A
Summer Internship Report
On
“Cashbook Website Using ASP.NET CORE MVC”

(IT346 – Summer Internship - I)

Prepared by

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Under the Supervision of

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Accredited with Grade A+ by NAAC
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August, 2023

CHARUSAT
CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

Accredited with Grade A by NAAC
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CERTIFICATE

This is to certify that the report entitled **"Cashbook Website Using ASP.NET CORE MVC"** is a bonafied work carried out by **Janak K Makadia (22IT067)** under the guidance and supervision of **Prof. Hemant Yaadav** & **Mr. Nikunj Sobhashana** for the subject **Summer Internship – I (IT346)** of **5th Semester** of Bachelor of Technology in **Department of Information** at Chandubhai S. Patel Institute of Technology (CSPIT), Faculty of Technology & Engineering (FTE) – CHARUSAT, Gujarat.

To the best of my knowledge and belief, this work embodies the work of candidate himself, has duly been completed, and fulfills the requirement of the ordinance relating to the B.Tech. Degree of the University and is up to the standard in respect of content, presentation and language for being referred by the examiner(s).

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The ThreeWeb
SOLUTION

Date: 02/07/2024

Internship Completion Certificate

To,

Janak Makadia

This is an Internship Completion Certificate for **Mr. Janak Makadia**, a student of B.Tech (IT) of Charusat University (CSPIT).

We state on record that Janak has successfully completed an **Offline Internship** in the role of **ASP.Net Core Intern** at **The Three Web Solution** from **20th May, 2024 to 2nd July 2024 (6 Weeks).**

Janak was an excellent intern who worked on various projects with us. He surpassed our expectations and delivered successful results.

He was dedicated, skilled, and goal-oriented throughout his tenure. He also had a warm, cheerful, and cooperative attitude that make him a great team player. We are grateful for his contribution and wish him all the best in his future endeavors.

Best Regards,

Team
The Three Web Solution

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to my college, **Chandubhai S. Patel Institute of Technology (CSPIT)**, **CHARUSAT** for providing me with the opportunity to undertake this internship. Special thanks to my internship supervisor, **Mr. Nikunj Sobhashana**, at **The Threeweb Solutions** for their invaluable guidance, support, and mentorship throughout the duration of the project. Your insights and advice were crucial in the successful completion of my work.

I am also thankful to my colleagues at The Threeweb Solutions for their cooperation and assistance, which greatly enhanced my learning experience. Additionally, I extend my appreciation to my academic advisor, Prof. Hemant Yadav, for their constant encouragement and constructive feedback.

Finally, I am profoundly grateful to my family and friends for their unwavering support and understanding during this period. Their encouragement has been a source of motivation and strength for me.

ABSTRACT

The purpose of this internship was to develop a comprehensive cashbook application aimed at helping users efficiently manage their financial transactions. The scope of the project included designing a user-friendly interface, ensuring secure user authentication, and implementing robust functionalities for managing books and transaction records.

The core of the application involves several key features:

1. **User Authentication**: A secure login/signup system authenticated via SMTP, ensuring that user accounts are protected.
2. **Main Dashboard**: A central hub that includes a navigation bar with a profile view option, and a books page displaying various lists of books. The dashboard provides options for CRUD (Create, Read, Update, Delete) operations on books.
3. **Transaction Records**: Each book links to a records page where users can add and manage transaction records, perform CRUD operations, and view total cash in, cash out, and net balance. The application supports categorization of cash inflows and outflows.
4. **Dynamic Searching and Sorting**: Enhanced user experience through dynamic searching of books and sorting options to organize books based on different criteria.

All data is persistently stored in a database, ensuring that user inputs and modifications are reliably saved and retrievable.

The actual work involved the complete lifecycle of software development: requirement analysis, design, implementation, testing, and deployment. Key technologies and tools utilized included modern web development frameworks like ASP.NET CORE MVC, databases for data storage like SQL, and SMTP protocols for authentication.

The conclusion of the internship underscored the successful creation of a functional and reliable cashbook application. The project not only achieved its objectives but also provided valuable insights into real-world application development, user experience design, and secure authentication practices. This internship has significantly enhanced my skills in software development and project management, laying a solid foundation for future professional endeavours.

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DESCRIPTION OF COMPANY

Company Overview: The Threeweb Solutions is a startup firm specializing in IT industry. The company is renowned for its innovative solutions and commitment to excellence, catering to a diverse clientele ranging from small businesses to large enterprises.

Work Type: The company primarily focuses on Software Development, offering a range of products and services designed to meet the evolving needs of its customers. The firm's dedication to quality and innovation has positioned it as a trusted partner in the industry.

Administrative Structure: The Threeweb Solutions operates with a well-defined administrative structure that supports efficient decision-making and streamlined operations. The organizational hierarchy is as follows:

- **CEO**: Leading the strategic vision and overall management.
- **Executive Team**: Comprising the key executives who oversee various departments.
- **Department Heads**: Managing specific functional areas such as Marketing, Sales, Research and Development, and Human Resources.
- **Team Leads and Managers**: Overseeing day-to-day operations and guiding project teams.

Number of Employees: The company employs approximately 15 individuals, including professionals with diverse expertise and backgrounds. This workforce is instrumental in driving the company's growth and maintaining its competitive edge.

Location and Spread: The Threeweb Solutions is headquartered in Ahmedabad, India, with no additional offices. This geographical spread enables the company to serve a wide range of markets and customers effectively.

Division of the Company: The company is divided into several key divisions, each focusing on a specific aspect of the business:

- **Product Development**: Innovating and enhancing the company's offerings.
- **Sales and Marketing**: Promoting products and services to target markets.
- **Research and Development**: Focusing on new technologies and product improvements.

Group and Division: During my internship, I was part of the .NET Team within the Software Development Team. This group was responsible for developing and maintaining the company's software solutions made with .NET Framework, with a particular focus on creating user-friendly and secure applications.

Administrative Tree: The administrative structure within my group was as follows:

- **Group Manager**: Leading the team and coordinating with other departments.
- **Developers and Engineers**: Implementing the technical aspects of projects.

- **Interns**: Assisting with various tasks and learning from experienced team members.

Main Functions of the Company The primary functions of the company include:

- **Product Innovation**: Continuously developing new products and services to meet market demands.
- **Market Expansion**: Increasing market share through strategic marketing and sales efforts.
- **Customer Engagement**: Building strong relationships with customers to understand and fulfil their needs.
- **Operational Efficiency**: Streamlining processes to enhance productivity and reduce costs.

Customer Profile and Market Share The company serves a diverse customer base, including:

- **Small to Medium Enterprises (SMEs)**: Providing tailored solutions to help them grow and succeed.
- **Large Corporations**: Offering scalable and robust products that meet complex requirements.
- **Individual Consumers**: Delivering user-friendly and reliable services for personal use.

The Threeweb Solutions holds a significant market share in IT industry, owing to its strong reputation, high-quality products, and exceptional customer service. The company’s strategic approach and commitment to innovation continue to drive its success and industry leadership.

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Managing financial transactions efficiently is a critical task for both individuals and businesses. Traditional methods, such as maintaining physical ledgers or using basic spreadsheet software, often lead to errors, inefficiencies, and a lack of real-time updates. In today's digital age, there is a growing need for robust financial management solutions that offer ease of use, security, and comprehensive functionality.

The objective of this project was to develop a cashbook application designed to streamline the management of financial transactions. This application provides users with a modern, user-friendly interface, secure authentication methods, and powerful tools for tracking and analysing their financial activities.

1.2 PURPOSE AND OBJECTIVES

The primary purpose of the internship project was to create a functional and reliable cashbook application that addresses the shortcomings of traditional financial management methods. The specific objectives included:

- **Developing a Secure Authentication System**: Implementing a login and signup feature authenticated via SMTP to ensure user security.
- **Designing an Intuitive User Interface**: Creating a main dashboard that allows easy navigation and access to various features.
- **Implementing CRUD Operations**: Enabling users to create, read, update, and delete books and transaction records.
- **Providing Financial Summaries**: Displaying total cash in, cash out, and net balance to give users a clear overview of their financial status.
- **Enhancing User Experience**: Adding dynamic search and sorting functionalities to facilitate easy access to information.

1.3 SCOPE OF THE PROJECT

The scope of the project encompassed the full development lifecycle of the cashbook application, including:

- **Requirement Analysis**: Identifying the needs and expectations of potential users.
- **Design**: Creating a user-friendly interface and defining the application's architecture.
- **Development**: Coding the application using appropriate technologies and frameworks.
- **Testing**: Ensuring the application functions correctly and securely.
- **Deployment**: Making the application available for users.

1.4 METHODOLOGY

The development process followed an iterative approach, allowing for continuous feedback and improvements. Key methodologies included:

- **Agile Development**: Iterative development cycles with regular reviews and updates.
- **User-Centered Design**: Focusing on the needs and experiences of users to guide design decisions.
- **Secure Coding Practices**: Implementing best practices to ensure data protection and application security.

1.5 SIGNIFICANCE OF THE PROJECT

The cashbook application offers significant benefits, including:

- **Increased Efficiency**: Streamlining the process of managing financial transactions.
- **Enhanced Security**: Protecting user data with secure authentication methods.
- **Improved Accuracy**: Reducing errors associated with manual financial management.
- **Better Financial Insights**: Providing users with comprehensive summaries of their financial activities.

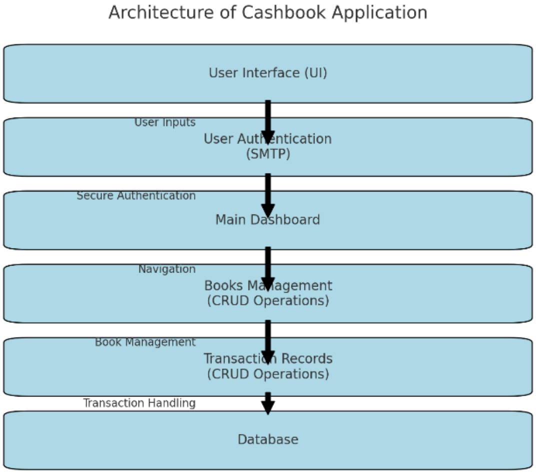
1.6 STRUCTURE OF THE REPORT

The report is organized into several chapters, each detailing a specific aspect of the project:

- **Chapter 1: Introduction**: Overview of the project, including background, objectives, scope, methodology, significance, and report structure.
- **Chapter 2: User Authentication System**: Detailed explanation of the login/signup feature and security measures.
- **Chapter 3: Main Dashboard and Books Page**: Description of the dashboard, profile view, and CRUD operations on books.
- **Chapter 4: Transaction Records Management**: Overview of the transaction records page, CRUD operations, and financial summaries.
- **Chapter 5: Additional Functionalities**: Discussion on dynamic searching and sorting features.
- **Chapter 6: Database Management**: Insights into data storage and retrieval processes.
- **Chapter 7: Challenges and Solutions**: Analysis of challenges faced and solutions implemented during the project.
- **Chapter 8: Conclusion**: Summary of key achievements and suggestions for future work.

1.7 FIGURES

Fig 1.1: The architecture of the cashbook application.


Architecture of Cashbook Application
User Interface (UI)
User Inputs
User Authentication (SMTP)
Secure Authentication
Main Dashboard
Navigation
Books Management (CRUD Operations)
Book Management
Transaction Records (CRUD Operations)
Transaction Handling
Database

Chapter Summary

By following this structured approach, the report aims to provide a comprehensive and detailed account of the cashbook application development project, highlighting its significance, methodology, and outcomes.

CHAPTER 2: USER AUTHENTICATION SYSTEM

2.1 LOGIN/SIGNUP PAGE DEVELOPMENT USING SMTP

2.1.1 Login Page

The login page serves as the gateway for users to access the application securely. It prompts users to enter their registered email address or Username (Any 1 or both) and password. Upon submission, the application verifies these credentials against stored records in the database. Successful authentication grants users access to their personalized dashboard and features.

Implementation Details:

- **Validation:** User input undergoes validation checks to ensure completeness and correctness. This includes verifying that the email format is valid and that the password meets specified security criteria.
- **Error Handling:** Clear error messages are displayed for incorrect credentials or other login issues, aiding users in troubleshooting their login attempts.
- **Remember Me Option:** Optionally, a "Remember Me" feature can be implemented using secure cookies, allowing users to stay logged in across sessions without needing to re-enter credentials frequently.

2.1.2 SignUp Page

The SignUp page facilitates new user registration by collecting essential information such as Full Name, Username, E-mail, Password, Confirm Password and possibly additional details required by the application. Upon submission, the system validates the entered information for uniqueness and correctness before proceeding with account creation.

Integration with SMTP for Email Verification:

- **Email Confirmation:** After a user completes the SignUp form, the application sends a verification email to the provided address using SMTP. This email contains a unique verification link that the user must click to confirm their email address and activate their account.
- **Confirmation Handling:** Upon clicking the verification link, the application verifies the authenticity of the request and activates the user's account, allowing them to log in and access the application's features.

2.2 SMTP INTEGRATION FOR EMAIL VERIFICATION

Integrating SMTP for email verification enhances the security and reliability of user registrations. By leveraging SMTP services, the application ensures that:

- **Email Validity:** Users provide legitimate email addresses during registration, reducing the risk of fake accounts or spam registrations.
- **User Engagement:** The verification process encourages user engagement by confirming their intent to register and validating their contact information.
- **Security Measures:** By sending verification links via email, the application confirms that users have access to the email address they provided, adding an extra layer of security before granting access to sensitive application functionalities.

2.3 SECURITY MEASURES ENSURING SECURE AUTHENTICATION

2.3.1 Password Hashing

Passwords entered by users are hashed using strong, one-way cryptographic algorithms like bcrypt or Argon2 before being stored in the database. Hashing transforms plain-text passwords into irreversible strings of characters, ensuring that even if the database is compromised, passwords cannot be deciphered.

Benefits of Password Hashing:

- **Protection Against Attacks:** Hashed passwords are resistant to brute-force attacks and password cracking techniques.
- **Data Privacy:** User passwords remain confidential, as only the hashed versions are stored in the database.
- **Salting:** Adding a unique salt to each password before hashing further strengthens security by preventing identical passwords from producing the same hash.

2.3.2 Secure Session Management

Secure session management protocols safeguard user sessions from unauthorized access and potential exploits. Key practices include:

- **HTTP-Only Cookies:** Cookies used for session management are configured with the HTTP-Only attribute, preventing client-side scripts from accessing them. This minimizes the risk of cross-site scripting (XSS) attacks.
- **CSRF Protection:** Cross-Site Request Forgery (CSRF) tokens are generated and validated with each user request to prevent unauthorized actions initiated by forged requests.
- **Session Expiry:** Sessions are automatically terminated after a predefined period of inactivity or upon explicit user logout, reducing the window of opportunity for session hijacking.

2.3.3 SSL/TLS Encryption

SSL/TLS encryption protocols are employed to secure data transmitted between users' devices (browsers) and the application's servers. This encryption:

- **Data Confidentiality:** Ensures that sensitive information, including login credentials and session tokens, remains private and inaccessible to unauthorized parties.
- **Data Integrity:** Verifies that data transmitted between the client and server remains unchanged and authentic during transit, guarding against tampering or interception.

2.4 FIGURE: SCREENSHOTS OF LOGIN/SIGNUP PAGES

Figure 2.1: Login Page

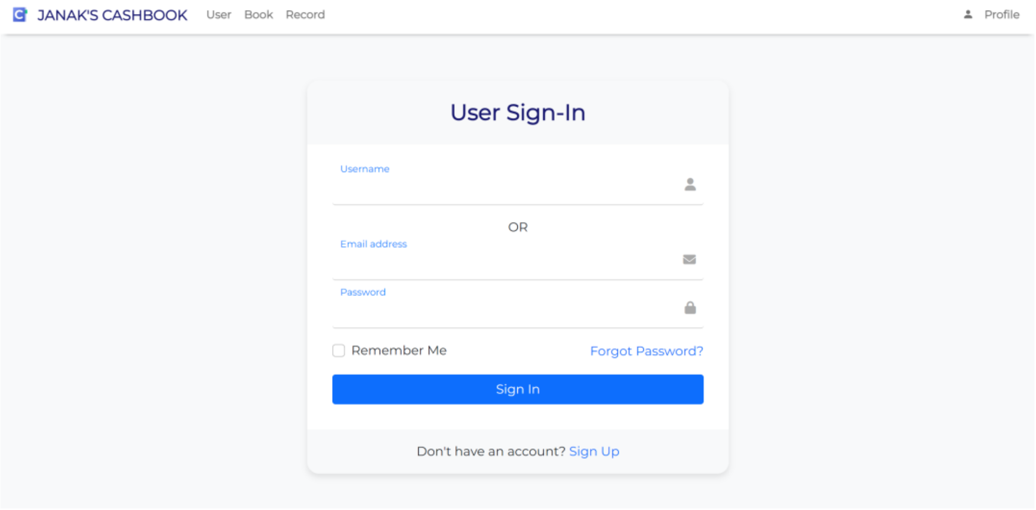
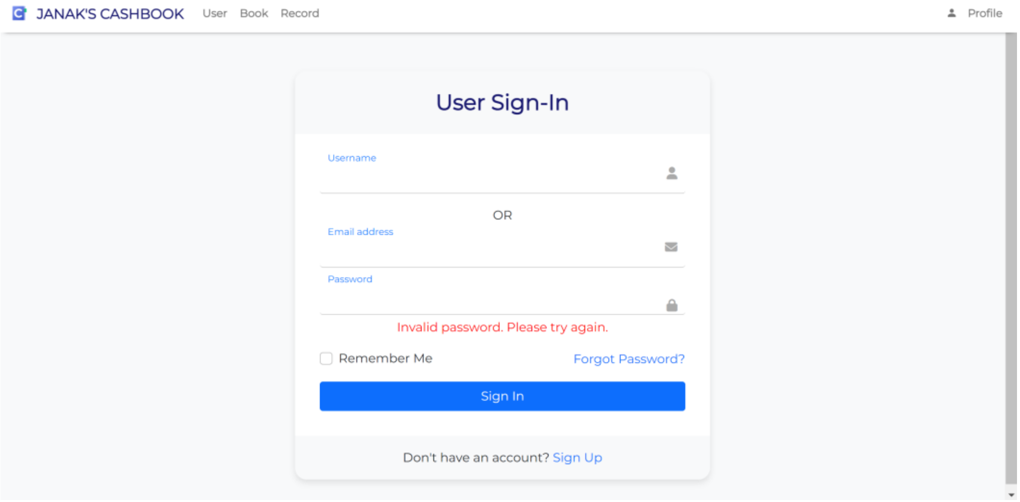
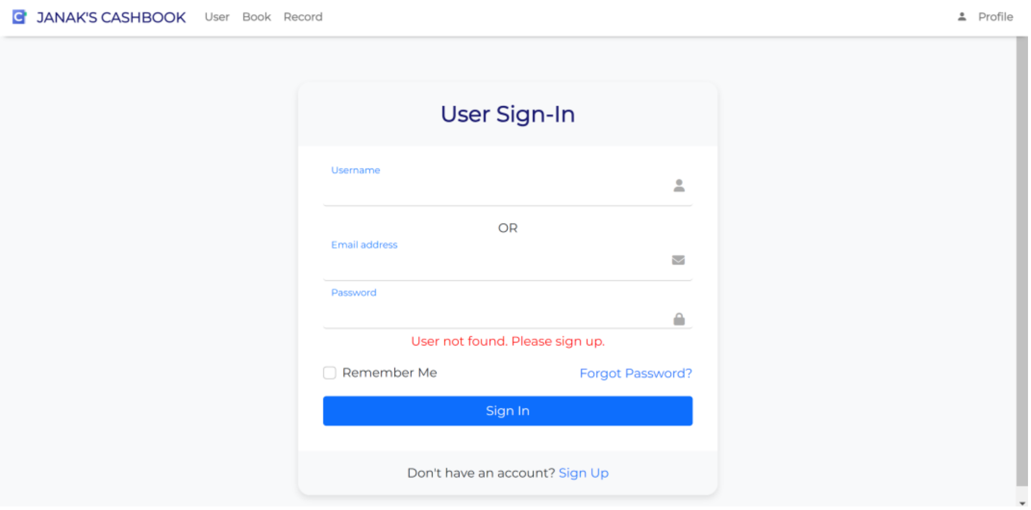


Fig 2.1.1 Layout Structure of SignIn page



Invalid password. Please try again.

Fig. 2.1.2 Invalid Password Attempt



User not found. Please sign up.

Fig. 2.1.3 Invalid User Attempt by entering wrong Username/ Email

Figure 2.2: SignUp Page with Email Verification

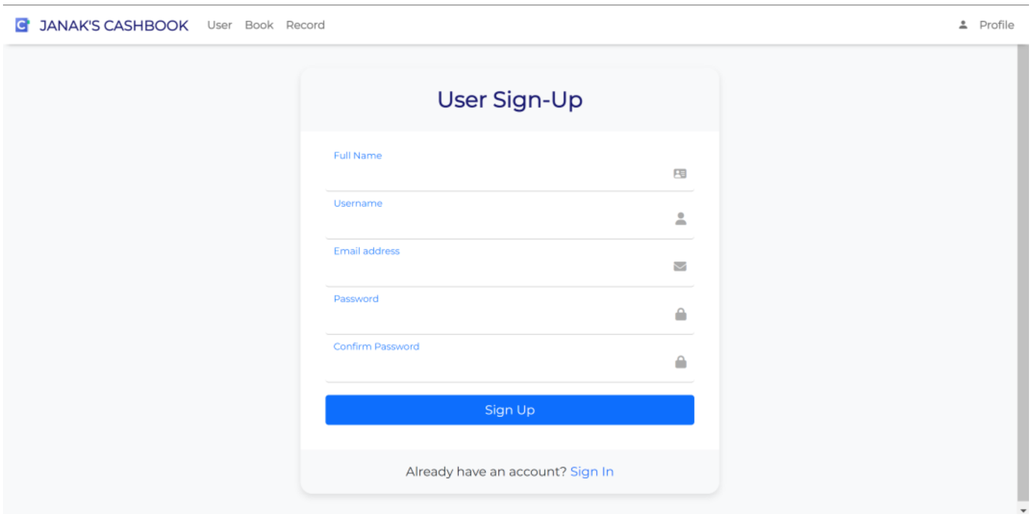
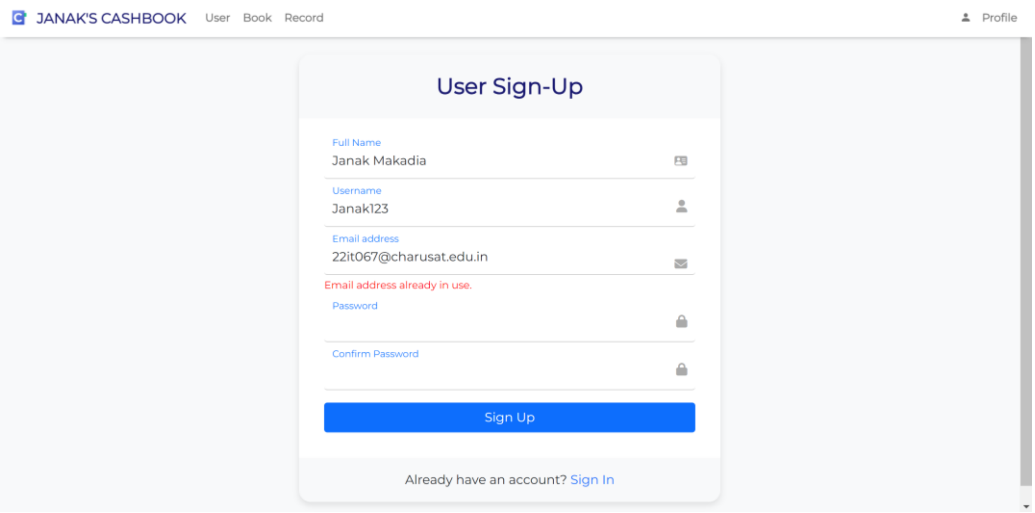


Fig 2.2.1 Layout Structure of SignUp page



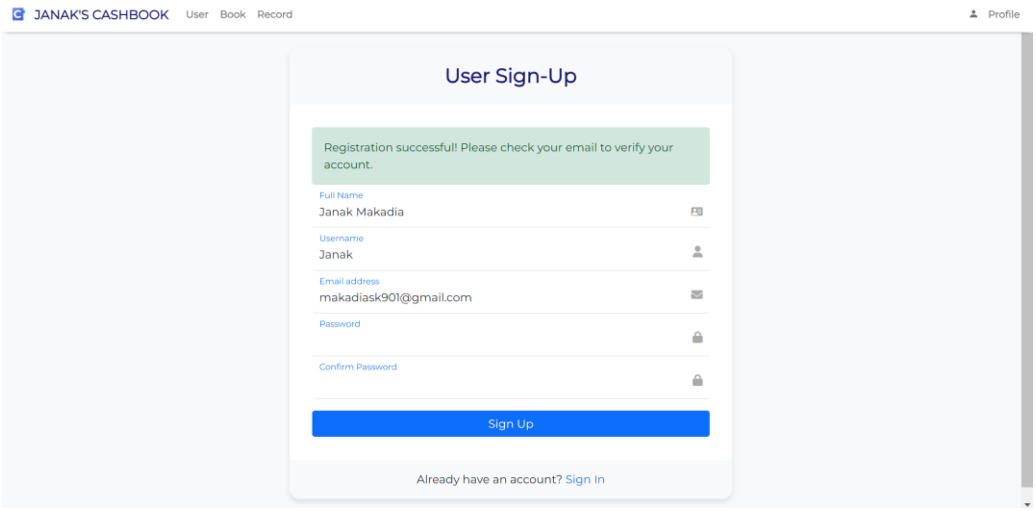
Full Name: Janak Makadia

Username: Janak123

Email address: 22it067@charusat.edu.in

Email address already in use.

Fig 2.2.2 Existing user SignUp attempt



User Sign-Up

Registration successful! Please check your email to verify your account.

Full Name
Janak Makadia

Username
Janak

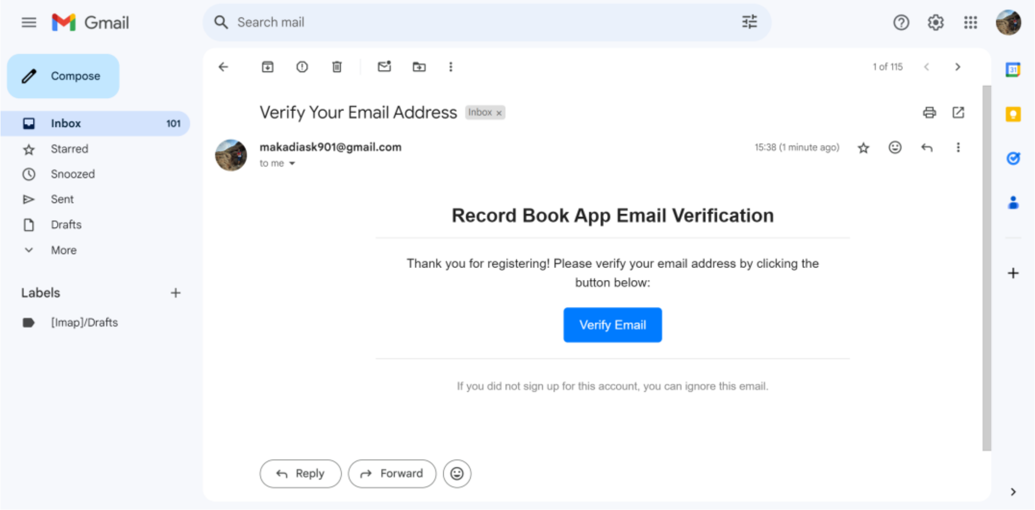
Email address
makadiask901@gmail.com

Password

Confirm Password

Already have an account? Sign In

Fig. 2.2.3 Successful User SignUp



Verify Your Email Address

makadiask901@gmail.com
to me

15:38 (1 minute ago)

Record Book App Email Verification

Thank you for registering! Please verify your email address by clicking the button below:

If you did not sign up for this account, you can ignore this email.

Fig 2.2.4 Mail received in Gmail Account

Chapter Summary

This detailed chapter explores the comprehensive development of the user authentication system using SMTP integration, emphasizing robust security measures such as password hashing, secure session management, optional two-factor authentication, and SSL/TLS encryption. These practices collectively ensure user data protection and mitigate risks associated with unauthorized access and data breaches.

CHAPTER 3: MAIN DASHBOARD & BOOKS PAGE

3.1 NAVBAR AND PROFILE VIEW IMPLEMENTATION

3.1.1 Navigation Bar

The navigation bar serves as the primary interface element for navigating within the application. It typically includes links to essential sections such as:

- **Home:** Directs users to the main dashboard or landing page upon login.
- **Books:** Provides access to the Books page, where users can view, add, edit, and delete books from their collection.
- **Records:** Links to the Transactions page for managing financial records and transactions.
- **Profile:** Offers access to user settings, account information, and options for customization.

Implementation Details:

- **Responsive Design:** The navigation bar is designed to be responsive, adapting to different screen sizes and devices for optimal user experience.
- **Accessibility:** Ensures navigation elements are accessible to all users, including keyboard navigation and screen reader compatibility.

3.1.2 Profile View Feature

The profile view feature allows users to manage their personal information and account settings within the application. This includes:

- **User Information:** Displaying user details such as name, email address, profile picture, and any other relevant information with facility to delete account also.
- **Settings:** Providing options for users to update their password, email address, notification preferences, and other account settings.
- **Logout:** Enabling users to securely log out of their accounts to protect against unauthorized access.

Security Considerations:

- **Authorization Checks:** Ensuring that only authenticated users can access and modify their profile information.
- **Data Privacy:** Implementing measures to protect sensitive user data, such as using encrypted connections (SSL/TLS) and securely storing credentials and personal information.

3.2 BOOKS PAGE: DISPLAY AND MANAGEMENT

3.2.1 Book List Display

The Books page displays a comprehensive list of books stored in the application's database. Key features include:

- **Pagination:** Efficiently manages large datasets by displaying a limited number of books per page, with navigation controls for easy browsing.
- **Search Functionality:** Allows users to search for specific books by name enhancing usability and accessibility.
- **Sorting Options:** Provides users with the ability to sort books alphabetically, by created date, or by other relevant attributes for better organization and retrieval.

3.3 CRUD OPERATIONS ON BOOKS

3.3.1 Create Book

Users can add new books to their collection through a straightforward form interface. Required fields typically include:

- **Book Name:** Users enter the title of the book they wish to add.
- **Optional Fields:** Additional details such as author, genre, ISBN, and description may also be included to enrich the book's metadata.

Automatic Creation from Suggested List:

- Users can also streamline the book creation process by selecting from a suggested list of books available in the application's database. This feature simplifies data entry and ensures consistency in book details.

Validation:

- Before submission, the form validates mandatory fields to ensure they are filled correctly. This validation process maintains data integrity and prevents incomplete or erroneous entries from being processed.

3.3.2 Read Book

The Read operation allows users to:

- **View Detailed Information:** Users can access comprehensive details about each book stored in the application, including metadata like author, genre, publication date, and any associated notes or comments.
- **Quick Reference:** This feature enables users to quickly reference and review book details within the application, facilitating efficient management of their book collection.

3.3.3 Update Book

Users can modify existing book details, focusing on updating the book's name or other metadata:

- **Real-Time Updates:** Changes made by users are immediately reflected in the database and displayed on the Books page.
- **Concurrency Control:** To maintain data consistency, the application implements concurrency control mechanisms. These mechanisms prevent conflicts that may arise when multiple users attempt to update the same book simultaneously.

3.3.4 Delete Book

Users have the option to remove books from their collection:

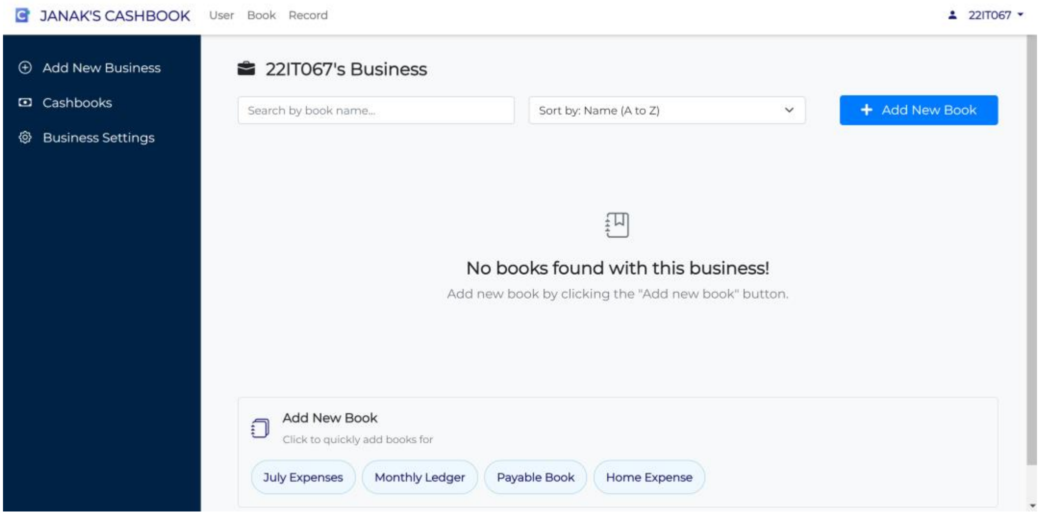
- **Confirmation Prompt:** Before deletion, users are prompted to confirm their action. This confirmation step helps prevent accidental removal of valuable data.
- **Verification Requirement:** Users must correctly enter the book's name as an additional confirmation measure, ensuring deliberate deletion.

3.3.5 Toastr Notification:

- **Notification Feedback:** Upon successful completion of CRUD operations (Create, Read, Update, Delete), Toastr notifications are displayed. These notifications provide immediate feedback to users, confirming the outcome of their actions (e.g., "Book created successfully", "Book updated", "Book deleted").

3.4 FIGURES: SCREENSHOT OF PROFILE AND DASHBOARD

Figure 3.1: Dashboard or Books Page

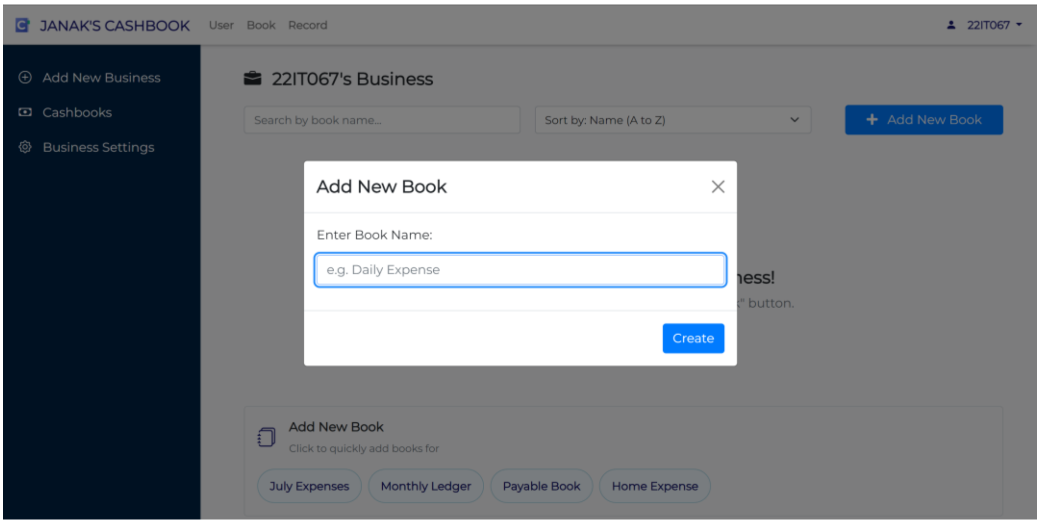


No books found with this business!

Add new book by clicking the "Add new book" button.

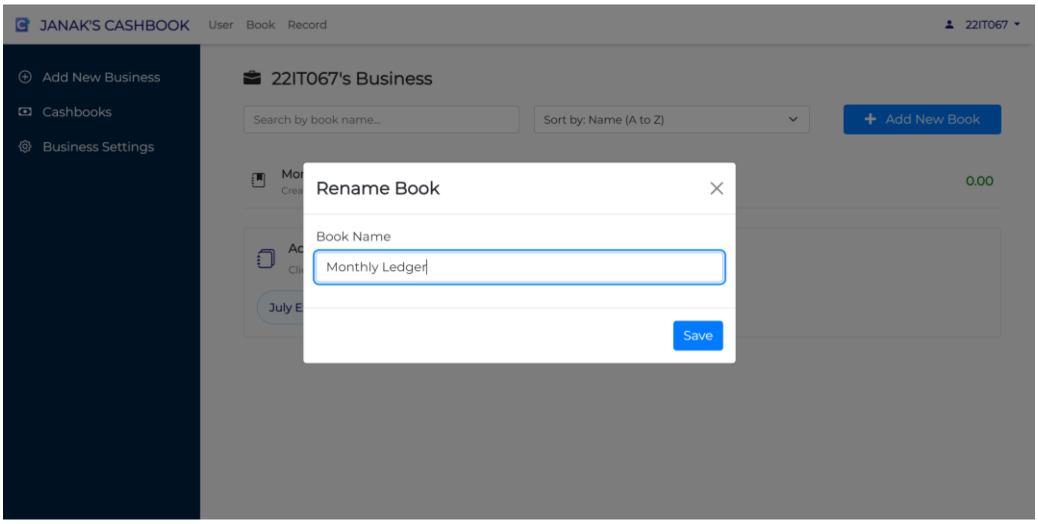
Click to quickly add books for

Figure 3.2: Performing CRUD operations



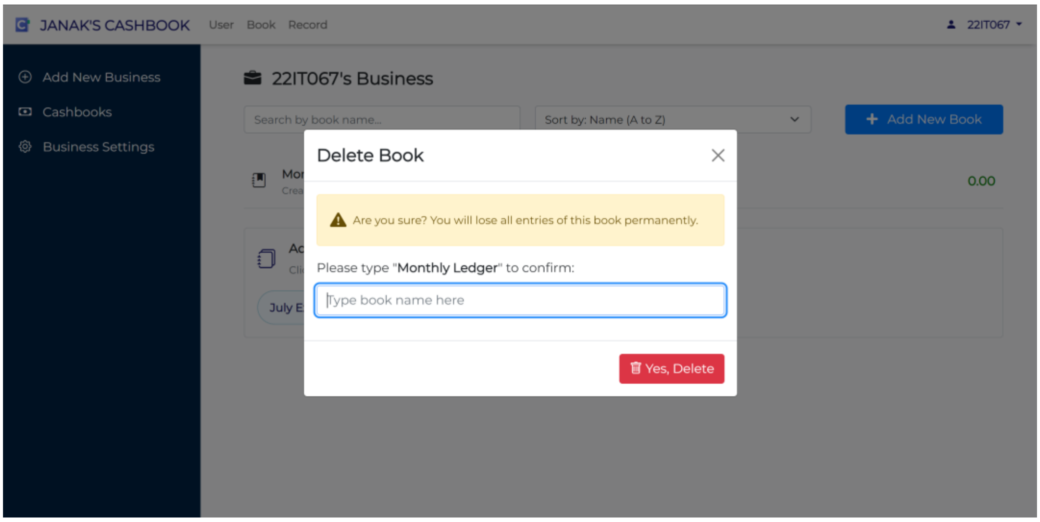
Enter Book Name: e.g. Daily Expense

Fig. 3.2.1 Add new book operation



Book Name: Monthly Ledger

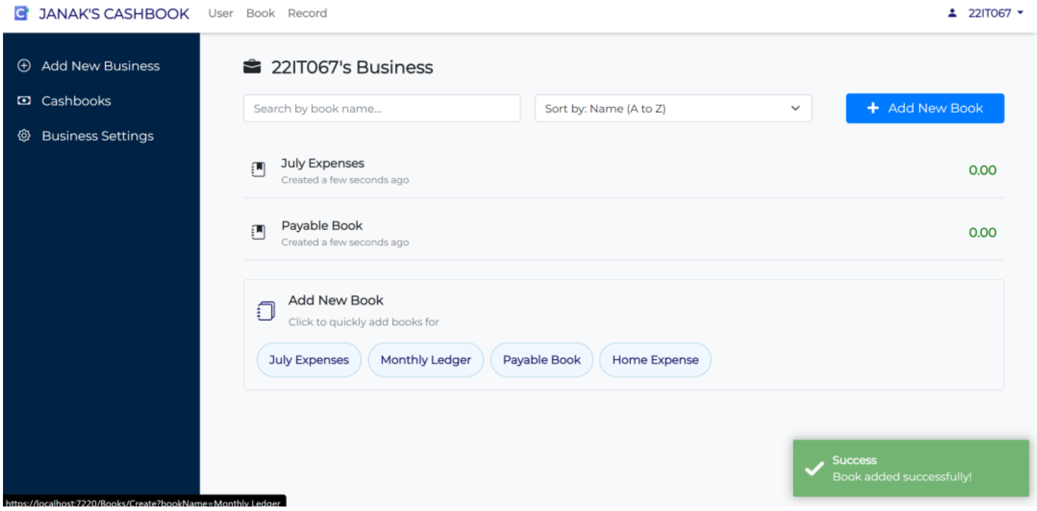
Fig. 3.2.2 Rename/Edit book operation



⚠ Are you sure? You will lose all entries of this book permanently.

Please type "**Monthly Ledger**" to confirm: Type book name here

Fig. 3.2.3 Delete book operation



Success
Book added successfully!

Fig 3.2.4 Toastr Notifications for CRUD operations

Chapter Summary

This chapter extensively covers the implementation of the main dashboard and Books page within the Cashbook application. It emphasizes user-friendly navigation, robust management of book data through CRUD operations, and secure user profile management. These features collectively enhance usability, data integrity, and user satisfaction while ensuring efficient management of book collections.

CHAPTER 4: TRANSACTION RECORDS MANAGEMENT

4.1 RECORDS PAGE: ADDING TRANSACTION RECORDS

The Records page in the Cashbook application facilitates the addition of new transaction records to track financial activities comprehensively. This section focuses on integrating file upload functionality for bills and receipts, ensuring secure storage and accessibility.

4.1.1 Transaction Form

Users can log new transactions with detailed information:

- **Date and Time:** Input fields for selecting or manually entering the transaction date and time.
- **Amount:** Fields to specify the transaction amount, categorized as income (cash in) or expense (cash out).
- **Category:** Dropdown selection of predefined categories (e.g., salary, groceries) to classify the transaction.
- **Mode of Payment:** Options include online/UPI, net banking, or cash/offline, allowing users to specify how the transaction was conducted.
- **Notes:** Optional text area for adding additional details or comments related to the transaction.

4.1.2 File Upload:

- **Attachment Functionality:** Users can upload supporting documents such as bills or receipts in formats like PDF, JPEG, or PNG. In case, if the documents gets deleted from local system or storage, users can retrieve them from website.
- **Preview Option:** Provides a preview function for uploaded files, allowing users to view attached documents within the application interface before submission.
- **Download Option:** Users can also download the files using download functionality in their local storage or system.

Timestamped Storage:

- **Automatic Naming:** Uploaded files are saved with a timestamp in a designated project folder on the server. This ensures that files remain accessible even if deleted from the user's device, maintaining data integrity and compliance.

4.2 CRUD OPERATIONS ON TRANSACTIONS

4.2.1 Create Transaction

Efficient creation process with robust validation:

- **Automatic Date and Time:** Date and time are fetched automatically at the time when the user creates the record, ensuring accuracy and convenience.
- **Fields:** Users can input various details such as amount, category, mode of payment, and optional notes.
- **File Attachment:** Users can upload bills or receipts directly while entering transaction details.
- **Mode of Payment:** Selection options include online/UPI, net banking, or cash/offline.
- **Validation:** Ensures all mandatory fields are correctly filled to maintain accurate records.

4.2.2 Read Transaction

Detailed viewing and retrieval of transaction information:

- **Fields Displayed:** Displays comprehensive details including date, time, amount, category, mode of payment, and any attached files.
- **File Preview and Download:** Users can preview uploaded files within the application interface and download them for offline reference.

4.2.3 Update Transaction

Flexible modification of transaction details:

- **Fields Editable:** Users can update any information such as amount, category, mode of payment, notes, and attached files.
- **File Management:** Users can update or replace attached files associated with transactions as necessary.
- **Concurrency Control:** Implements mechanisms to handle concurrent updates, ensuring data consistency across the application.

4.2.4 Delete Transaction

Secure deletion process with retention assurance:

- **File Retention:** Ensures that uploaded files remain accessible even after deletion from the user's device.
- **Confirmation Requirement:** Users must confirm deletion actions to prevent accidental removal of transaction records.

4.3 FINANCIAL SUMMARY

4.3.1 Calculation of Total Cash In, Cash Out, and Net Balance

Automated computation and display of financial metrics:

- **Total Cash In:** Sum of all income transactions (cash inflow).
- **Total Cash Out:** Sum of all expense transactions (cash outflow).

- **Net Balance:** Difference between total cash in and total cash out, representing the overall financial position.
- **Mode of Payment Analysis:** Provides insights into transaction distribution across different payment methods (online/UPI, net banking, cash/offline).

4.4 CATEGORIES FOR CASH IN AND CASH OUT

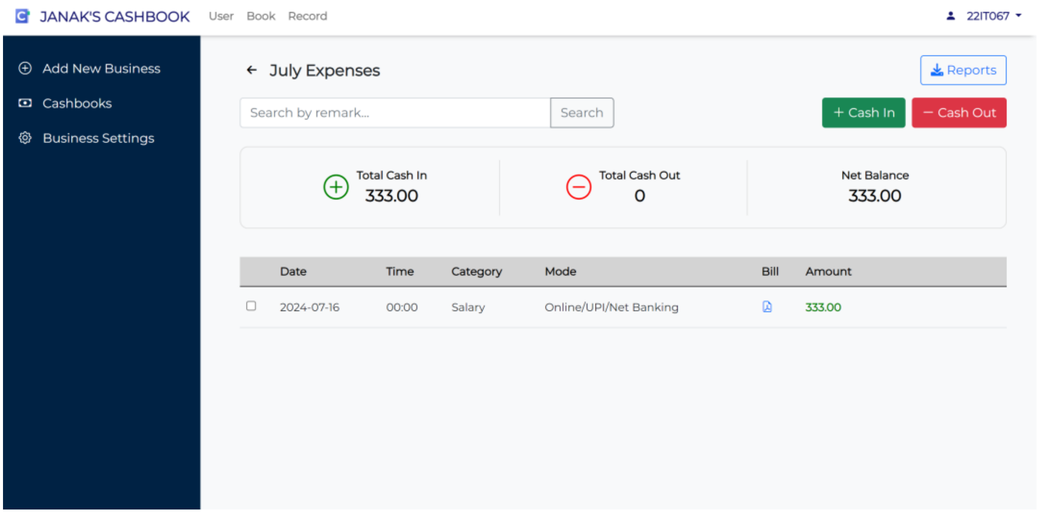
4.4.1 Predefined and Custom Categories

Structured classification of transactions:

- **Standard Categories:** Predefined categories for income and expenses facilitate systematic tracking and reporting.
- **Customization Options:** Users can personalize categories by adding, editing, or deleting them to align with specific financial management needs.

4.5 FIGURES: SCREENSHOTS OF TRANSACTION PAGE

Figure 4.1 Transaction Records List

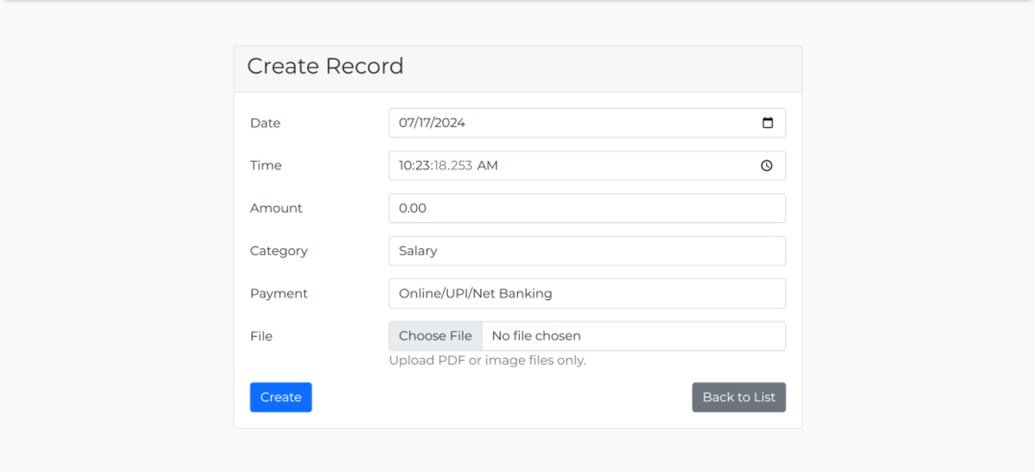


← July Expenses

Total Cash In	Total Cash Out	Net Balance
333.00	0	333.00

	Date	Time	Category	Mode	Bill	Amount
□	2024-07-16	00:00	Salary	Online/UPI/Net Banking		333.00

Figure 4.2 CRUD Operations on Transactions



Create Record

Date: 07/17/2024

Time: 10:23:18.253 AM

Amount: 0.00

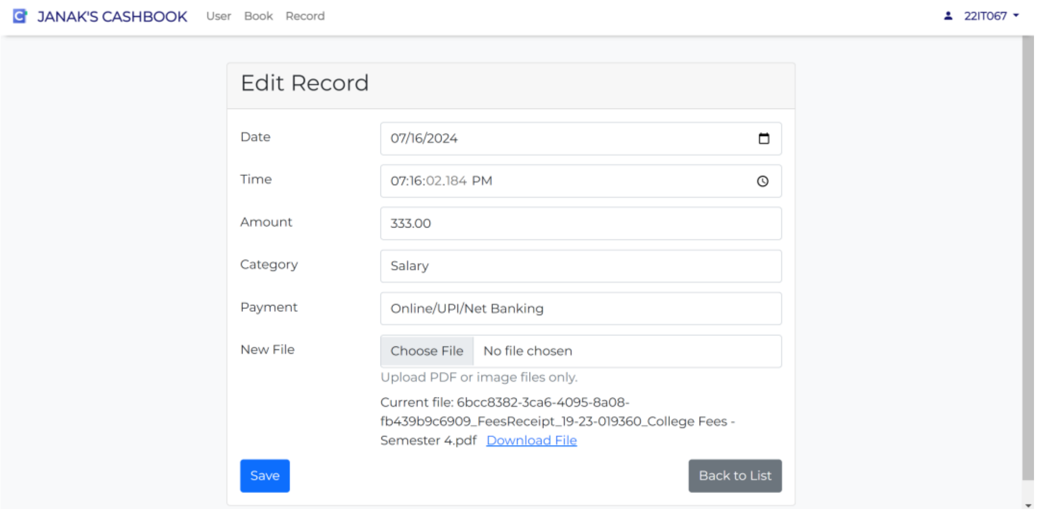
Category: Salary

Payment: Online/UPI/Net Banking

File: No file chosen

Upload PDF or image files only.

Fig. 4.2.1 Create operation for transaction record



Edit Record

Date: 07/16/2024

Time: 07:16:02.184 PM

Amount: 333.00

Category: Salary

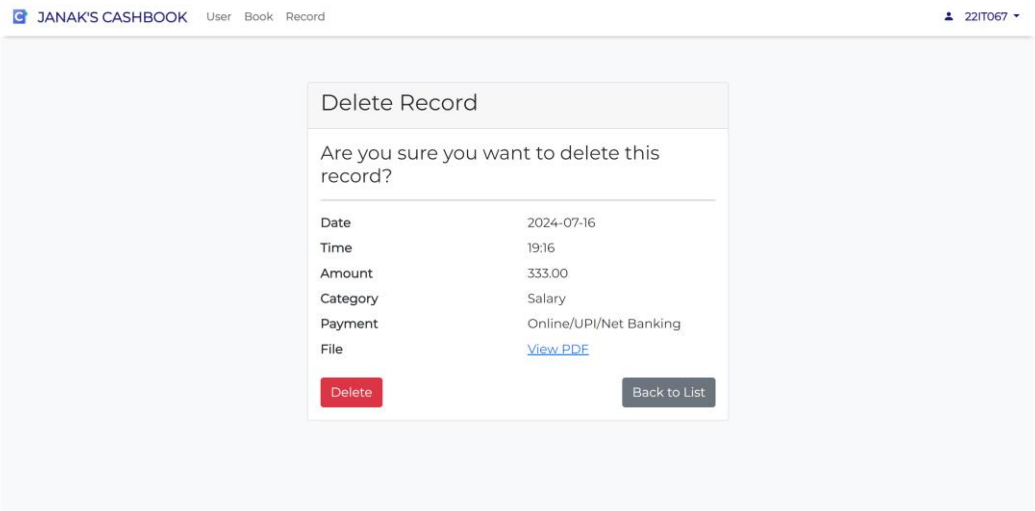
Payment: Online/UPI/Net Banking

New File: No file chosen

Upload PDF or image files only.

Current file: 6bcc8382-3ca6-4095-8a08-fb439b9c6909_FeesReceipt_19-23-019360_College Fees - Semester 4.pdf Download File

Fig. 4.2.2 Edit operation on transaction record



Delete Record

Are you sure you want to delete this record?

Date	2024-07-16
Time	19:16
Amount	333.00
Category	Salary
Payment	Online/UPI/Net Banking
File	View PDF

Fig. 4.2.3 Delete operation on transaction record

Chapter Summary

This chapter provides an in-depth exploration of transaction records management within the Cashbook application. It emphasizes the integration of file upload functionality for bills and receipts, ensuring secure storage and accessibility with timestamped file naming on the server. The addition of mode of payment options enhances transaction detail capture, supporting comprehensive financial tracking and reporting. These features collectively enhance user convenience, data security, and the efficiency of managing financial records in the application.

CHAPTER 5: ADDITIONAL FUNCTIONALITIES

5.1 DYNAMIC SEARCHING

5.1.1 Implementation of Dynamic Search Functionality

The Cashbook application integrates dynamic searching to streamline data retrieval and enhance user productivity.

- **Real-time Search:** Users can initiate searches by entering keywords or phrases into a search bar.
- **Instant Filtering:** As users type, the application dynamically filters and displays results matching the entered criteria.
- **Search Scope:** Encompasses transaction details such as date, time, amount, category, mode of payment, and notes.
- **Interactive Experience:** Removes search results as users delete entered content, ensuring responsiveness to user actions.
- **Responsive Design:** Optimized for various devices, ensuring consistent performance and usability across platforms.

5.2 SORTING BOOKS

5.2.1 Implementation of Sorting Options for Books

Users can sort their book list based on multiple criteria to facilitate easy navigation and access to specific items.

- **Sortable Fields:** Offers sorting options based on:
  - **Book Name:** Alphabetical order (A-Z, Z-A).
  - **Created At:** Date and time when the book entry was created (oldest to newest, newest to oldest).
  - **Updated At:** Date and time when the book entry was last updated (oldest to newest, newest to oldest).
  - **Net Balance:** Calculates and sorts books by their net balance (high to low, low to high).
- **User Control:** Enables users to toggle between ascending and descending order for each sorting criterion.
- **Persistent Preferences:** Remembers user sorting preferences across sessions, ensuring a personalized browsing experience.
- **Intuitive Interface:** Implements user-friendly UI elements such as dropdown menus or clickable headers for seamless navigation.

5.2.2 User Interaction and Efficiency

- **Enhanced Navigation:** Sorting functionalities empower users to efficiently organize and access their book records based on their preferences.

- **Improved User Experience:** Dynamic searching and sorting capabilities collectively enhance usability, enabling users to quickly locate specific transactions or books within the application.
- **Performance Optimization:** Backend optimizations ensure fast response times and smooth functionality even when handling large datasets.

5.3 NAVBAR AND PROFILE VIEW

5.3.1 Implementation of Navigation Bar

The navigation bar serves as a central hub for accessing different sections of the Cashbook application, ensuring intuitive navigation and enhanced user experience.

- **Centralized Navigation:** Provides direct links to essential sections such as Home, Transactions, Books, Reports, and User Profile.
- **Dropdown Menus:** Organizes related options under dropdown menus for efficient space utilization and ease of access.
- **Responsive Design:** Adapts seamlessly to various screen sizes and devices, maintaining consistent usability across platforms.

5.3.2 Profile View Feature

Users can view and manage their profile settings directly within the application interface.

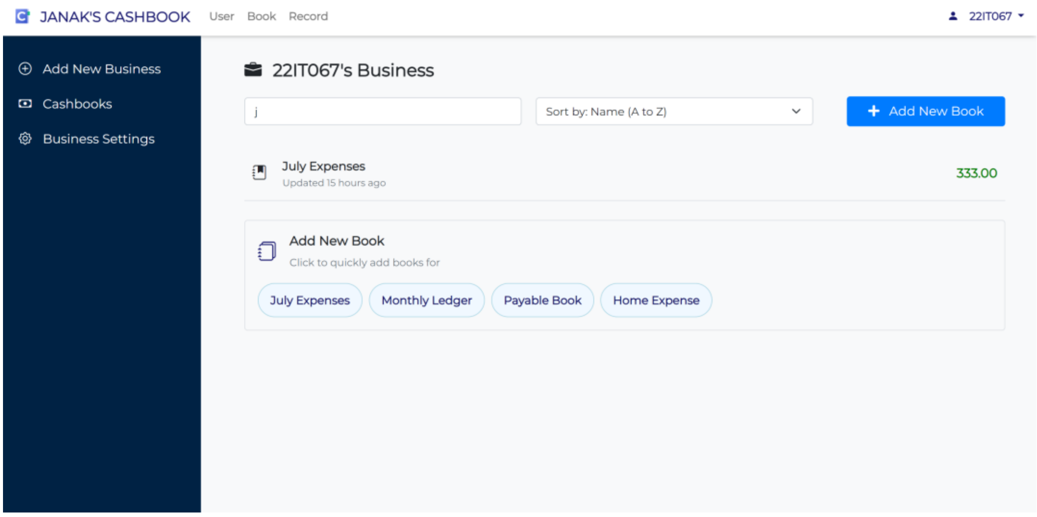
- **User Information:** Displaying user details such as name, email address, profile picture, and any other relevant information with facility to delete account also.
- **Settings:** Providing options for users to update their password, email address, notification preferences, and other account settings.
- **Logout:** Enabling users to securely log out of their accounts to protect against unauthorized access.

Security Considerations:

- **Authorization Checks:** Ensuring that only authenticated users can access and modify their profile information.
- **Data Privacy:** Implementing measures to protect sensitive user data, such as using encrypted connections (SSL/TLS) and securely storing credentials and personal information.

5.4 FIGURES: SCREENSHOTS OF FUNCTIONALITIES

Figure 5.1: Dynamic Searching



22IT067's Business

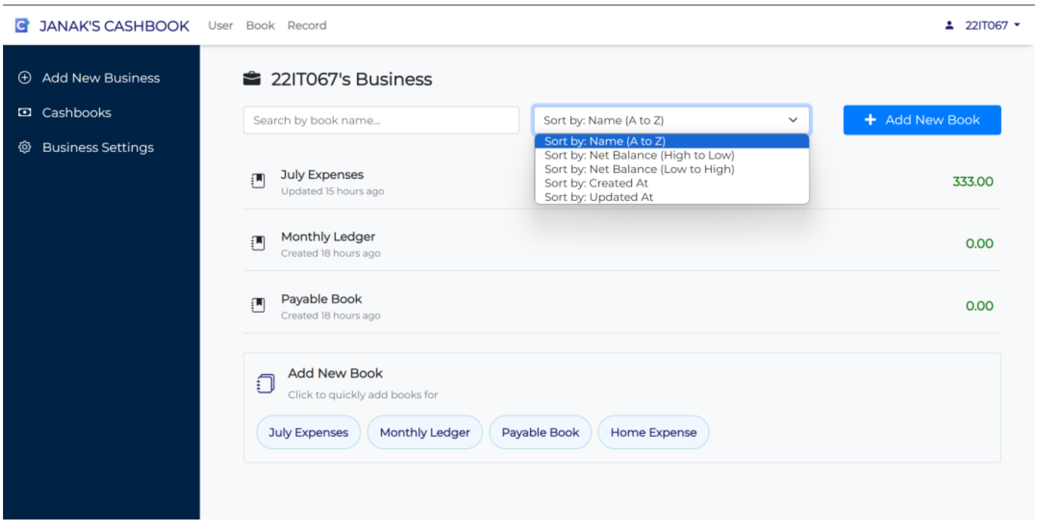
j

Sort by: Name (A to Z)

July Expenses
Updated 15 hours ago
333.00

Add New Book
Click to quickly add books for
July Expenses · Monthly Ledger · Payable Book · Home Expense

Figure 5.2: Advanced Sorting



22IT067's Business

Search by book name...

Sort by: Name (A to Z)
- Sort by: Name (A to Z)
- Sort by: Net Balance (High to Low)
- Sort by: Net Balance (Low to High)
- Sort by: Created At
- Sort by: Updated At

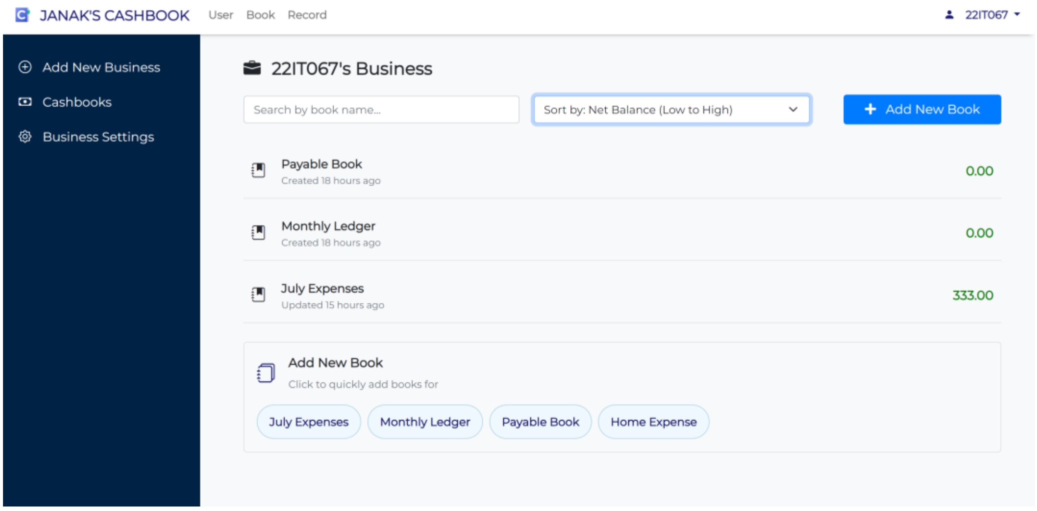
July Expenses
Updated 15 hours ago
333.00

Monthly Ledger
Created 18 hours ago
0.00

Payable Book
Created 18 hours ago
0.00

Add New Book
Click to quickly add books for
July Expenses · Monthly Ledger · Payable Book · Home Expense

Fig. 5.2.1 Sorting Options



22IT067's Business

Search by book name...

Sort by: Net Balance (Low to High)

Payable Book
Created 18 hours ago
0.00

Monthly Ledger
Created 18 hours ago
0.00

July Expenses
Updated 15 hours ago
333.00

Add New Book
Click to quickly add books for
July Expenses · Monthly Ledger · Payable Book · Home Expense

Fig. 5.2.2 Sorted Book List

Chapter Summary

Chapter 5 explores advanced functionalities integrated into the Cashbook application to optimize user interaction, data management, and navigation. Dynamic searching enables real-time filtering of transaction details, while versatile sorting options enhance the organization and accessibility of book records. The navigation bar facilitates intuitive access to different application sections, complemented by the profile view feature for seamless user account management. These enhancements collectively contribute to a user-centric experience, promoting efficiency, convenience, and informed decision-making within the financial management context.

CHAPTER 6: DATABASE MANAGEMENT

6.1 DATA STORAGE

6.1.1 Database Structure

The Cashbook application employs a structured database schema to efficiently store and organize user data.

- **Tables and Relationships:** Utilizes relational database concepts with tables for users, transactions, books, and other relevant entities.
- **Entity-Relationship Model:** Defines relationships such as one-to-many and many-to-many relationships to maintain data integrity and support complex data queries.

6.1.2 Schema Design

- **Users Table:** Stores user profiles with fields for user ID, name, email, hashed passwords, and profile settings.
- **Transactions Table:** Contains records of financial transactions with attributes including transaction ID, date, time, amount, category, mode of payment, and references to related user IDs.
- **Books Table:** Manages information related to books in the cashbook with fields for book ID, name, creation timestamp, update timestamp, and user IDs linking to book owners.

6.1.3 File Storage Integration

- **File Storage Mechanism:** Incorporates file storage for uploaded documents such as bills and receipts.
- **Timestamped Naming:** Saves uploaded files with timestamps to ensure unique file identifiers and facilitate easy retrieval.

6.2 DATA RETRIEVAL

6.2.1 Query Optimization

Efficient retrieval of data to enhance application performance and user experience.

- **Indexed Fields:** Implements indexing on frequently queried fields like user IDs, transaction dates, and book names to expedite data retrieval.
- **Query Optimization Techniques:** Utilizes SQL query optimizations such as joins, filtering, and aggregations to minimize response times and improve application responsiveness.

6.2.2 CRUD Operations Implementation

- **Transactional Support:** Ensures atomicity, consistency, isolation, and durability (ACID properties) for database transactions involving creation, retrieval, updating, and deletion of records.
- **Error Handling:** Implements robust error handling mechanisms to manage exceptions and ensure data integrity during CRUD operations.

6.3 DATA SECURITY

6.3.1 Authentication and Authorization

- **Password Hashing:** Stores passwords securely using cryptographic hashing algorithms (e.g., bcrypt) to protect user credentials from unauthorized access.
- **Access Control:** Implements role-based access control (RBAC) to restrict access to sensitive functionalities and data based on user roles (e.g., admin, regular user).

6.3.2 Backup and Recovery

- **Regular Backups:** Automated backups of the database to prevent data loss due to system failures or human errors.

6.4 FIGURES: SCREENSHOTS RELATED TO DATABASE

Figure 6.1: Database Schema

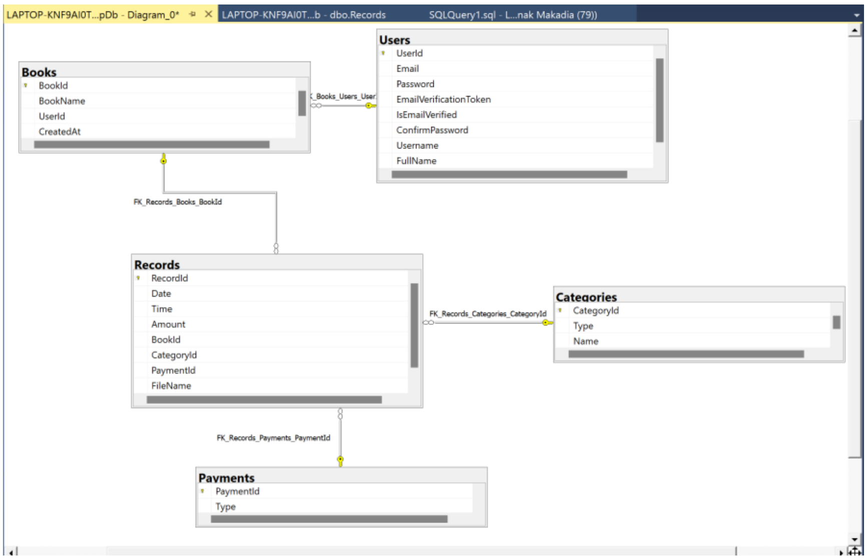


Fig 6.2: File Integration in folder with the help of database

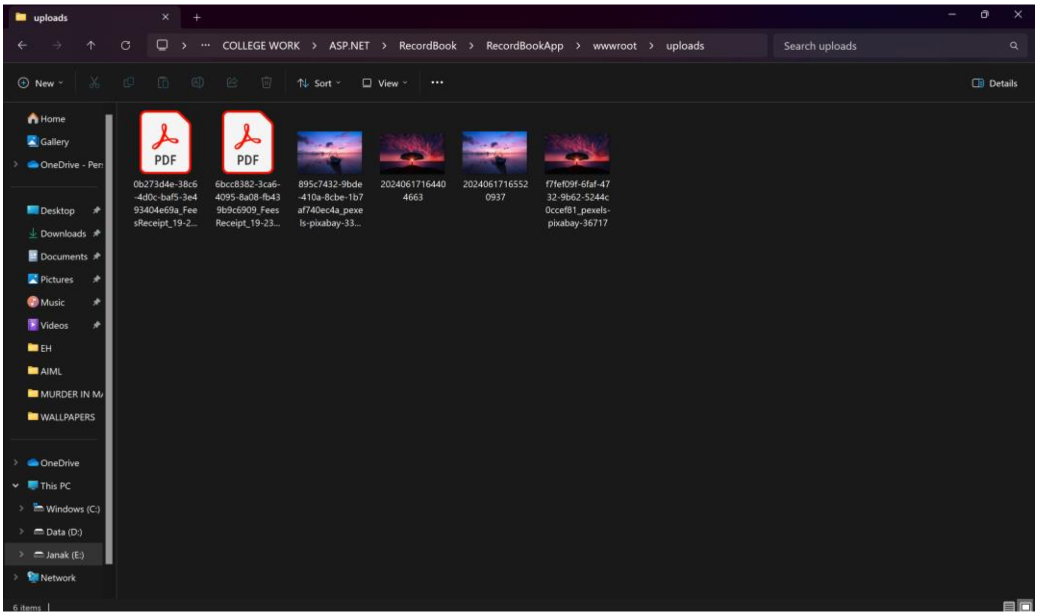
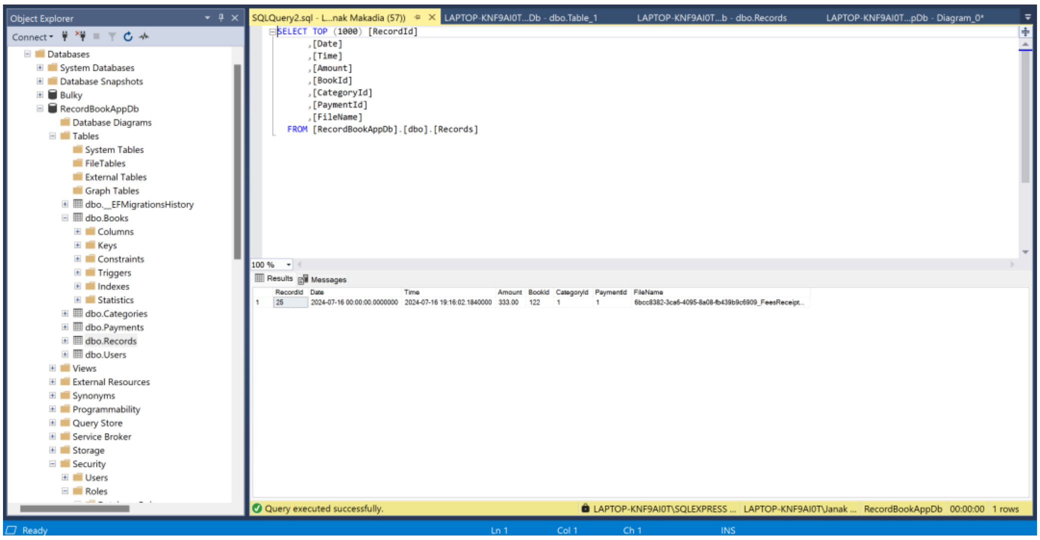

uploads
COLLEGE WORK > ASP.NET > RecordBook > RecordBookApp > wwwroot > uploads
Search uploads
New
Sort
View
Details
Home
Gallery
OneDrive - Per
Desktop
Downloads
Documents
Pictures
Music
Videos
EH
AIML
MURDER IN M
WALLPAPERS
OneDrive
This PC
Windows (C:)
Data (D:)
Janak (E:)
Network
6 items
0b273d4e-38c6-4d0c-baf5-3e493404e69a_FeesReceipt_19-2...
6bcc8382-3ca6-4095-8a08-fb439b9c6909_FeesReceipt_19-23...
895c7432-9bde-410a-8cbe-1b7af740ec4a_pexels-pixabay-33...
20240617164404663
20240617165520937
f7fef09f-6faf-4732-9b62-5244c0ccef81_pexels-pixabay-36717

Fig 6.3: Query Interface and Retrieved Data



```
SELECT TOP (1000) [RecordId]
      ,[Date]
      ,[Time]
      ,[Amount]
      ,[BookId]
      ,[CategoryId]
      ,[PaymentId]
      ,[FileName]
  FROM [RecordBookAppDb].[dbo].[Records]
```

	RecordId	Date	Time	Amount	BookId	CategoryId	PaymentId	FileName
1	25	2024-07-16 00:00:00.0000000	2024-07-16 19:16:02.1840000	333.00	122	1	1	6bcc8382-3ca6-4095-8a08-fb439b9c6909_FeesReceipt...

Query executed successfully. LAPTOP-KNF9AI0T\SQLEXPRESS ... LAPTOP-KNF9AI0T\Janak ... RecordBookAppDb 00:00:00 1 rows

Chapter Summary

Chapter 6 provides an in-depth exploration of database management within the Cashbook application. It highlights the structured approach to data storage, efficient retrieval techniques, and robust security measures. Integration with application logic through ORM frameworks enhances development efficiency and ensures seamless interaction between the application and underlying database. Overall, these database management practices support scalability, reliability, and data integrity, laying a solid foundation for the Cashbook application's functionality and performance.

CHAPTER 7: CHALLENGES AND SOLUTIONS

7.1 CHALLENGES FACED

During the development of the Cashbook application, several challenges arose that required strategic solutions to ensure a smooth and efficient user experience.

7.1.1 Data Consistency and Integrity

Ensuring that data remains consistent and accurate across the application posed significant challenges, particularly with concurrent user interactions.

- **Concurrency Issues:** Managing simultaneous access and updates to records without causing conflicts or data corruption.
- **Data Validation:** Ensuring that all data entered by users is valid and follows the required format.

7.1.2 Security Concerns

Maintaining the security of user data, particularly sensitive financial information, was a primary concern.

- **Authentication and Authorization:** Implementing secure authentication mechanisms and ensuring that only authorized users can access specific functionalities.
- **Data Encryption:** Protecting sensitive data both in transit and at rest to prevent unauthorized access.

7.1.3 Performance Optimization

The application needed to handle a large volume of transactions and user interactions efficiently.

- **Query Performance:** Optimizing database queries to reduce latency and ensure quick response times.
- **Scalability:** Designing the system to handle increased load and data volume as the user base grows.

7.1.4 User Experience (UX)

Creating an intuitive and user-friendly interface that caters to users with varying levels of technical expertise.

- **Usability:** Ensuring the application is easy to navigate and use.
- **Accessibility:** Making the application accessible to users with disabilities.

7.2 SOLUTIONS IMPLEMENTED

To address the challenges faced during development, several solutions were implemented to enhance the application's functionality, security, and performance.

7.2.1 Ensuring Data Consistency and Integrity

- **Optimistic Concurrency Control:** Implemented mechanisms to handle concurrent updates, reducing the risk of conflicts and ensuring data integrity.
- **Comprehensive Validation:** Added robust data validation checks at both client and server sides to ensure data integrity before processing and storing.

7.2.2 Enhancing Security

- **Secure Authentication:** Integrated secure authentication mechanisms such as OAuth2.0 and JWT (JSON Web Tokens) to verify user identities.
- **Role-Based Access Control (RBAC):** Implemented RBAC to restrict access to certain functionalities based on user roles, ensuring that sensitive operations are only accessible to authorized users.
- **Data Encryption:** Employed encryption techniques for data both in transit (using SSL/TLS) and at rest (using AES-256).

7.2.3 Optimizing Performance

- **Database Indexing:** Utilized indexing on frequently queried fields to speed up data retrieval and enhance overall performance.
- **Caching Mechanisms:** Implemented caching strategies to store frequently accessed data in memory, reducing database load and improving response times.
- **Scalability Planning:** Designed the application architecture to support horizontal and vertical scaling, allowing the system to handle increased load effectively.

7.2.4 Improving User Experience

- **User-Friendly Interface:** Developed an intuitive interface with clear navigation and user prompts to enhance usability.
- **Accessibility Features:** Included accessibility features such as keyboard navigation, screen reader support, and high-contrast themes to cater to users with disabilities.
- **Responsive Design:** Ensured the application is responsive, providing an optimal user experience across various devices and screen sizes.

Chapter Summary

Chapter 7 details the challenges faced during the development of the Cashbook application and the solutions implemented to address these challenges. By focusing on data consistency, security, performance, and user experience, the development team was able to create a robust and user-friendly application that meets the needs of its users effectively

CONCLUSION

SUMMARY OF KEY ACHIEVEMENTS

The development of the Cashbook application resulted in several significant achievements, reflecting the effort and strategic planning that went into its creation.

1. Robust User Authentication

Implemented a secure and reliable user authentication system using SMTP for email verification, ensuring that only verified users can access the application.

2. Comprehensive Transaction Management

Developed a comprehensive transaction management system with CRUD functionalities, allowing users to efficiently manage their financial records.

3. Advanced Search and Sorting

Incorporated dynamic searching and versatile sorting options to enhance data accessibility and user productivity.

4. Secure and Efficient Data Management

Ensured secure and efficient data storage, retrieval, and management through optimized database practices and robust security measures.

5. User-Centric Design

Created a user-friendly interface with responsive design and accessibility features, providing an optimal user experience across devices and catering to users with varying needs.

FUTURE WORK

While the Cashbook application has achieved its primary goals, there are several areas for potential improvement and future enhancement.

1. Enhanced Reporting and Analytics

- **Advanced Reporting:** Develop more advanced reporting features, providing users with deeper insights into their financial data through customizable reports and visualizations.

- **Predictive Analytics:** Integrate predictive analytics to help users forecast financial trends and make informed decisions based on historical data.

2. Mobile Application

- **Native Mobile Apps:** Develop native mobile applications for iOS and Android to provide a more seamless experience for mobile users.
- **Offline Functionality:** Implement offline functionality, allowing users to access and manage their data without an active internet connection.

3. Integration with Financial Tools

- **API Integrations:** Integrate with popular financial tools and services, such as accounting software and payment gateways, to provide a more comprehensive financial management solution.
- **Bank Synchronization:** Enable synchronization with bank accounts to automatically import and categorize transactions.

4. Enhanced Security Measures

- **Two-Factor Authentication (2FA):** Implement two-factor authentication to provide an additional layer of security for user accounts.
- **Security Audits:** Conduct regular security audits to identify and address potential vulnerabilities, ensuring the application remains secure against emerging threats.

FINAL THOUGHTS

The Cashbook application represents a significant step forward in personal financial management, offering users a powerful tool to manage their finances efficiently and securely. By continually improving and expanding its features, the application aims to meet the evolving needs of its users and remain a valuable resource for financial management.

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