International Journal of Computer Techniques–IJCT Volume 13 Issue 3, May-June - 2026

Open Access and Peer Review Journal ISSN 2394-2231 https://ijctjournal.org/

RESEARCH ARTICLE OPEN ACCESS

"LIBRONIX" – Smart AI Library Management system

Ambika Tapshale*, Bhagvati Bobade**, Aadhya Bhavsar***,
Ritu Garudkar**** , Shreya Desale*****

*(Department of computer science, DPGU School of Technology and Research, Pune, India.
Email: tapshaleambika8@gmail.com)

**(Department of computer science, DPGU School of Technology and Research, Pune, India.
Email: bhagvatibobade2007@gmail.com)
Email: tapshaleambika8@gmail.com)

***(Department of computer science, DPGU School of Technology and Research, Pune, India.
Email: aadhyabhavsar115@gmail.com)
Email: tapshaleambika8@gmail.com)

****(Department of computer science, DPGU School of Technology and Research, Pune, India.
Email: ritugarudkar2@gmail.com)
Email: tapshaleambika8@gmail.com)

*****(Department of computer science, DPGU School of Technology and Research, Pune, India.
Email: theshreyadesale@gmail.com)

---------- ********** ----------

Abstract:

The Library Management System is a software that helps libraries work. In places libraries still do things like keeping track of books lending books and managing users by hand. This old way takes a lot of time is not efficient and has mistakes. It is also hard to deal with a lot of information and find what you need quickly. The proposed system provides a solution to these problems by managing library tasks in an efficient way. The administrator can add, update, delete and search for book records. Users can easily check if a book is available and borrow or return it. The system stores all information in a database, which allows for access, accuracy and secure data. Some key benefits of the system include: A user-friendly interface that is easy to use for administrators and users. Reduced manual. Minimized errors. Improved overall productivity. The Library Management System enhances management efficiency and provides a reliable platform for handling library tasks. The system can be upgraded with features like access and online book reservation in the future. The Library Management System makes library operations more efficient and organized. It helps administrators manage library tasks easily and provides users with access to books. The Library Management System is a tool, for libraries.

Keywords — Library management , Book tracking ,Easy borrowing , User-friendly , Digital system , Time-saving , Error reduction, Secure data , Quick search , Efficient system.

---------- ********** ----------

I. INTRODUCTION

Background of the Study Libraries play a role in storing organizing and providing access to knowledge resources like books, journals and digital materials. For a time libraries have used manual systems with registers and paper records to manage book inventories and user information. These methods take a lot of time are hard to maintain and can have human errors. With technology advancing there is a growing need to use systems that can manage library operations efficiently. An automated

Library Management System helps reduce work improves accuracy and provides quick access to information. It makes the library work better by digitizing records and simplifying tasks like issuing, returning and searching books.

II. MOTIVATION AND OBJECTIVES:

A. Motivation:

The systems we have now are really slow. They make a lot of mistakes. It is also very hard to manage them when we have a lot of information to deal with. We need a system that can do things automatically and give us the information we need quickly. This would be very helpful, with volumes of data. The new system should make it easy to get the information we need from the data.

B. Objectives:

We want to create a system that can manage the library automatically.

- This system will help reduce the amount of work we have to do by hand and cut down on mistakes.
- The library management system is going to make things run smoothly and make sure the information we have is correct.
- We also want to make it easy for people to use the system.
- The library management system will keep all the information safe and secure.

III. Related Work

Recent studies have found that many library systems now use web, cloud and mobile technologies. These systems let users access information online get data quickly and interact with the system easily.

Some of these systems have problems. For example they may not be secure they need an internet connection to work and they may not have all the features users want. The system we are proposing is different. It is simple fast. Handles data in a secure way. Web technologies, cloud technologies and mobile technologies are used to make it work.

The proposed system focuses on simplicity, efficiency and secure data handling, with web, cloud and mobile technologies.

IV. Research Gap

Despite all the progress made current systems still have some issues:

- They do not have security, in place
- Some systems do not work well
- They need internet to function
- Their interfaces can be very complicated

These problems show that we need a system that's easy to use, safe and works well. A simple system is really needed.

TABLE 1
Literature survey Table

Sr. No.	Author(s)	Year	Title of Paper	Method / Technology Used	Key Findings	Limitations
1	Zhang et al.	2025	Web-based library management system using mern stack	monogoDB, Express.js, React.js, Node.js, HTML, CSS	Automation reduces manual work, Faster data retrieval and management improved user interface and accessibility.	Limited security mechanisms, No AI-based recommendation system, require continuous internet access
2	Bharti et al.	2024	Modern library management system: A web- based framework for resource automation	HTML, CSS, Jawa script, MySQL	Efficient tracking of books and users Reduced human errors improved Reporting system	OTP/Email notification not fully implemented Limited scalability Basic UI design
3	Sharma el al.	2024	Intelligent library management system using AI and machine learning	Python, Machine learning, algorithm, AI models	Personalized book recommendations improved user engagement efficient data analysis	Requires large datasets high computational cost complex implementation
4	Singh & Kumar	2023	Recent Trends in Library Management Systems	Cloud Computing Platforms, RFID Technology, Database system	Enhanced Accessibility through cloud system Faster book tracking using RFID better resource utilization	High setup cost Security and privacy concerns Requires skilled personnel

V. SYSTEM DESIGN

A. System Architecture

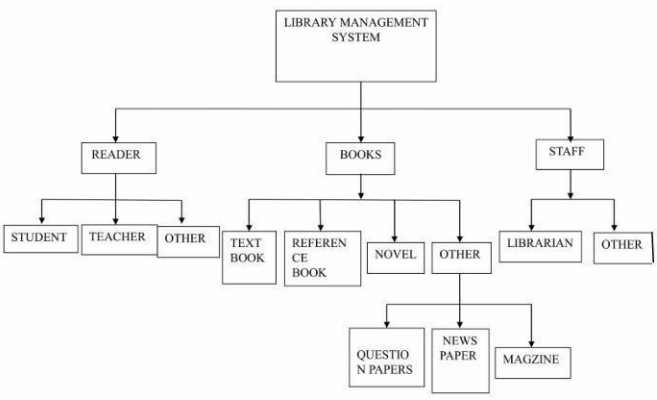

Figure 1 :System Architecture

The Diagram shows the system architecture of the Library management System, dividing it into Readers, Books and staff with their respective categories

The system architecture consists of three layers:

1. User Interface Layer
   - o Login page
   - o Dashboard
   - o Forms for book and user management

2. Application Layer
   - o Processes user requests
   - o Contains business logic

3. Database Layer
- o Stores book records
- o Stores user information
- o Maintains transaction data

B. Use Case Diagram:

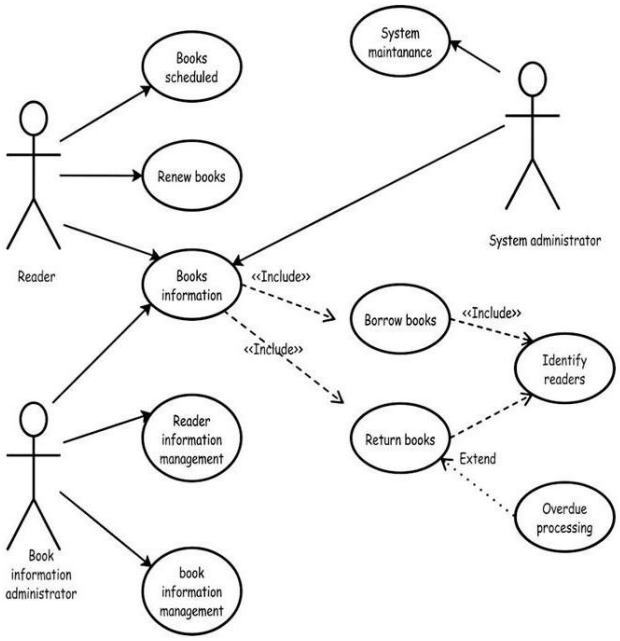

Figure 2: Use Case Diagram

This is a use case diagram of a Library Management System showing how users interact with it.
1. Reader can view book information, borrow, return, and renew books.
2. Book Information Administrator manages book and reader records.
3. System Administrator handles system maintenance.
4. “Include” shows required actions (like identifying readers before borrowing), and “Extend” shows optional actions (like overdue processing when books are late).

C. Activity Diagram:

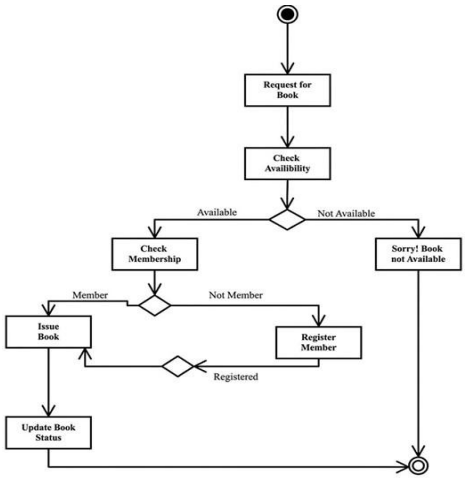

Figure C: Activity Diagram

This is an activity diagram showing the process of issuing a book in a Library Management System.

The process starts with a request for a book, then the system checks availability.

1. If the book is not available, the process ends with a message.
2. If it is available, the system checks membership. If the user is a member, the book is issued and the book status is updated. If the user is not a member, they must register first, then the book is issued.

Overall, it shows the step-by-step flow from requesting a book to issuing it or ending the process.

D. Flowchart

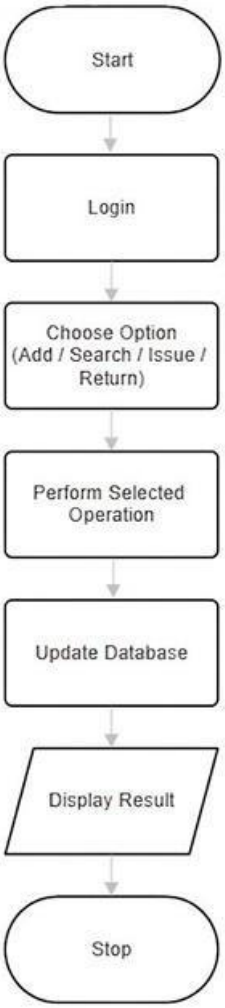

Figure D: Flowchart Of Library Management System

This flowchart shows the step by step process of the system, starting from login, selecting an operating, performing it, updating the database, displaying results, and ending the process.

D.Algorithm:

1. Start
2. Enter username and password
3. If login is valid go to step 4 else go to step 2
4. Display menu options:
   a) Add Book
   b) Search Book
   c) Issue Book
   d) Return Book
5. User selects an option
6. Perform selected operation:
   - o If Add → store book details
   - o If Search → display book
   - o If Issue → update issue record
   - o If Return → update return record
7. Update database
8. Display result
9. Stop

VI. ADVANTAGES

Advantages:

The Library Management System has benefits over old manual systems:

- Saves time and effort: Automated processes make tasks, like searching, issuing and updating records faster.
- Reduces errors: Digital data storage and processing minimize mistakes.
- Provides data access: Information can be retrieved quickly from the database when needed.
- Ensures data storage: Data is stored safely in the database reducing the risk of loss or unauthorized access.
- Easy to use interface: The system has an user-friendly interface that makes it easy for users to operate.
- Efficient record management: All records are organized systematically making it easier to maintain, update and track information.

VII. APPLICATIONS:

- School and college libraries
- Public libraries
- Digital libraries
- Book management systems
- Educational institutions

VIII. CONCLUSION AND FUTURE SCOPE:

Conclusion:

The Library Management System is a way to manage the library. It makes things easier and more accurate for people who use the library. The Library Management System does what it is supposed to do. It works better than the old ways of doing things. In the future we can make the Library Management System better by adding a mobile app storing information online and using cool features, like the Library Management System suggesting books to people based on what they like.

Future scope:

The system can be further enhanced by:

1. Developing an application
2. Enabling online book reservation
3. Integrating AI-based recommendation systems
4. Adding barcode or RFID technology
5. Implementing storage for better accessibility

IX. REFERENCES

[1]. Zhang et al., 2025, Zhang et al., "Web-Based Library Management System Using MERN Stack," International Journal of Computer Science and Information Technology, vol. XX, no. XX, pp. XX–XX, 2025.

[2] Bharti et al., 2024, Bharti et al., "Modern Library Management System: A Web-Based Framework for Resource Automation," International Journal of Advanced Research in Computer Science, vol. XX, no. XX, pp. XX–XX, 2024.

[3] Sharma et al., 2024 Sharma et al., "Intelligent Library Management System Using AI and Machine Learning," Journal of Artificial Intelligence and Computing Applications, vol. XX, no. XX, pp. XX–XX, 2024.

[4] Singh and Kumar, 2023 Singh and Kumar, "Recent Trends in Library Management Systems," International Journal of Emerging Technologies and Research, vol. XX, no. XX, pp. XX–XX, 2023.x

[5] Gupta, T .; Tripathi, R; Shukla, M.K; Mishra,S.2020 ,"Design and Development of IOT based smart library using line follower robot." Department of Electronics and Communication Engineering, Galgotias University, Greater Noida(Uttar Pradesh), India, vol. XX, no. XX, pp. XX-XX, 2020.