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NIT Library Management System

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Abstract: ***The Library Management System of National Institute of Technology (NIT) is designed to automate and manage the daily operations of the library in an efficient and systematic manner. This system helps in maintaining records of books, journals, students, faculty members, book issue and return details, and fines in a digital format. The main objective of the NIT Library Management System is to reduce manual work, minimize errors, and improve accessibility of library resources.***
The system provides features such as book search, issue and return management, user registration, report generation, and inventory control. It ensures quick access to information, better data security, and efficient utilization of library resources. By implementing this system, the NIT library can enhance its services, save time, and provide a user-friendly experience for students and staff.
Keywords: Library Management System, NIT Library, Automation, Database Management, Book Issue and Return, Digital Library, Inventory Management, User Management, Information System.

I. INTRODUCTION

ACCE (Asmara Community College of Education) is one of the colleges in Eritrea. ACCE library system provides everyday activity manually, which is recording data in a paper base. In most developing countries like Eritrea LMS are an integral part of the prompt and efficient to record detailed information of books and members.
This system will provide the much-needed information repository that the libraries need to be efficiently managed, which contains the relationships among admin, user, and members. [1] The government has an important role in providing policies that support the development of libraries and information literacy, while educational institutions need to integrate the use of libraries into the learning process. Thus, the right strategies can be identified to improve the quality of education through library literacy, which ultimately contributes to the achievement of the SDGs goals. [3] This study aims to explore LMMs that have been developed for effective administration of library resources and services. This study will also explore the concept of LMMs in the context of libraries and delves into the various models that institutions are adopting to optimize their resources, enhance user experiences and navigate the complexities of the digital age. [4]

II. PROBLEM STATEMENT

Traditional manual library management systems face several critical problems that affect the efficiency and effectiveness of library services [3]. Maintaining records manually often leads to data duplication, loss of records, and errors in book issue and return entries [1]. Searching for books using manual registers is time-consuming and frustrating for both librarians and users [3].
As libraries grow in size, managing large collections and increasing user demands becomes extremely difficult without automation [1]. Manual systems lack real-time updates, proper security mechanisms, and efficient report generation facilities [5]. Furthermore, integrating digital resources and supporting remote access is nearly impossible in traditional library setups [4]. These limitations highlight the need for reviewing and adopting automated Library Management Systems that can handle modern library requirements efficiently [2].

III. LITERATURE REVIEW

Several researchers have contributed to the study of library management systems and models. Hussain et al. conducted a systematic literature review on library management models concluded that technology-based systems significantly improve operational efficiency and service delivery in libraries. Their study emphasized the shift from traditional models to integrated and digital library systems [1]. Pari chi and Nisha reviewed the Greenstone Digital Library Management System and highlighted its strengths such as open-source architecture, multilingual support, and metadata handling capabilities. Their study showed that open-source LMS solutions are cost-effective and suitable for academic institutions, especially in developing countries [2].

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Araya and Mengsteab designed a web-based library management system to overcome the drawbacks of manual libraries, such as paperwork, record loss, and slow transaction processing . Their research demonstrated that web-based LMS improves accessibility, accuracy, and overall library performance [3].

Studies on library literacy and digital transformation emphasize that libraries play a crucial role in achieving quality education and sustainable development goals by providing equal access to information [4]. Research on knowledge management in libraries also suggests that integrating LMS with knowledge management tools enhances information organization and decision-making processes [5].

IV. METHODOLOGY

This review paper follows a systematic literature review methodology to analyze existing research related to library management systems This approach helps in identifying research gaps and future directions in library management system development [1].

Various journal articles, conference papers, and research studies were reviewed to understand system features, technologies, and implementation strategies [3]. The methodology involved identifying relevant studies, analyzing their objectives and findings, and comparing different LMS models [2]. Emphasis was placed on understanding how automated systems address the limitations of manual libraries and improve service delivery [5].

V. TECHNICAL OVERVIEW

A Library Management System (LMS) is a software-based information system developed to automate and integrate all core library functions such as acquisition, cataloging, circulation, user management, and reporting.

From a technical perspective, a Library Management System is a structured, database-driven, and secure information system designed to automate and optimize library operations. Its modular architecture, robust database management, and scalable design make it suitable for modern academic, public, and digital libraries.

The system replaces traditional manual workflows with automated processes, improving efficiency, accuracy, and accessibility.

VI. TECHNOLOGIES USED

Frontend – HTML, CSS

ReactJS (Hooks) -Used for building interactive user interfaces Hooks help manage state and component logic.

Backend -

NodeJS -Handles backend and server-side operations Processes client requests efficiently.

Express JS -Lightweight framework for NodeJS Used to create APIs and manage routing.

Database -

MongoDB -No SQL database for data storage. Stores books, users, and transaction records.

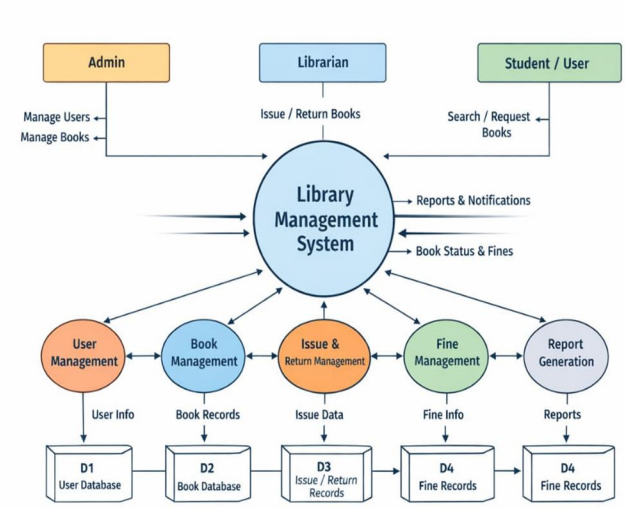
Development Tool – Visual Studio Code

VII. COMPARISON AND ANALYSIS

Authors	Year	Technique Used	weakness
Kumar et al.	2017	Desktop-based LMS using C++ and MySQL	No remote access, difficult maintenance
Sharma and Gupta	2018	Web-based LMS using PHP and SQL	Security vulnerabilities, slow for large data
Patel et al.	2019	RFID-based Library Management System	High cost, hardware failure issues
Singh and Kaur	2020	Cloud-based Library Management System	Internet dependency, data privacy risk
Verma et al.	2021	Android-based Library Management App	Limited features, device compatibility issues

From the above comparison, it is clear that early desktop-based systems lacked flexibility and remote access. Web-based systems improved accessibility but introduced security concerns. RFID-based systems enhanced automation but increased implementation costs. Cloud-based systems provided scalability but raised privacy issues. Mobile-based systems offered portability but lacked advanced features. Hence, an efficient, secure, scalable, and cost-effective library management system is needed.

VIII. DATA FLOW DIAGRAM



Data Flow Diagram of Library Management System

IX. FUTURE SCOPE

The future scope of Library Management Systems includes the integration of advanced technologies such as artificial intelligence for intelligent search and recommendations [5]. RFID technology can be used for automated book tracking and inventory management [2]. Cloud-based LMS solutions enable remote access and scalability for large libraries [3].

Mobile applications can further improve user experience by allowing users to search and reserve books anytime and anywhere [4]. Data analytics can help libraries analyze user behavior and improve resource utilization [1].

X. RESULT

The Library Management System was successfully designed and implemented to automate library operations such as book management, user management, issue and return of books, and fine calculation. The system provides a user-friendly interface for Admin, Librarian, and Students, making library activities faster and more efficient.

The implemented system stores all data securely in the database and allows quick retrieval of book and user information. Manual work is reduced, errors are minimized, and overall efficiency of the library is improved. The system also supports real-time updates of book availability and transaction records. Testing results show that the system performs accurately for all major operations such as adding books, issuing books, returning books, and generating reports. The system is scalable, reliable, and suitable for use in schools, colleges, and institutional libraries. Overall, the Library Management System meets the project objectives and provides an effective solution for modern library management.

XI. CONCLUSION

This review paper concludes that Library Management Systems are essential for modern libraries to manage growing collections and user demands efficiently. Automated LMS overcomes the limitations of manual systems by improving accuracy, efficiency, security, and accessibility. The reviewed literature highlights the importance of adopting technology-driven solutions to enhance library services and support education and research.

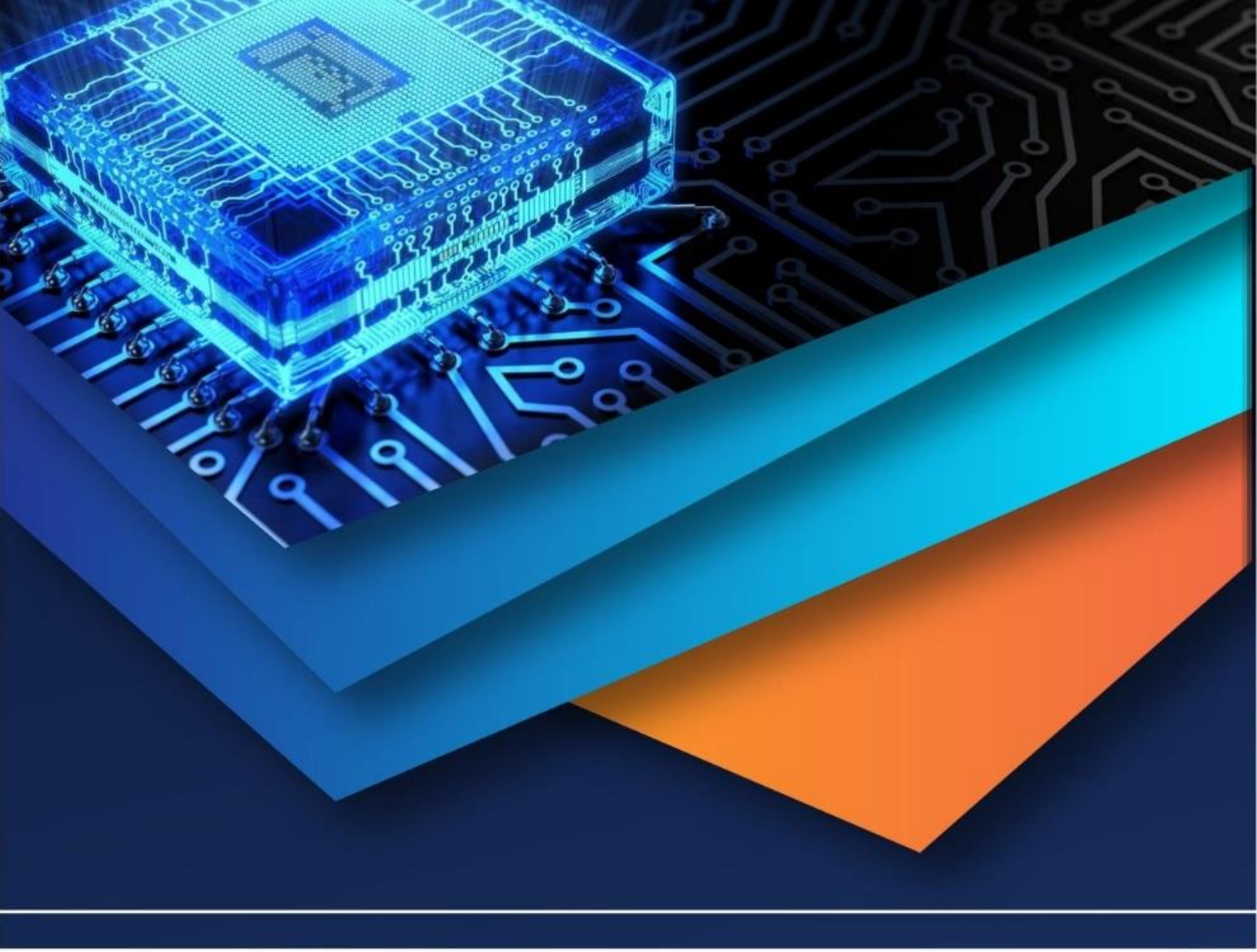
Future advancements in technology will further strengthen LMS capabilities and transform libraries into smart knowledge centers. Proper planning, implementation, and training are crucial for the successful adoption of library management systems.

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