

Development of Islamic Digital Library

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Abstract: This study addresses several challenges related to the storage and management of digital Islamic manuscripts. Firstly, the lack of appropriate technology for storing these manuscripts poses a significant hurdle. Additionally, there is a need for a platform that enables efficient management of manuscript collections and assists administrators in handling them effectively. To tackle these issues, the study proposes the development of a specialized database using MySQL, which is well-suited for document storage. Furthermore, Python is selected as the backend programming language for server-side development. The goal is to create a user-friendly platform that allows administrators to easily add or delete books from the collection. Finally, the study aims to evaluate the software testing conducted in the software environment to ensure the complete system behaves as intended. The anticipated outcome of this research is the development of a comprehensive platform that grants full administrative access and effectively addresses the challenges associated with storing and managing digital Islamic manuscripts.

Keywords: MySQL, Digital Library, Islamic Manuscripts

1. Introduction

These days, digital libraries are everywhere. Almost every institution is holding one of their own. A popular strategy for information providers is to integrate content and services through portals [1]. A digital library's capacity for efficient information access is a key component. A digital library typically has an automatic search and retrieval system that users of the library can use to retrieve documents thanks to recent advancements in information retrieval [2]. Modern technology has made it possible to store manuscripts for hadith works using innovative techniques. Researchers recently tested manuscripts of writings by hadith scholars on a variety of subjects in order to produce high-quality and authentic printed copies.

According to statistics, the quantity of digital reading materials borrowed in 2020 more than doubled from 167,374 to 367,306 [3]. This is essential to improving public confidence in services that present hadith-related information. This method is a type of education that makes use of the Internet's capacity to offer content and educational programmed that adapted and interactive to different

community levels, whether local or far.

It is undoubtedly important to underline the authenticity and quality of the hadith delivered and displayed in order to promote it through the platform mentioned. In actuality, the information cannot be made available to the public if it is accurate wrong, false, or in the form of wrong information related to a hadith. When it comes to hadith and Sunnah, it is related to the affairs of the text or religious texts, which should be sourced from reliable and accurate sources of the facts brought, thus the information also always needs to be screened and checked accordingly.

From related work of "E-Library Management System" [4] discussed that for operating system Windows 7 can be used as an operating system because it has more features, and is stable and friendly. For the database, this work used MySQL because it is simple to manage and retrieve records using straightforward English-language queries that are simple to read and write. For development tools and programming language, the whole website's code is written in HTML, which is then developed using CSS, JavaScript for style, and PHP for server-side scripting.

Overall, the combination of web development, information management systems, and the selection and analysis of source material contributes to the development of a robust and user-friendly digital library for Islamic manuscripts. This digital platform enables easy access, efficient management, and effective utilization of the manuscript collection, promoting the preservation and dissemination of Islamic knowledge and supporting scholarly research and learning in the field.

2. Materials and Methods

This section discusses the findings from the development of the Islamic digital library. All the progress of development has been made. To analyze the final system performance, the testing results are compared and observed.

2.1 Creation of Database using MySQL

Figure 1 shows the flowchart for the Islamic digital library system that incorporates MySQL, a popular relational database management system, to store and manage the library's data. MySQL is utilized to design and create the necessary database schema for the system. This includes tables to store information about books, authors, publication details, and other relevant data. The integration of MySQL ensures efficient and organized data storage, retrieval, and management within the system.

It begins with the "Start" symbol and progresses to the creation of the database schema. The "admin" table and the "book" table are both created in this stage. This step involves designing and structuring the tables necessary for storing data related to the Islamic digital library. These tables may include information about books, authors, publication details, and user accounts. MySQL offers a robust and efficient platform for organizing and managing data within the system. The "admin" table oversees controlling user rights and accounts inside the library system. The admin's username and password, which are essential for authentication and access control, are stored in fields on the form. Only authorized administrators will be able to access this table and carry out administrative duties like adding new books to the library.

The "book" table is designed to hold data on the books that are offered at the library. It has sections for the book's author, publication date, and title. These specifics provide consumers with the crucial information they need to find and access the required books in the digital library. Once the schema is created, the flowchart continues with the implementation of the backend logic using a programming language like Python. This includes handling user authentication, database queries, and other essential functionalities. The flowchart concludes with the "Stop" symbol, indicating the successful completion of the web development process using MySQL.

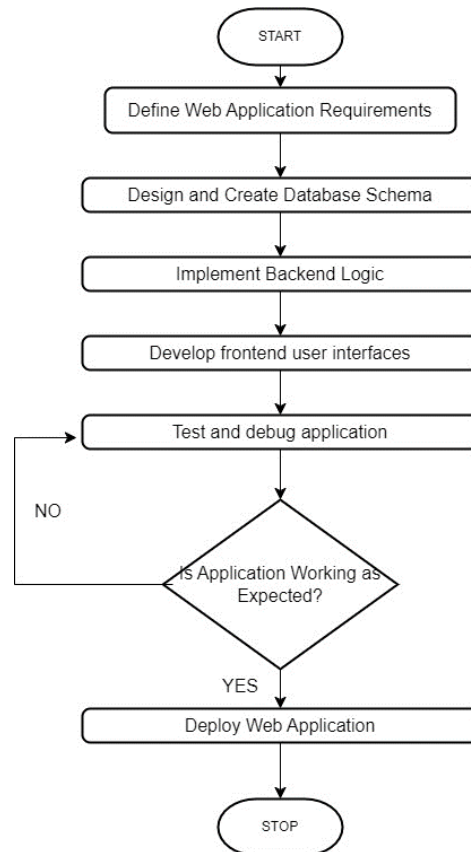


Figure 1: Flowchart for MySQL

2.2 Creation of GUI using Flask

Flask, a lightweight web framework for Python, is integrated into the flowchart to develop the web interface of the Islamic digital library system. Flask allows for the creation of routes and views, handling user requests, rendering templates, and managing the overall web application. The flowchart shown in Figure 2, depicts the steps involved in configuring the Flask application, designing web pages, creating Flask templates for dynamic content rendering, and writing Flask routes to handle various user actions and interactions. Flask's simplicity and extensibility make it a suitable choice for developing the user interface of the system.

This involves setting up the necessary dependencies, defining routes, and configuring templates. Flask offers a simple and flexible framework for creating web applications, making it ideal for developing the Islamic digital library's user interface. The flowchart then moves to the design of web pages, where HTML, CSS, and Flask templates are used to create visually appealing and interactive interfaces. These templates can dynamically display data retrieved from the MySQL database, ensuring an engaging user experience. Finally, the flowchart reaches the "Stop" symbol, indicating the completion of the Flask development process.

The flowchart moves on to the building of the user interface using Flask once the database schema is created. In order to do this, the routes in Flask must be configured, which specifies the URLs that users may visit inside the application. These routes reply to incoming requests and start the relevant functions to provide the required answers.

For building web applications, Flask offers a straightforward and adaptable framework, making it a good choice for constructing the user interface for the Islamic digital library. In addition to other

features, Flask makes it simple for developers to build routes, process form submissions, and maintain user sessions.

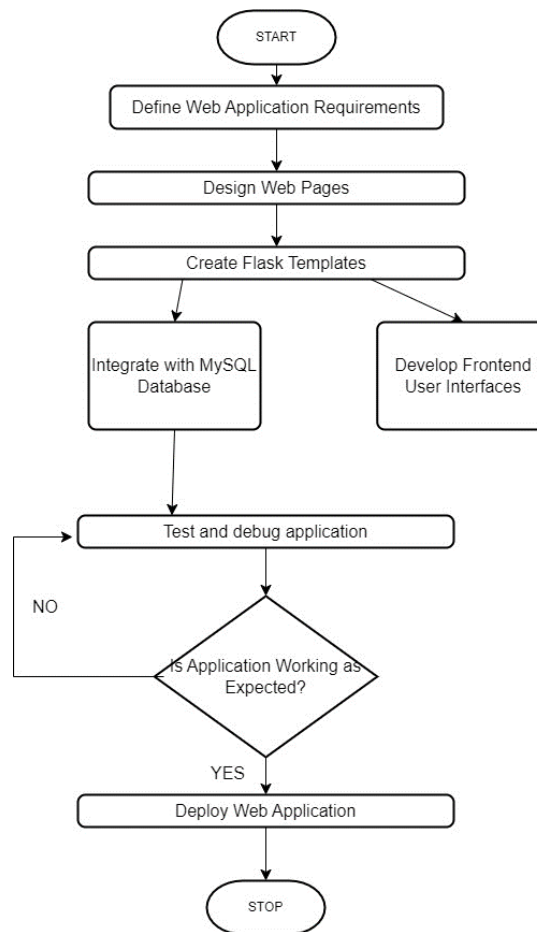


Figure 2: Flowchart for Flask

The flowchart then concentrates on creating the web pages that make up the user interface. While CSS (Cascading Style Sheets) is used to regulate the visual look and layout of the components, HTML (Hypertext Markup Language) is used to organize the content of the pages. Utilizing reusable Flask templates, the HTML pages are generated dynamically using information taken from the MySQL database.

The Islamic digital library can show book details, search results, user profiles, and other pertinent data collected from the database thanks to the dynamic rendering capabilities of Flask's templates. Through real-time updates and interactive elements, this dynamic nature improves the user experience.

2.3 Deployment of Islamic Digital Library as Web Application using Python

Python, a versatile programming language, plays a crucial role in the development of the Islamic digital library system. It is used to write the backend logic and implement various functionalities. The flowchart in Figure 3 encompasses the process of writing Python code for the backend logic, which includes handling user authentication, database interactions, search algorithms, and other key functionalities. Python's flexibility, extensive libraries, and frameworks make it an ideal choice for developing the robust and dynamic backend of the system.

The "Start" symbol is used as the starting point, and then Python code is written to implement the backend logic. The provided code contains several functions and routes that constitute the backend logic of the application. These functions include *get_mysql_connection()*, which establishes a connection with the MySQL database, and *get_file_size(file_path)*, which calculates the size of a file. Additionally,

the *login_required(route_function)* function acts as a decorator to enforce authentication for certain routes, while *allowed_file(filename)* checks the validity of uploaded files.

The routes defined in the code, such as *home()*, *allbooks()*, *addbook()*, *viewbook()*, *viewpdf()*, and *logout()*, handle specific HTTP requests and carry out backend operations. These operations involve querying the database, retrieving and manipulating data, and rendering templates to generate appropriate responses for the client.

Throughout these routes, HTML templates are rendered using the *render_template()* function. The templates provide the front-end user interface, allowing users to view and interact with the application's functionality. Implementing features like user identification, book search engines, and data manipulation is required for this. Python is a great option for managing difficult duties in the system because of its adaptability and wide-ranging library. Then, the flowchart continues to the testing and debugging step, when it is made sure that the Python code performs as intended and adheres to the specifications. This procedure aids in finding and fixing any problems or faults. The "Stop" sign at the end of the flowchart indicates that the Python development process has been successful.

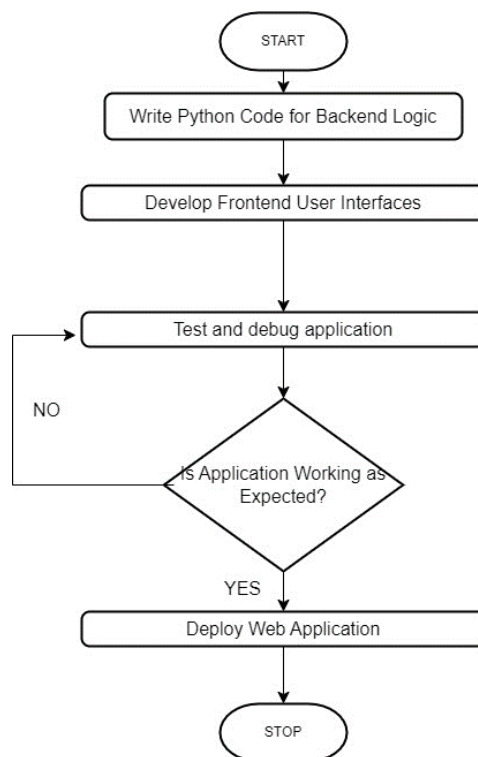


Figure 3: Flowchart for Python

2.4 Login as Admin

Figure 4 shows the flowchart of the development of Islamic digital library. The flowchart explained the techniques of how the system worked.

The flowchart begins with the "Start" symbol and leads to the login page where admin credentials are required. Upon entering the login information, the system checks for authorization. If the admin is authorized, the flow proceeds to grant access to the admin functionalities.

Once access is granted, the admin can perform various actions. One such action is the ability to add books to the library. The admin can navigate to the "Add Book" section and provide the necessary details for the new book entry. This step ensures the continuous growth and enrichment of the library's collection.

After completing the necessary tasks, the flowchart reaches the "Stop" symbol, indicating the end of the admin session. At this point, the admin can log out or exit the system.

This flowchart highlights the core processes involved in the admin functionality of the Islamic digital library system, offering a visual representation of the sequential steps and decisions made throughout the process.

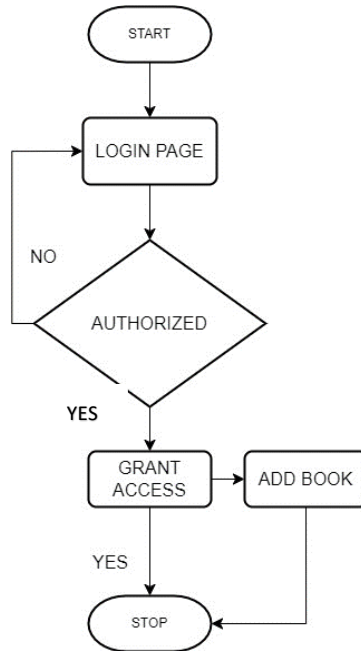


Figure 4: Flowchart for Admin

2.5 Login as Guest

The flowchart in Figure 5 for guest access in the Islamic digital library system illustrates the steps and functionalities available to users who log in as guests. It begins with the "Start" symbol and progresses to the login page. Guests can enter their login information or select the guest login option.

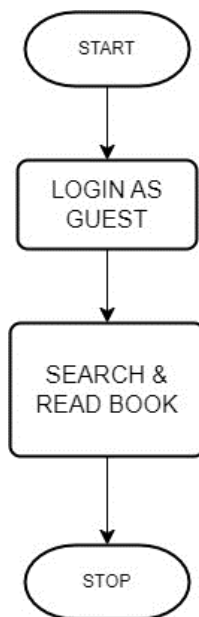


Figure 5: Flowchart for Guest

Once logged in as a guest, the flow continues to the search book functionality. Guests have the ability to search for books within the library using various criteria such as title, author, or keywords.

This feature enables guests to find specific books or explore the library's collection based on their interests.

After searching for a book, guests can proceed to the "Read Book" section. This functionality allows them to access and read the content of the selected book within the digital library system. It provides an immersive and convenient reading experience, ensuring that guests can benefit from the available resources.

Upon completing their reading session or whenever they wish to exit the system, guests reach the "Stop" symbol, signifying the end of their session. They can then log out or close the system.

3. Results and Conclusion

The work successfully accomplished its objectives of developing a database for storing digital Islamic manuscripts, creating a repository platform as an Islamic digital library, and conducting comprehensive software testing. Firstly, a database has been developed to effectively store digital Islamic manuscripts. By utilizing a suitable database management system, it ensures that the manuscripts are organized, easily searchable, and securely stored. This database serves as a robust repository for valuable Islamic manuscripts, facilitating efficient access and management of the collection.

Secondly, a graphical user interface (GUI) or interface for the Islamic digital library has been designed and developed. The GUI provides users with an intuitive and user-friendly platform to interact with the library's resources. Through the interface, users can search for specific manuscripts, browse through different categories, access detailed information about each manuscript, and engage in an immersive reading experience. The GUI design adheres to principles of usability and aesthetics, enhancing the overall user experience and making the digital library accessible to a wide range of users.

Lastly, the integration of the GUI and the database has been successfully accomplished, creating a repository system for the Islamic digital library. The GUI serves as the front-end interface through which users can interact with the database and access the manuscripts. The integration allows for seamless communication between the GUI and the database, enabling real-time updates, efficient data retrieval, and synchronization of information. This repository system ensures the smooth functioning and reliability of the Islamic digital library, providing users with a comprehensive and enriching experience.

Overall, the work has achieved its objectives of developing a robust database for storing Islamic manuscripts, designing an intuitive GUI for user interaction, and integrating the GUI with the database to create a repository system. This contributes to the preservation, accessibility, and dissemination of Islamic knowledge and heritage through the digital medium. The successful completion of these objectives sets a solid foundation for further enhancements and advancements in the Islamic digital library.

4. Recommendation for future work

In addition to the achieved objectives, there are several recommendations for further improvement and enhancement of the Islamic digital library. Firstly, incorporating a user account system specifically for students would provide personalized access to the manuscripts, allowing them to read and engage with the content more effectively.

Secondly, implementing server availability would enable users to access the digital library remotely, expanding its reach and accessibility. Lastly, integrating multilingual support and incorporating translation capabilities would cater to a diverse user base, facilitating the understanding and interpretation of manuscripts in various languages. These recommendations would enhance user experience, broaden the platform's impact, and promote cross-cultural exchange and understanding through the exploration of Islamic manuscripts.

Acknowledgement

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