Digital Library Management System Using Database Technology.

A Project Work Synopsis

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Abstract

The Digital Library Management System (DLMS) project introduces an innovative solution to reshape how libraries navigate the digital era's challenges. In response to the expanding realm of online resources and evolving user expectations, this project aims to establish an Online DLMS utilizing HTML, CSS, JavaScript, MongoDB, and Microsoft Azure. The primary objectives encompass improved resource accessibility, streamlined management processes, and fortified user experiences, all grounded in a secure and user-centric environment.

Keywords: Digital Library Management System, DLMS, online resources, user experience, resource management, security, scalability, cloud deployment, user engagement, MongoDB, Microsoft Azure, web development, user interface design.

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1. INTRODUCTION

In an era defined by digital transformation, the world of libraries is undergoing a profound shift. The transition from traditional brick-and-mortar repositories of knowledge to dynamic online hubs demands innovative solutions that cater to the evolving needs of users. This project embarks on a journey to bridge this gap by creating an Online Digital Library Management System (DLMS) that harnesses the power of modern web technologies and cloud infrastructure.

1.1 Problem Definition

In the rapidly evolving digital age, traditional libraries are transitioning into digital spaces to offer users convenient access to vast repositories of knowledge. The primary challenge lies in creating an efficient and user-friendly Digital Library Management System (DLMS) that can seamlessly replace or complement physical libraries. This DLMS project aims to address this challenge by leveraging modern web technologies and cloud infrastructure to build a comprehensive digital library ecosystem.

1.2 Problem Overview

The Online Digital Library Management System (DLMS) is a comprehensive web-based solution designed to revolutionize the way libraries manage and deliver digital resources. This project focuses on utilizing modern web technologies such as HTML, CSS, JavaScript, and MongoDB, with Microsoft

Azure as the hosting platform, to create a user-friendly, secure, and highly accessible digital library ecosystem.

1.3 Hardware Specification

Server Hardware:

Recommended Azure Virtual Machine Specifications

- Virtual Machine Series: General Purpose or Compute Optimized.
- Virtual CPU (vCPU): At least 2 vCPUs.
- RAM: Minimum 4GB (8GB or more is recommended).
- Storage: SSD storage for better performance.
- Operating System: Choose a suitable OS, such as Windows or Linux, depending on

your application's requirements.

• Network: Adequate network bandwidth for seamless communication

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2. LITERATURE SURVEY

2.1 Existing System

Some existing system are:-

1) Koha:

Koha is an open-source integrated library system (ILS) used by libraries of all

sizes, including academic, public, and special libraries. It offers features for

cataloging, circulation, acquisitions, and more.

Website: https://koha-community.org/

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2) DSpace:

DSpace is an open-source digital repository system widely used by academic and

research institutions. It's designed for storing, managing, and sharing digital

content, including scholarly articles, theses, and research data.

Website: https://www.dspace.org/

3) Fedora Commons:

Fedora Commons is an open-source digital repository platform known for its

flexibility and scalability. It's suitable for managing and preserving a wide range

of digital assets.

Website: https://duraspace.org/fedora/

4) Greenstone Digital Library Software:

Greenstone is an open-source software suite for building and distributing digital

library collections. It provides tools for creating, curating, and disseminating

digital content.

Website: http://www.greenstone.org/

5) CONTENTdm:

CONTENTIAM is a commercial digital collection management system

commonly used by libraries and cultural heritage institutions. It offers features

for digitization, metadata management, and access to digital collections.

Website: https://www.oclc.org/en/contentdm.html

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2.2 Proposed System

The proposed DLMS is an innovative online platform designed to transform traditional library operations into a modern, efficient, and user-centric digital ecosystem. This system will utilize cutting-edge technologies including HTML, CSS, JavaScript, MongoDB, and Microsoft Azure for hosting, offering a comprehensive and scalable solution.

2.3 Literature Review Summary

A Library Management System has been designed to automate, manage and look after the overall processing of a library, especially in ODL institutions. Efforts have been made to continually improve on library management systems, such as application login through smart 3 cards, RFID enabled smart library for cataloguing, circulation of materials, centralised database, user identification through their smart cards, theft detection statistics and reporting web based module etc (BGIL, 2017). More specifically, the aim is to simplify library process and in turn save time and cost. The automated library system (ALS) has undergone significant changes since its inception in the 1970s. These changes are reflected in the conceptual differences between the ALS and the integrated library system (ILS) (Kinner, 2009). It was observed by Uzomba, Oyebola and Izuchukwu (2015) how the importance of integrated systems in library activities such as cataloguing, circulation, acquisition and serials management, etc is no longer debatable as libraries all over the world have realised the need to move

from their manual practices into integrated systems and networked operations. An integrated library system can be such a robust enterprise resource management system that can continually adapt and fulfil the requirements and needs of patrons. According to Müller (2011), "In choosing ILS software, libraries must base their decision not only on the performance and efficiency of the system, but also on its fundamental flexibility to readily adapt to the future demands and needs of their patrons". Hence the need to consciously continue to improve on these systems. In integrating more features, its important to maintain standards, as opined by Mandal and Das (2013) that the widespread use of Integrated Library Systems (ILS), global communications via the Internet, and growing numbers of digital library initiatives have made the need for compliance with standards more critical than ever. That is, implementing information products and systems that support standards should at least ensure that library systems be able to: more easily adopt new technologies, such as, topic modelling.

3. PROBLEM FORMULATION

The DLMS project seeks to achieve the following objectives:

- Design and implement an intuitive web interface
 (HTML/CSS/JavaScript) to provide users with seamless access to the
 digital library, promoting user engagement.
- 2) Utilize MongoDB for efficient storage and management of digital resources, enabling effective resource organization and cataloging.
- 3) Develop advanced search and retrieval functionalities (JavaScript) to enhance resource discovery for users.
- 4) Implement secure user authentication and authorization mechanisms (HTML/CSS/JavaScript) to protect user data and control resource access.
- 5) Ensure high performance, scalability, and data security by hosting the DLMS on Microsoft Azure, while also establishing robust backup and disaster recovery strategies.

4. RESEARCH OBJECTIVES

1. To Assess User Needs and Expectations:

Conduct surveys, interviews, or user studies to understand the requirements and expectations of library patrons and staff regarding digital library services.

2. To Evaluate Existing Systems:

Analyse and evaluate the strengths and weaknesses of existing digital library management systems through a comprehensive review of the literature and case studies.

3. To Identify Technological Trends:

Investigate current and emerging technologies (e.g., AI, blockchain, linked data) that can enhance digital library management systems.

4. To Define Functional Requirements:

Clearly define the functional requirements of the proposed digital library management system, considering factors like resource cataloging, access control, and preservation.

5. To Develop a Prototype or Proof of Concept:

Create a prototype or proof of concept for the digital library management system to demonstrate its feasibility and potential features.

5. METHODOLOGY

Agile Methodology:

Development Phase: Agile methodologies like Scrum or Kanban can be employed during the development phase to promote iterative development, collaboration, and adaptability. Regular sprint cycles allow for continuous improvement and user feedback incorporation.

Waterfall Methodology:

Planning Phase: The project can start with a well-defined Waterfall methodology for project planning and requirements gathering. This ensures clear objectives and scope definition before moving to development.

User-Centered Design (UCD):

Design Phase: UCD methodologies involve user research, prototyping, and usability testing to create a DLMS interface optimized for user needs. It ensures that the system is designed with the end-users in mind.

Scalability Planning:

Architecture Phase: Scalability planning may involve methodologies like capacity planning and load testing to ensure the system architecture can handle increasing data volumes and user loads.

Security by Design:

Security Phase: Implementing security by design involves integrating security practices throughout the development process. Security methodologies such as threat modeling can help identify vulnerabilities and develop mitigation strategies.

6.EXPERIMENTAL SETUP

1. Development Environment:

Operating System: Set up development machines with the appropriate operating system (e.g., Windows, Linux, macOS) that supports your chosen technologies (HTML, CSS, JavaScript, MongoDB).

Development Tools:

Install code editors (e.g., Visual Studio Code, Sublime Text) and development frameworks (e.g., Node.js for JavaScript development) to write and test your code.

2. Version Control:

Use version control systems like Git and platforms like GitHub or GitLab to track changes to your project's source code. This enables collaboration, version history tracking, and code backup.

3. Web Development Stack:

Set up a web development stack that includes:

Web server software (e.g., Apache, Nginx) to serve your web application.

Node.js and npm (Node Package Manager) for JavaScript package management.

MongoDB for database management. Install and configure MongoDB for your development environment.

4. Microsoft Azure Account:

Create a Microsoft Azure account if you don't already have one. Azure will be used for hosting your DLMS. Configure your Azure services and resources as needed, including virtual machines (for hosting), Azure Cosmos DB (for MongoDB if required), and storage account.

7.CONCLUSION

In conclusion, the development and deployment of the Online Digital Library Management System (DLMS) represent a significant step forward in modernizing library operations and enhancing user experiences in an increasingly digital world. This project embarked on a journey to address several critical challenges faced by traditional library systems and succeeded in delivering a comprehensive solution that leverages cutting-edge technologies.

8. TENTATIVE CHAPTER PLAN I	FOR THE PROPOSED WORK
CHAPTER 1: INTRODUCTION	

CHAPTER 2: LITERATURE REVIEW

CHAPTER 3: OBJECTIVE

CHAPTER 4: METHODOLOGIES

CHAPTER 5: EXPERIMENTAL SETUP

CHAPTER 6: CONCLUSION AND FUTURE SCOPE

REFERENCES

1) W3Schools:

Website: https://www.w3schools.com/

Offers interactive tutorials and examples for HTML, CSS, and JavaScript, making it a great starting point for learning web development fundamentals.

2) MongoDB Documentation:

Website: https://docs.mongodb.com/

Provides comprehensive guides and references for utilizing MongoDB as your database solution.

3) Microsoft Azure Documentation:

Website: https://docs.microsoft.com/en-us/azure/

Offers detailed resources on deploying web applications, using Azure services, and setting up virtual machines.

4) Article - "Building a Digital Library with HTML, CSS, and JavaScript":

- 5) Article: https://dzone.com/articles/building-a-digital-library-with-html-css-and-java
- 6) A tutorial-style article guiding you through creating a digital library interface using HTML, CSS, and JavaScript.
- 7) "Building Web Applications with MongoDB and HTML5"

Book: https://www.amazon.com/Building-Web-Applications-MongoDB-HTML5/dp/1491911651