Online Library: A Cloud Based Web Application

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Abstract— Books are essential in everyone's life, especially in students' lives. They are human's best friends because they motivate us to achieve our goals and overcome setbacks. Thus, books should be affordable for everyone, especially for students. People collect many books in their lifetime for various purposes, but most of the time, they never use them again after finishing the book. Meanwhile, these books can help those who cannot afford them. However, a significant proportion of people in a developing country like Bangladesh live in poverty. Our project aims to create a digital platform via a web application where anyone can donate or sell their unused books at a reasonable price, and others can benefit by receiving or purchasing them. We intend to utilize one of the most popular cloud service providers for building and hosting our web application. In the modern era, Cloud Computing is an emerging technology that revolutionizes IT infrastructures and flexibility. Our project will use AWS (Amazon Web Service) since it is one of the most popular services.

Keywords— Cloud computing, online library, entire workflow, AWS. Digital platform, cloud based web application.

I. INTRODUCTION

An online library, also called a digital library, an internet library, a digital repository, or a digital collection is an online database of digital objects that can include text, still images, audio, video, digital documents, or other digital media formats or a library accessible through the internet. An Online libraries offer a vast collection of materials in various formats, including text, audio, and video. Users can access these materials through an internet connection using computers, smartphones, or tablets. Online libraries typically provide a search function that enables users to find specific books or articles quickly. Some online libraries also offer borrowing services, where users can borrow books for a specific period, and then return them online. A cloud-based web application is a software program that runs on remote servers and is accessed through a web browser or a dedicated app. The term "cloud-based" refers to the fact that the application is hosted on a cloud computing platform, where the computing resources are pooled and provided to users on an as-needed basis. Cloud-based web applications have several advantages over traditional software applications, including:

➢ **Accessibility-** Cloud-based web applications can be accessed from anywhere with an internet connection, making it easy for users to work from home or while traveling.

➢ **Cost-effectiveness-** Cloud-based web applications typically require lower upfront costs than traditional software programs, and they can be more cost-effective over the long term due to reduced maintenance and upgrade costs.

➢ **Collaboration**- Cloud-based web applications make it easy for teams to collaborate on projects, as they can all access the same application from anywhere.

➢ **Security-** Cloud-based web applications are typically more secure than traditional software programs, as the service provider is responsible for managing security updates and backups.

A. Purpose

The proposed project" Online Library" intends to provide a platform for underprivileged students to browse used books on the website and buy or take donations of books from the sellers or donors. Defining the functions and specifications of the" Online Library" is the primary purpose of this paper. The paper illustrates, in clear terms, the system's primary uses.

B. Intended Audience and Reading Suggestions

This Paper is for developers and project supervisor. Further the discussion will provide all the internal, external, functional and also non-functional information about" Online Library".

C. Project Scope

"Online Library" creates a space for the book lovers who wants to buy books at a cheap rate and underprivileged students who can get their necessary books as donation. For using our system, every user must create their account by filling their personal information with a unique email address. All the personal information will be stored in their individual account and other user cannot access this information. After successfully creating an account, user can search their desired book to purchase from other user and user can post their unnecessary books information with picture for sell. There will be another option for the user in which they can donate their books to the poor students. If

119

any user wants to collect their books by donation, then he/she must agree with some terms and condition. He/she has to donate those books again to another poor student after a certain period so that other student can also be benefitted. Otherwise, he/she will be banned for taking more donation in future. This system is largely cross platform and is available to anyone using the internet. The system will be run on a cloud server with each user having a remote user interface through a web browser to interact with it.
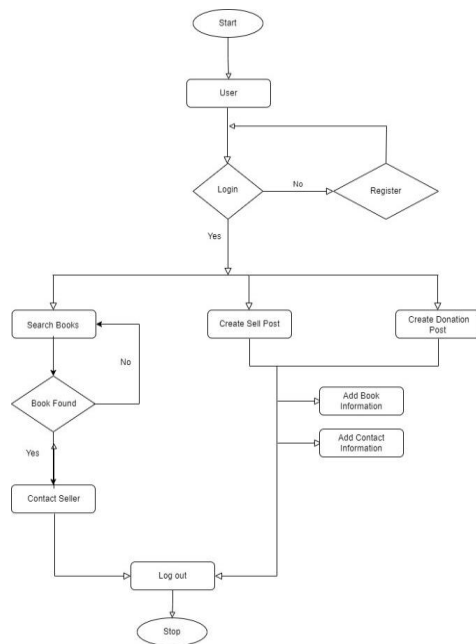

Fig. 1. Entire Workflow

II. LITERATURE REVIEW

The debut of Amazon Web Services (AWS) in 2002 was a watershed moment in the company's history as well as a substantial shift in its economic model. With the choice to make its knowledge of e-commerce software development available to its partners, Amazon transformed itself into a true ASP (Application Service Provider) in addition to its e-retailer business. Many businesses and independent developers now rely on these web services to interface directly with Amazon's platform and databases [1]. The standard web hosting [2] is easily adaptable to the cloud services supplied by AWS products with only a few changes, but the first thing to consider is whether migrating a traditional web application hosting solution to the AWS cloud is worthwhile. You'll need a suitable architecture if you decide that the cloud is the correct fit for you. This section will assist you in determining whether or not an AWS cloud solution is appropriate for your needs. It compares deploying your web application in the cloud versus installing it onpremises, shows an AWS cloud architecture for hosting your application, and covers the solution's major components. A recent analysis by some Indian students (2022) – The Online Book Store System is an easy assignment similar to purchasing cart or e-commerce however is only for e-book shopping using AWS

[3]. Another study [4] employs a self-teaching strategy that makes use of a variety of publically available resources as well as prior knowledge and experience of the topic earned from related courses. In this research, a little experiment is carried out to demonstrate how easy a static web app is written in react can be delivered over the internet utilizing AWS's 'Amplify' function. This thesis also discusses the benefits and drawbacks of cloud computing services. The findings suggest that cloud computing can be used to design and deploy sophisticated web and mobile applications, freeing up time to focus on delivering a high-quality product in a fraction of the time it takes to provide traditional products. However, the deployment of an app using AWS Amplify in my research study is merely one example of the benefits of cloud services. Other aspects of cloud computing should be investigated in the future. An article [5] analyzed the performance and cost of a web application hosted on the CC using an analytical methodology. These analytical findings are backed up or supplemented by experimental findings. The experiment was carried out on Amazon Web Services (AWS). The experimental testbed results were found to match with the analytical results on a variety of performance parameters, with a maximum inaccuracy of 0.1 percent. These two outcomes are statistically indistinguishable. According to the findings, traffic rate has a significant impact on cloud service performance, such as endto- end response time being impacted by unreasonable delays in user requests. By observing the results, it is clear that when the traffic rate grows, both computing and bandwidth expenses skyrocket. P Teregowda, B Urgaonkar [6] discusses the challenges faced by web-based digital library search engines, specifically focusing on CiteSeerx, which provides citation indexing, full text indexing, and document metadata from computer and information science documents. The paper explores the constraints and choices faced by such systems and considers the benefits of infrastructure virtualization and cloud computing. A study [7] offers a simple mobile application to connect those who want to donate their books with people who might need them. This application is called 'Bridge' because it will connect the needy with the donors, allowing them to obtain the books they desire from those who have finished using them. Faiz Abidi1 , Hasan Jamal Abidi1 , Syed Armani [8], presented Libraries face common problems related to digital data, efficiency, and high IT infrastructure costs. Collaboration between libraries is limited, leading to lower efficiency. Cloud computing can bridge this gap by enabling data sharing, reducing costs, increasing efficiency, and improving scalability. It can also enhance user experience and convert capital expenditure into operational expenditure. S.Y. Bansode and S.M. Puja. [9] presented cloud computing, its advantages and disadvantages, and explores how libraries can use this technology to improve staff productivity and services. Cloud computing is a new internet based service that allows the use of computer power from any location, providing new opportunities for organizations and businesses to save on cost and maintenance by using third-party hardware, software or platforms. Richard Chukwhu Ogbu and Ahmed Lawal [10] discusses the benefits of cloud computing and its

120

applications in e-library services in Nigeria. Cloud computing is a technology that provides access to a pool of computing resources on-demand as a service, with minimal management effort. It promotes availability of resources, creates powerful distributed computing systems with global reach and super computing capabilities. Rupesh Sanchati, Gaurav Kulkarni [11] discusses challenges faced by libraries in managing sensitive patron information in web-based digital libraries, and proposes building and managing their own data centers for greater control. It explores infrastructure virtualization and cloud computing as solutions to challenges related to growth, features, and usage, and proposes improving the user service model in university libraries with cloud computing. The paper also discusses security issues related to data location, mobility, and availability. Some of the systems established for 'A Crowd-Sourcing Mobile Platform For Textbook Selling And Swap Using Information Retrieval' [12] have been developed to undertake book recycling, allowing students to exchange or acquire books they require. In general, there are two types of platforms: websites specifically intended for bookselling and recycling, and chatting platforms that allow students to create a group chat and share information about their books while looking for a buyer. E-Follett and WeChat are two examples of common platforms discussed. A project [13] encourages all those who aid and support citizens in charities by donating to the donation machine, which is designed to sense, send a message, capture a photo, and post a message on social networking sites. This project automates the process in a real-time context. A study [14] deconstructs task–technology fit into two segments: ideal task–technology fit and individual use context– technology fit, in an effort to assist firms in better understanding consumers. Survey methodology is used to acquire user experience data linked to the use of cloud-based bookshops. Two scalability metric functions have been proposed in a recent study [15]. The resource scalability meter function describes the relationship between the multi-tier cloud software service's capacity and its use of cloud resources, whereas the cost scalability metric function substitutes cost for cloud resources. They use the Cloud-Store program to validate their information. Cloud Store, which represents an online bookstore, follows the TPC-W specification. They tested two private OpenStack deployments and 21 different public Amazon Web Service (AWS) configurations. A new methodology for evaluating the costs and benefits of deploying web-based applications in the cloud is developed in this [16] research. Traditional performance models and indexes linked to system resource utilization have been rewritten to include new measures that are valuable to business management. Furthermore, a case study of a typical e-commerce scenario has been used to demonstrate the proposed methodology.

III. OVERALL DESCRIPTION

A. Product Perspective This project is basically a second-hand online book market where anyone can get their necessary books at a cheap rate, and they can also sell their redundant books so that other reader can use this. The most prominent feature of this project is that user can help the

poor students by donating their books. It will be very beneficial for those students who cannot buy books for their academic purpose.

B. User Classes and Characteristics
" Online Library" has basically 2 types of users.
- Seller
a. can act as a seller
b. can also act as a donor
- Buyer
a. can purchase books as a customer
b. can also collect books through donation.

C. Product Functions" Online Library" stores all the books from sellers or donors and displays on the website so that customers can contact the sellers or donors to collect necessary books.
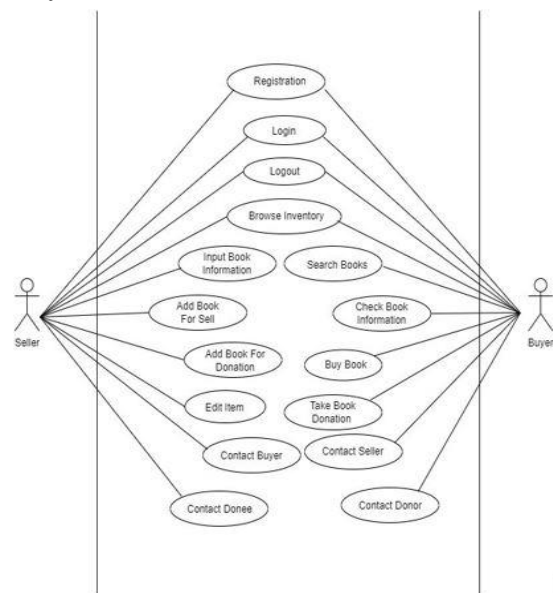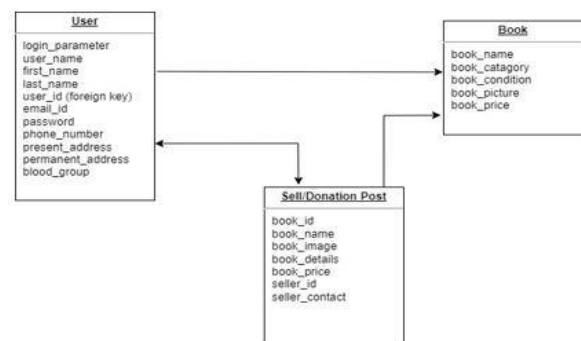

Fig. 2. Use-case diagram

Fig. 3. Data Flow Diagram

Before using the main function of the website, users have to be registered. All users have - login parameter, user name, first name, last name, user id, email, phone number, present address, permanent address, blood group, and password hese are the information that contains all the necessary information about user.

All the books uploaded by seller will contain book name, book category, book condition, book picture and book price information.

Each sell or donation post has some data - book id, book name, book image, book details, book price, seller id, seller contact

These are the information that contains sell or donation post details.

D. Operating Environment The web application will be operating in any browsers like

    a. Microsoft Edge,
    b. Google Chrome,
    c. Mozilla Firefox,
    d. Tor and
    e. Safari, etc.

E. Design
User activities are 3 types -

- Registration Process
- Searching Book Process
- Create Sell/Donation Post

Users will first fill up his/her profile information. After this, he/she needs to go through the g-mail verification process.

Fig. 4. Registration Process

Users will login to the website. They will input keywords for searching in search box and they can filter the search results by various categories. Then the users can find their desired books if those are in the website.

Fig. 5. Searching Book Process

Users will login to the system. Then they will put book details. Users must put their contact information; otherwise customers can not be able to contact them. After that they can post it for selling or donation.

Fig. 6. Create Sell/Donation Post

IV. SYSTEM FEATURES

" Online Library" is a online platform for selling, donat- ing and buying used books. So the main art of this website is to buy used books at a cheap rate or poor students can collect books by taking donation.

A. Description and Priority" Online Library" has some main features and also some sub features. All the features with descriptions of this project is given below:

1) Searching Books: This feature is being operated by any user. With this feature, they can search the books which they want to purchase.

2) Creating Sell Post: This is done by the users who want to sell books. They can post the books details with price and picture here for selling.

3) Creating Donation Post: This is done by the users who want to donate their books. For donating, they can post the books details here with pictures.

4) Payment: The buyers can buy books by contacting with the sellers. And the whole payment procedure will be decided by them. They can choose any online transactions or cash payment according to their priority.

B. Functional Requirements The" Online Library" is built on Javascript, React and AWS Amplify.

Back-End - JavaScript

Front-End - React, Material UI Development Tool- Visual Studio Code

Cloud Service - AWS Amplify, AWS Appsync, AWS CLI Cloud

Authentication- AWS Cognito

Cloud Database Storage- Aws DynamoDB, AWS S3.

V. METHODOLOGY

The proposed methodology is to develop an web application so that book donors, or those who have books at home that they no longer need or use, may easily connect with those who are in need of books but do not have them and/or cannot purchase them. The following are the application's various features:
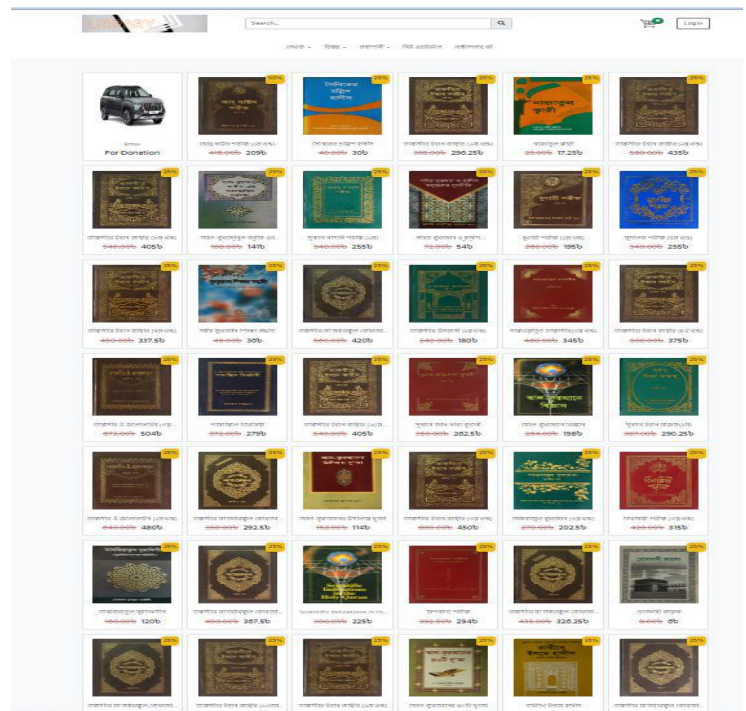

Fig. 7. Home screen of the web
Application

A. Registration If someone is new to the website and uses it, he or she must register on the website. For this, they have to provide their information and sign up.
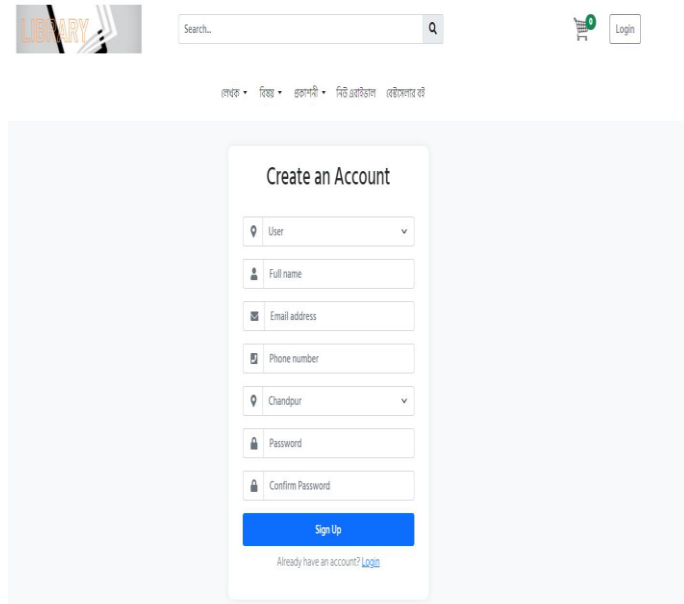

Fig. 8. User registration form

B. Login After signing up users can log in to the system using their provided mail address and password.
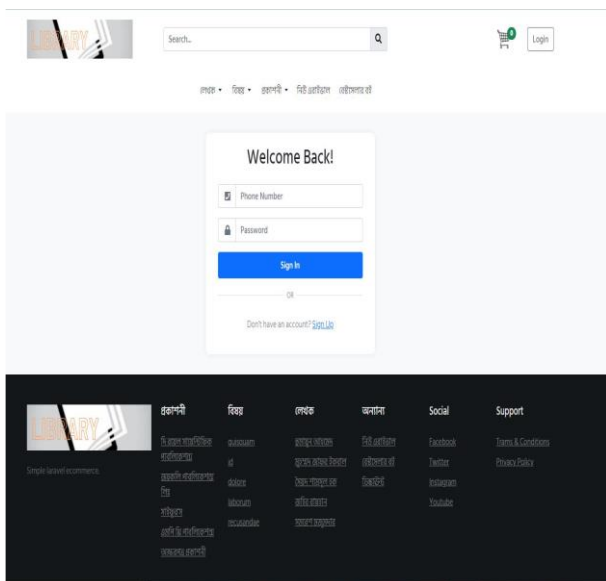

Fig. 9. User Login form

C. Option Menu an options menu is provided on the top of the pages which includes login/logout, home, post ad and all ads posted.

D. Donate or Sell a Book People who want to sell or donate their books, click on the button 'Post Ad'. After that they get a form to put information about the book, for example – book name, author name, book condition, book image and price (if it is for sell) and post ad for sell or donation.

E. Find Donors or Sellers When someone is looking for a book, they can click on the top of the page 'All Ads' and check which books are available.
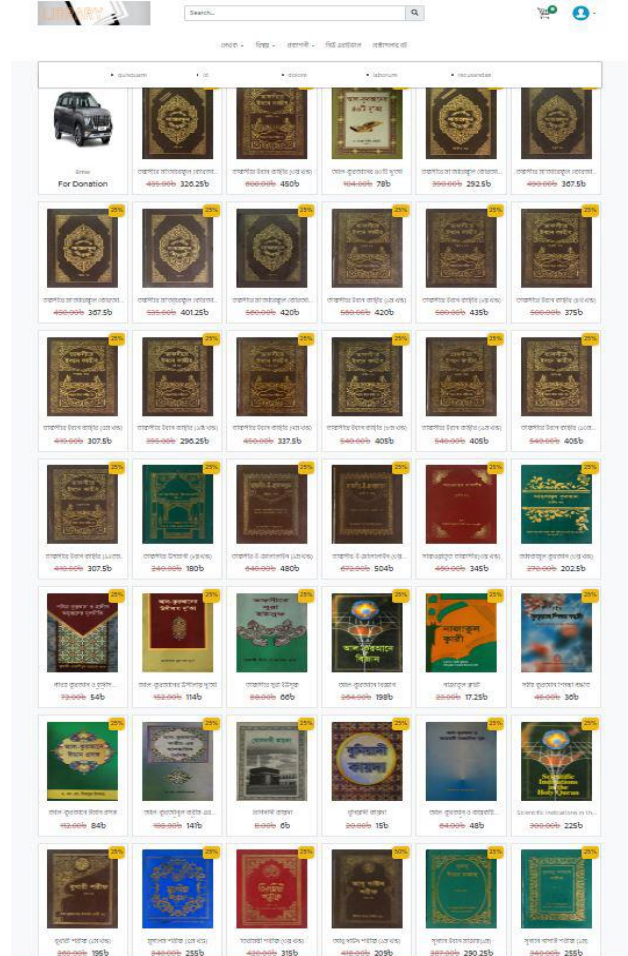

Fig. 10. Posting ad for sell/donate Books

Information such as name, address, and contact number along with all the book information. If the users want to buy or want a donation of a book, they can use the contact number of the donors/sellers and communicate with them.
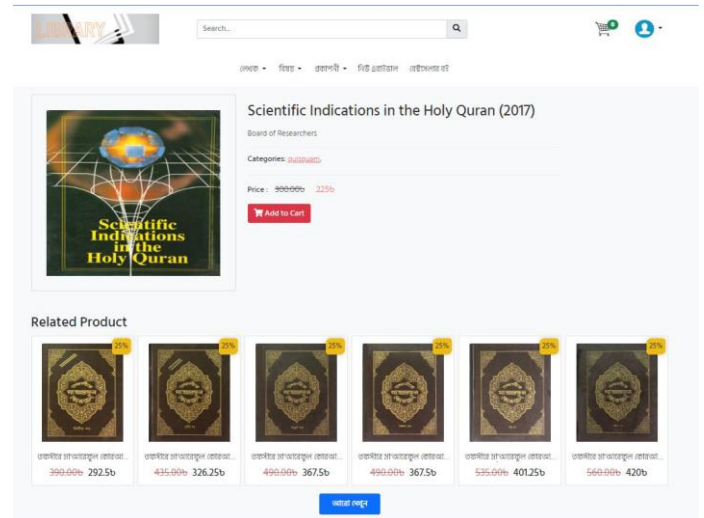

Fig. 11. Book information page

123

F. Easy to Use User Interface Online Library was designed with a user interface that is simple to use, bearing in mind that it would be utilized by individuals of diverse ages.

VI. DISCUSSION AND FUTURE WORK

This website," Online Library," can be extremely beneficial to a big number of people. It will help people to buy their necessary books at a low cost and sell or donate their surplus books so that others can benefit from them. The program has a broader utility because it was built with all age groups and kinds of people in mind. The main features of this website are users can post book sell or donation ad and anyone registered on the website can search their desired books and make a purchase or take a donation. The interface of the website is very simple so that anyone can use it. The future goal is to improvise the interface, increase functionality, and make it more user-friendly. We will ensure its security stronger. Also, the users who will donate more, the website will give them reward points to their accounts.

VII. CONCLUSION

The" Online Library" connects people who have books they no longer need with people who are in need of these books. It is quite simple to register to donate, sell, buy and take book donations. It's simple to contact folks who want to donate and buy. It will enable people to take books out of their homes that they are not using and donate or buy them for someone who genuinely needs them. According to the research, this is the first book online website, and it has the potential to be a game-changer, especially in a country like Bangladesh. Both buyers and sellers benefit from online libraries, buyers can easily buy books and sellers can easily sell books. As a result, both the buyer and the buyer save time and money.

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