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ABSTRACT: The proposed project aims to develop a robust Library Management System (LMS) using PHP with a unique feature of QR code-based student authentication and book transaction. Traditional library systems often face challenges in efficient book tracking and student authentication. This project addresses these issues by implementing a streamlined process where students can effortlessly log in and perform book transactions using QR codes. The system begins with students scanning a unique QR code assigned to them for automatic login. Once authenticated, students can proceed to scan the QR code of the book they wish to borrow or return. The system tracks the borrowing and returning of books, updating the database accordingly. One of the key functionalities of the system is fine calculation. Upon returning a book, the system automatically calculates any overdue fines accrued by the student. Fine calculation is based on predefined rules set by the library administration, such as daily or hourly fines for overdue books. This automated process eliminates manual fine calculation errors and ensures fair and accurate penalty imposition. The Library Management System is designed to be user-friendly and efficient, catering to the needs of both students and library staff. It provides features for administrators to manage book inventory, student records, and fine collections. Additionally, the system offers reporting functionalities to generate insights into book borrowing trends, fine collections, and overdue book statistics. Overall, the QR Code-Based Library Management System with Fine Calculation using PHP offers a modern and efficient solution to streamline library operations, enhance user experience, and promote effective book management in educational institutions and libraries.

KEY WORDS: Library Management System QR Code PHP Student Authentication Book Transaction.

I. INTRODUCTION

The introduction of the QR Code-Based Library Management System with Fine Calculation using PHP heralds a significant leap forward in the realm of library administration and user experience. In traditional library systems, cumbersome procedures for student authentication and manual book transactions often hinder efficiency and accuracy. However, this innovative system revolutionizes these processes by leveraging QR code technology to streamline student login and book transactions seamlessly. By simply scanning a unique QR code assigned to them, students can effortlessly authenticate themselves and gain access to the library's resources. Furthermore, the system facilitates swift book borrowing and returning through QR code scanning, eliminating the need for manual data entry and reducing the likelihood of errors. Notably, the system's capability to automatically calculate fines for overdue books enhances administrative efficiency and ensures fairness in penalty imposition. This introduction marks the dawn of a new era in library management, promising enhanced user convenience, operational efficiency, and data accuracy.

II. PURPOSE

• Identify need of Project

The need for the QR Code-Based Library Management System with Fine Calculation using PHP stems from the persistent challenges faced by conventional library systems. Traditional methods of managing library resources often entail cumbersome processes for both students and library staff, leading to inefficiencies and inaccuracies in book tracking, student authentication, and fine calculation. Manual book transactions and record-keeping are prone to errors, resulting in administrative burdens and potential discrepancies in library inventory. Additionally, the complexity of fine calculation for overdue books further compounds these challenges, often leading to inconsistencies and delays in penalty imposition. In this context, the proposed system emerges as a timely solution, offering streamlined workflows, automated processes, and enhanced user experience. By leveraging QR code technology for student authentication and book transactions, the system eliminates tedious manual tasks, reduces errors, and promotes operational efficiency. Furthermore, the automated fine calculation feature ensures fairness and accuracy in penalty assessment, thereby alleviating administrative burdens and fostering a more conducive learning environment. Thus, the QR Code-Based Library Management System addresses the pressing

need for modernization and optimization of library operations, ultimately enhancing the effectiveness and usability of library services for students and staff alike.

III. OBJECTIVE OF SYSTEM

- The primary objective of the project is to streamline book transactions within the library by implementing a QR code-based system for both student authentication and book borrowing/returning.
- Another key objective is to automate the calculation of fines for overdue books. By defining and implementing fine calculation rules within the system.
- The project aims to improve the overall user experience for both students and library staff. A crucial objective of the project is to enhance administrative efficiency by automating manual tasks associated with book tracking, student authentication, and fine calculation

IV. LITERATURE SURVEY

Dominador M. Acasamoso; Ernie C. Avila; Norman T. Ficundo, “Development And Acceptability of a Proposed Library Management System,”[1] 2021 - This paper examines Managing the library in a university or school is not an easy task especially if it has huge number of books that is open for utilization and borrowing to students. The librarian faces challenges in tasks like tracking of the books on-borrow due to uncontrolled demand more particularly during examination period or research seasons. In this study, the proponents sought to measure the acceptability of the proposed Library Management System capable of handling tasks for library management

Qu Long, “ Design and Implementation of Library and Information Management System under the Background of Big Data,”[2] 2023 – The proposed system the accuracy of the library and information management system using big data through experiments, with the highest being 93% and the lowest being 82%. The accuracy of traditional library and information management systems is highest at 76% and lowest at 68%. From this experimental result, it can be seen that big data technology has the effect of improving the accuracy of information collection, indicating a high degree of compatibility between big data technology and library and information management systems.

Heru Supriyono; Muhammad Ramadhan Fitriyan; Muamaroh, “ Developing a QR Code-based Library Management System with Case Study of Private School in Surakarta City Indonesia,”[3] 2018 - his paper discusses the development process of the system and then followed by the tests conducted and discussion. The objective of the work is to record the borrowing, extension, and returning processes as well as their report preparation using QR code based library management system. The information system was built in webbased environment using Bootstrap framework and the data was managed by using MySQL database management system

Irmawan Rahyadi; Masyhur Duncik; Budhi Santoso; Ike Novianti; Fitri Murfianti; Tamimi Zakirah, “Evaluating A Library Automation System Application in Senayan Library Management System (Slims): The Human Organization Technology (HOT) FIT Model in Indonesia,”[4] 2021 - The three aspects in this research are Human (user), organization (library), Technology (SLiMS). In addition, this research explores indicators to improve SLiMS service in library. Using the HOT FIT, this research find that librarians need to improve their empathy when assisting library users. Using HOT FIT model is particularly offering positive change to librarians which able to explain comprehensive evaluation to provide information system core component approach (library stakeholder). This investigation recommends further education to library visitors and students who use library service on library information system specifically on information search and collection.

V. PROPOSED SYSTEM

The proposed system is a comprehensive Library Management System (LMS) that leverages QR code technology and PHP scripting to streamline library operations. This system revolutionizes traditional library management by introducing a seamless process for student authentication and book transactions. Students will be provided with unique QR codes for automatic login upon scanning, eliminating the need for manual authentication procedures. Book transactions such as borrowing and returning are also simplified through QR code scanning, ensuring swift and accurate record-keeping. One of the standout features of this system is its ability to automatically calculate fines for overdue books based on predefined rules set by the library administration. By implementing fine calculation algorithms within the system, the project ensures fair and accurate penalty imposition, reducing

administrative burdens and enhancing user satisfaction. Additionally, the system offers administrative functionalities for managing book inventory, student records, and generating reports to gain insights into library operations. Overall, the proposed system aims to modernize and optimize library management, offering enhanced efficiency, accuracy, and user experience for both students and library staff.

VI. SYSTEM ARCHITECTURE

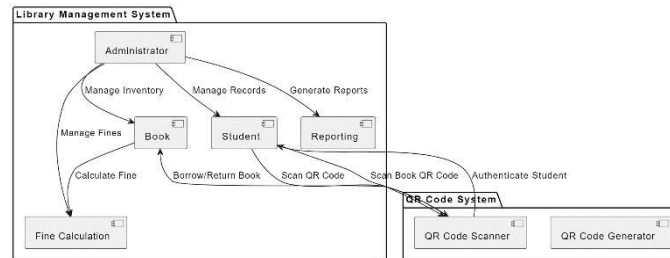


Fig -1: System Architecture Diagram

ADVANTAGES

- Easy to used system
- Control system from anywhere
- Centralized system

SYSTEM REQUIREMENTS

Software Used:

1. Programming Language – BootStrap, Php
2. Database – Mysql
3. Tools – Visual Studio Code
4. Algorithm – AES.
- 5.

Hardware Used:

1. Processor – i3 or above
2. Hard Disk – 150 GB
3. Memory – 4GB RAM

VII. ALGORITHMS

In the proposed library management system, Advanced Encryption Standard (AES) will be utilized to enhance security measures for sensitive data such as student information, borrowing records, and fine calculations. AES, being a symmetric encryption algorithm, ensures confidentiality and integrity of data by encrypting it before storage and decrypting it upon retrieval. When a student logs in or performs a book transaction, their personal information and transaction details will be encrypted using AES before being stored in the database. This ensures that even if unauthorized access to the database occurs, the data will be indecipherable without the appropriate decryption key. Additionally, AES can be employed to secure communication channels between the client (such as a web browser or mobile app) and the server hosting the library management system, preventing eavesdropping and man-in-the-middle attacks. By integrating AES encryption into the system architecture, the project ensures robust security measures, safeguarding sensitive information and enhancing overall trustworthiness of the library management system.



VIII. RESULTS

Admin Module:

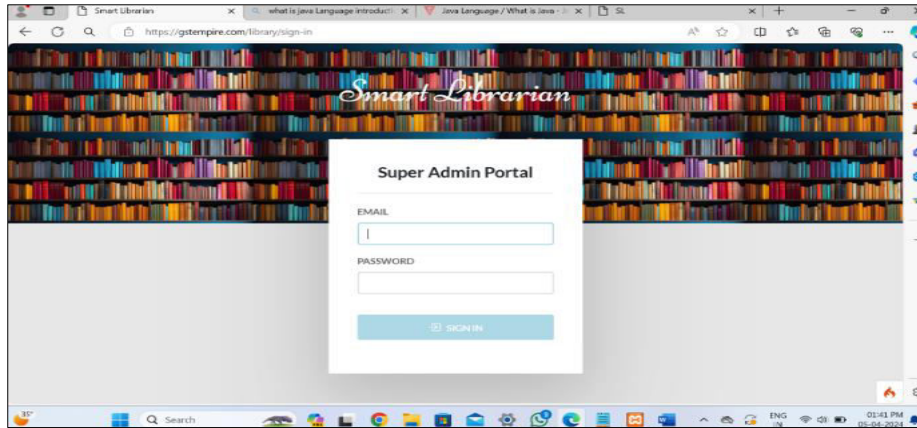


Fig.1: - Super Admin Portal Login

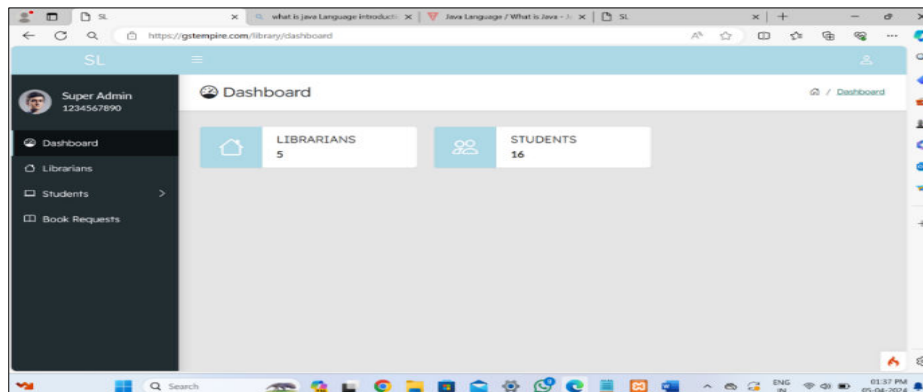


Fig.2: - Super Admin Dashboard

Student Module:

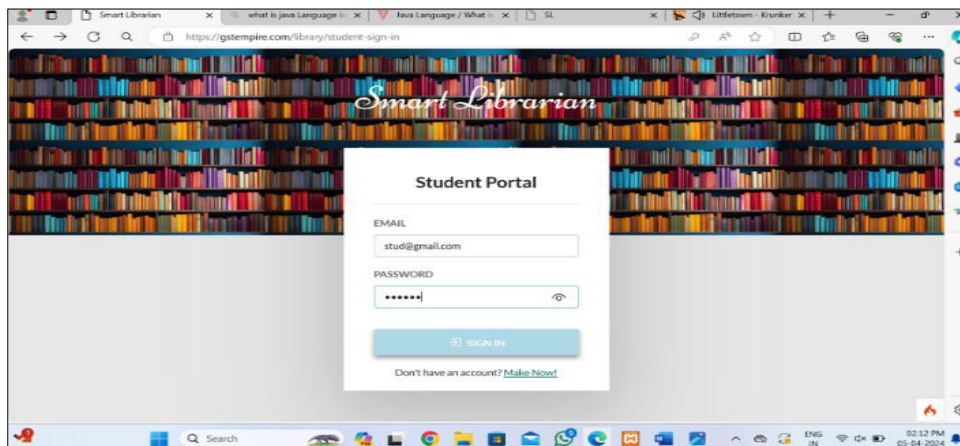


Fig.3: - Student Portal Login



No.	Book Name	Return Date	Return Submitted Date	Action
1	Data Structures and Algorithms	10 Mar, 2024	-	Return Book
2	Computer Knowledge	09 Mar, 2024	-	Return Book
3	Computer Knowledge	04 Mar, 2024	09 Mar, 2024	Returned Book
4	Computer Knowledge	04 Mar, 2024	-	Return Book
5	Computer Knowledge	29 Feb, 2024	08 Mar, 2024	Returned Book
6	Computer Knowledge	27 Feb, 2024	29 Feb, 2024	Returned Book
7	Computer Knowledge	25 Feb, 2024	26 Feb, 2024	Returned Book

Fig.4: - Student's Books Details

Librarian Module:

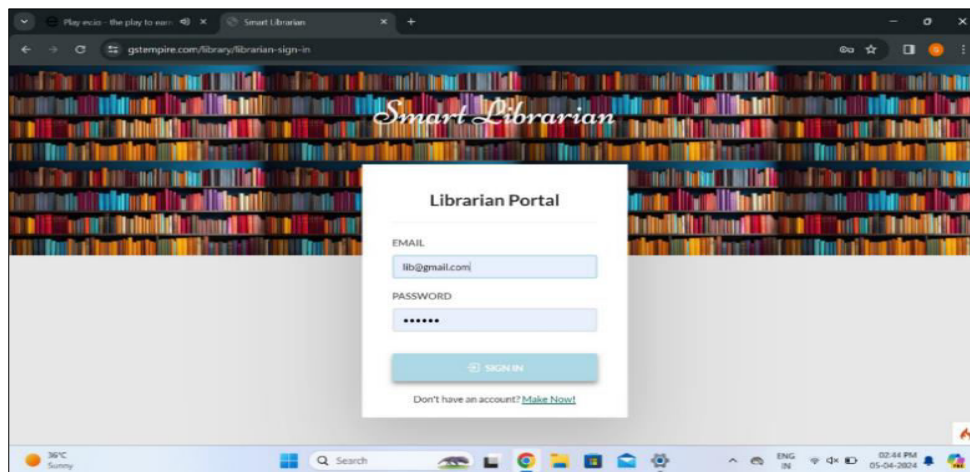


Fig.5: - Librarian Portal Login

No.	Barcode	Book Name	Author	Year	Price	Status	Action
3	[Barcode]	Java Programming	Prabhat Singh	0000	1001	Active	[Action]
4	[Barcode]	Computer Knowledge	Disha Sharma	2020	300	Active	[Action]
5	[Barcode]	Core Java	R Nageswar Rao	2013	450	Active	[Action]
6	[Barcode]	Computer Science With Python	Sumita Arora	2023	240	Active	[Action]

Fig.6: - Books Details in Stock

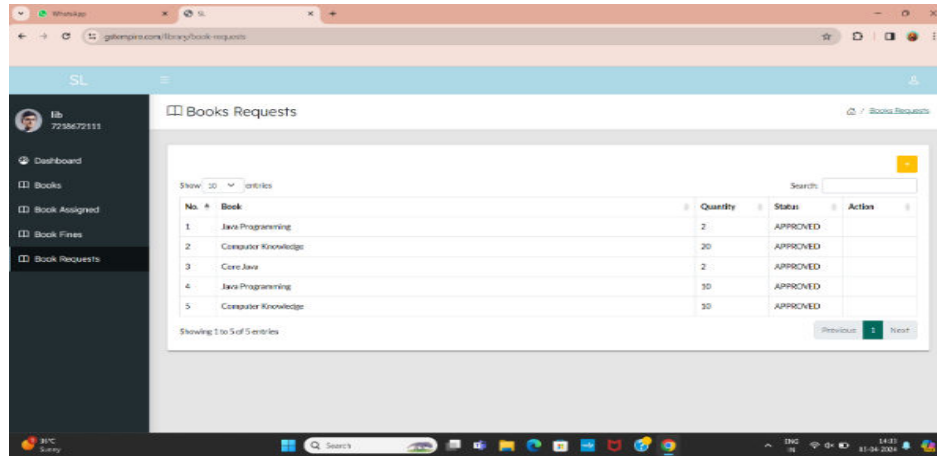


Fig.7: - Request Copies of Books

IX. CONCLUSION

In conclusion, the implementation of the QR CodeBased Library Management System with Fine Calculation using PHP represents a significant step forward in modernizing library operations and enhancing user experience. By leveraging QR code technology for student authentication and book transactions, the system streamlines processes, reduces manual errors, and promotes efficiency in library management. The automated fine calculation feature ensures fairness and accuracy in penalty imposition, relieving administrative burdens and fostering a conducive learning environment. Additionally, the system offers enhanced security measures through the integration of AES encryption, safeguarding sensitive data and maintaining the trust of users. Overall, this project underscores the importance of innovation in library systems, offering a robust solution that addresses the evolving needs of educational institutions and libraries while enhancing accessibility and usability for students and staff alike.

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