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DESIGN AND IMPLEMENTATION OF WEB-BASED LIBRARY MANAGEMENT SYSTEM USING AWS

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ABSTRACT

Traditional library systems have been altered by the quick development of digital technology, necessitating the development of effective, scalable, and remotely accessible alternatives. In terms of book tracking, user management, and record keeping, traditional library administration procedures are frequently labor-intensive, manual, and error-prone. In order to automate library activities, this article describes the design and implementation of a Web-Based Library Management System utilizing Amazon Web Services (AWS). Through a centralized cloud platform, the suggested system facilitates real-time data access, issue/return tracking, book catalog management, and secure user identification. To guarantee scalability, dependability, and data security, AWS services like EC2, S3, and RDS are used. The technology increases operational effectiveness, lessens manual labor, and gives administrators and users access from anywhere at any time.

KEY WORDS

Library Management System, AWS, Cloud Computing, Web Application, Database Management.

INTRODUCTION

Because they make knowledge resources accessible, libraries are essential in both academic and organizational settings. However, the scalability and accessibility of traditional library management systems are constrained by their heavy reliance on human procedures or separate software. Web-based solutions are becoming crucial for contemporary library automation due to the growing use of cloud computing. With a web-based library management system, users and librarians can manage and access library resources from anywhere in the world using a browser. High availability, data security, and affordable infrastructure are all provided by cloud platforms like AWS. The goal of this study is to create a cloud-hosted library system that guarantees data integrity

and system dependability while streamlining book administration, user registration, and transaction tracking.

LITERATURE SURVEY

The use of cloud-based information systems for library automation is highlighted in recent studies. Researchers have investigated web-based library platforms that combine relational databases with PHP, Java, and Python. It has been demonstrated that cloud technologies like AWS and Google Cloud improve system fault tolerance and scalability.Numerous studies emphasize the advantages of cloud deployment, such as lower maintenance costs, enhanced data security, and real-time accessibility. However, issues like performance optimization, data integrity, and authentication are still being studied. These results spur the creation of a modular, secure library management system based on AWS.

RELATED WORK

Previous library management systems were created as desktop programs, which restricted scalability and multi-user access. Although later web-based solutions were more accessible, they frequently lacked cloud support and reliability. In order to accommodate big datasets, several users at once, and safe data storage, modern methods incorporate cloud infrastructure. Research shows that when compared to conventional hosting options, AWS-based systems offer superior performance, automated backups, and load balancing. By developing a comprehensive end-to-end library management platform that is hosted on AWS, this study expands on these strategies.

EXISTING SYSTEM

The current library management system primarily relies on locally installed software programs or manual record-keeping. Registers or independent databases, which need physical access to the library, are used to preserve book details, user information, and transaction records. When it comes to book issuance, returns, and record updates, these procedures are laborious and prone to human mistake. Library employees must put in more manual labor to track overdue books and create reports. Additionally, the operational complexity of local servers is increased by the need for frequent maintenance, backups, and technical assistance Data redundancy and inconsistency result from traditional systems' lack of centralized data storage and real-time access. Due to a lack of security measures, the system is susceptible to data loss and illegal access. Performance deteriorates as the number of users and books rises, making scalability a significant concern. Multiple users cannot effectively access the system at

once, and remote access is not supported. All things considered, the current method is ineffective, unreliable, and inappropriate for the needs of contemporary libraries.

PROPOSED SYSTEM

All essential library functions are automated by the suggested system, which is a cloud-based web application. Book administration, user registration, and issue/return tracking are made possible by its distinct interfaces for administrators. The system guarantees high availability, scalability, and data security by utilizing AWS infrastructure. Centralized data access and real-time changes are made possible by the use of cloud databases. The suggested technique increases operational efficiency and minimizes manual labor when compared to current solutions.

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SYSTEM ARCHITECTURE

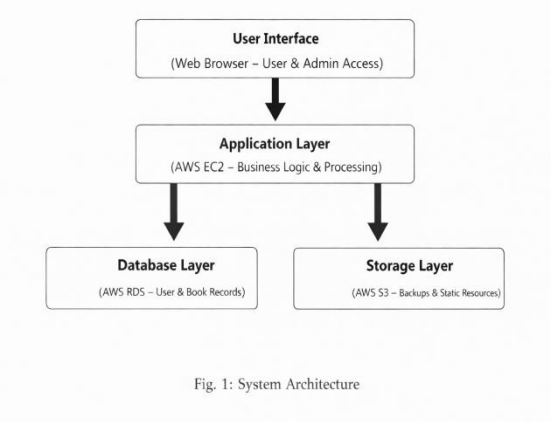

Fig. 1: System Architecture

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METHODLOGY DESCRIPTION:

The proposed system follows a structured and systematic workflow to automate library operations efficiently and securely.

User Authentication: Through a login interface, the system offers administrators and users a safe authentication method. While users are able to search, issue, and return books, administrators are able to manage books and transactions thanks to the implementation of role-based access control. To stop illegal access and guarantee data security, user credentials are checked against the centralized database.

Book Management: Administrators can add new books, update current records, remove out-of-date entries, and conduct effective book searches with the help of the book management module. Details like the title, author, category,

availability status, and unique identification number are all included in each book record. The solution ensures correct inventory management by instantly updating book availability following each issue or return activity.

Transaction Processing: This module manages the orderly issuance and return of books. The system assigns a return deadline and logs the issue date when a book is issued. When a book is returned, the system changes the transaction status and, if necessary, computes overdue information. Errors are reduced and transaction transparency is enhanced by this automatic tracking.

Cloud Deployment: In order to offer scalability and high availability, the application is deployed on Amazon Web Services (AWS), with the application layer hosted on AWS EC2. Cloud implementation guarantees dependable performance even under increased load and enables the system to manage numerous users concurrently. Additionally, automated backups and system monitoring are supported by AWS infrastructure.

Real-Time Access: Real-time data access and updates are made possible by a centralized database hosted on AWS RDS. Data consistency is ensured since any modification made by a user or administrator is immediately reflected throughout the system. Multiple users can access the system concurrently thanks to this real-time synchronization, which also improves system responsiveness and dependability overall.

RESULTS AND DISCUSSION:

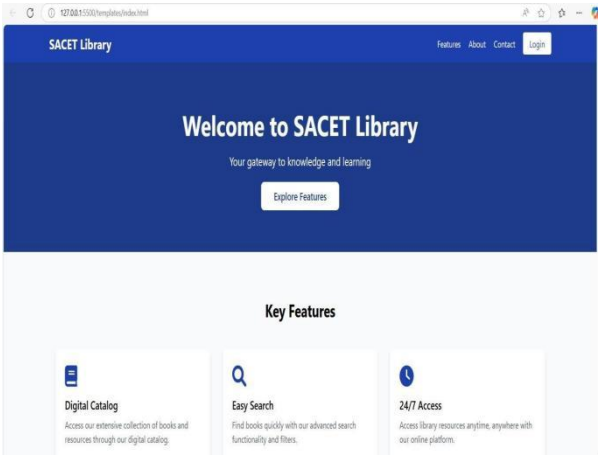

Fig 2: Home Page

The graphic displays the SACET Web-Based Library Management System's home page, which offers safe access to digital library services, essential features, and easy navigate

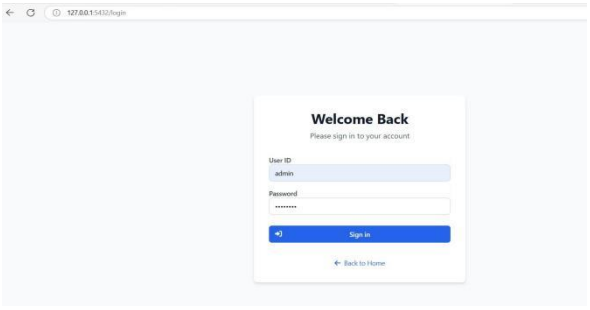

Fig 3: Login Page

The image depicts the secure login interface of the Library Management System, allowing authorized users and

administrators to access the system using valid credentials.

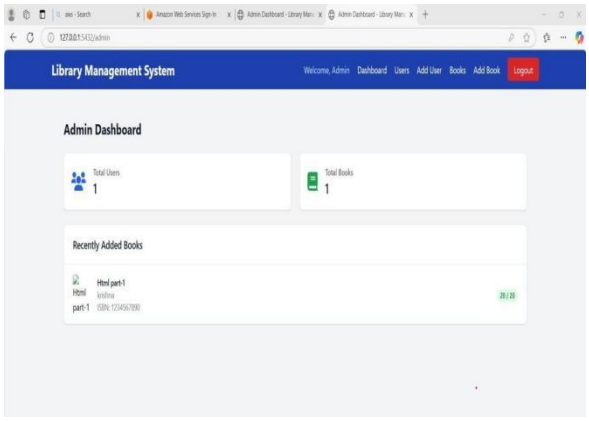

Fig 4: Admin Dashboard

The image shows the Admin Dashboard of the Library Management System, displaying user and book statistics along with recently added books for efficient administrative control.

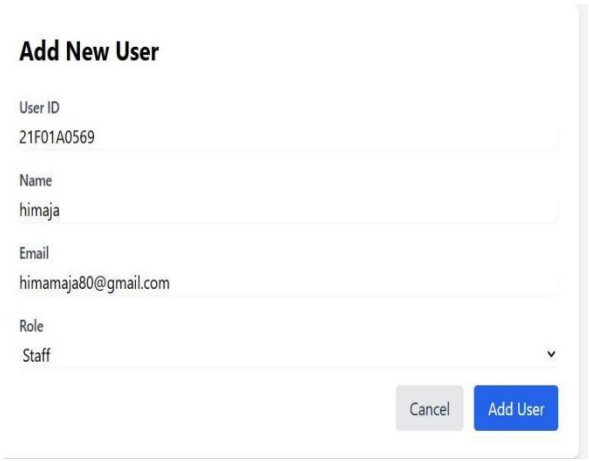

Fig 5: Staff Login Page

This image shows a web form interface for adding a new user, including fields for User ID, Name, Email, Role, and buttons to cancel or submit.

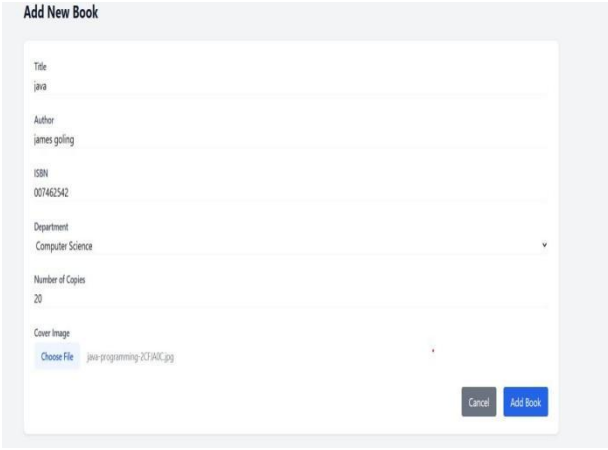

Fig 6: Book Adding

This image shows a web form for adding a new book, including fields for title, author, ISBN, department, number of copies, and a cover image upload option.

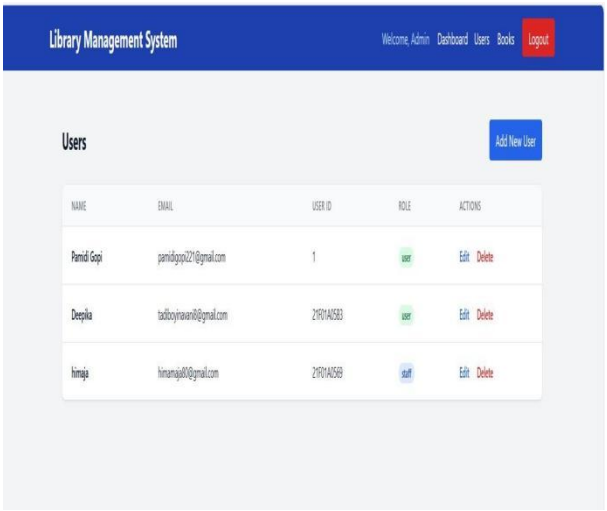

Fig 7: User And Staff Details

This image shows a Library Management System's admin interface displaying a user list with options to add, edit, or delete users.

CONCLUSION AND FUTURE ENHANCEMENT:

CONCLUSION

Using a scalable and secure cloud platform, the Web-Based Library Management System with AWS effectively automates library operations. The system guarantees effective data management, reduces human error, and improves accessibility. System performance and dependability are greatly enhanced by cloud deployment.

FUTURE ENHANCEMENTS

Future developments could include RFID-based book tracking, AI-based user recommendation systems, mobile application integration, and sophisticated analytics for consumption patterns.

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