collections and building security. However, the growing importance of digital assets requires more attention to cyber security measures. Addressing these gaps will enhance overall protection. In terms of future prospects, the evolution of library security will likely be driven by continued advancements in technology. AI, machine learning, and biometric authentication systems are expected to become more prevalent, further enhancing the ability of libraries to anticipate and respond to security threats.

By staying at the forefront of security innovations, libraries can ensure the preservation and accessibility of knowledge for future generations while providing a safe and secure environment for their users. This study highlights the importance of continuous investment in security, staff training, and technological advancement to meet the ever-growing demands of library protection.

Future Scope: Further studies can explore the integration of AI-based security systems in libraries and examine how global best practices in library security can be adapted for use in academic libraries across India.



References:

- Chuan, H. (2016). A Review of RFID Technology in Libraries. *The Electronic Library*, 34(1), 120-131.
- Collins, J. (2015). The Impact of Digital Security Systems in Modern University Libraries. *Library Security Review*, 32(2), 45-53.
- Kumar, A., & Yadav, N. (2023). Empowering Library System with AI: A Roadmap of AI in Indian Academic Libraries System. *International Journal for Research Trends and Innovation (www.ijrti.org)*, 8(10), 702-706. www.ijrti.org
- Namdav, v., & Naik, M. (2023). Use of RFID Technology in Libraries. *Journal of Management Research*, XV(2), 81-91. retrieved at <https://cimr.in/faculty-research.html#research-Journals>
- Patel, R. (2018). Cost-Benefit Analysis of RFID and Other Security Technologies in Academic Libraries. *Library & Information Science Research*, 39(1), 10-21.
- Peter, M., & Idris, M. (2024). Investigating the impact of AI chatbots on library operations and information retrieval in academic libraries. *IP Indian Journal of Library Science and Information Technology*, 9(2), 132-134. DOI: [10.18231/ijlitsit.2024.021](https://doi.org/10.18231/ijlitsit.2024.021)
- Raman, N. (2019). E-Surveillance and User Privacy in University Libraries. *Library Science Review*, 29(1), 52-59.
- Sangwan, S. (2015). RFID and Digital Access Control Systems: Enhancing Library Security. *Information Systems and Library Science*, 7(4), 89-97.
- Sharma, A. (2017). Emerging Trends in Library Security Tools and Techniques. *International Journal of Library and Information Services*, 5(3), 38-45.
- Tripathi, M. (2016). Security Measures in Modern Academic Libraries: Balancing Protection and Access. *Journal of Library and Information Technology*, 32(2), 112-119.