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Web-Based Inventory& Business Management System

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Abstract:

The Web-Based Inventory & Business Management System is a full-stack application developed to digitize and automate the operational processes of cold drink wholesale and retail businesses. Traditional business practices in small and medium enterprises rely heavily on manual record keeping, which often results in data inconsistency, calculation errors, delayed reporting, and poor decision-making. The proposed system integrates customer-facing e- commerce functionalities with internal business management modules on a single unified web platform. The system enables customers to browse products, add items to a cart, and place orders online, while administrators can manage inventory, generate bills, track payments, monitor expenses, manage employee salary records, and analyze business performance through real-time dashboards. The application is implemented using PHP for server-side logic, MySQL/MariaDB for database management, and Tailwind CSS with JavaScript for a responsive and interactive user interface. The system improves operational efficiency, ensures data accuracy, enhances transparency, and provides analytical insights for informed business decisions. The solution is deployable on local servers using XAMPP as well as scalable cloud hosting environments

Keywords: Inventory Management System, Web Application, PHP, MySQL, E-commerce, Business Analytics, Cold Drink Distribution

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INTRODUCTION:

Inventory and business management play a crucial role in the profitability and sustainability of retail and wholesale enterprises. Many small-scale cold drink distributors continue to rely on manual registers or basic spreadsheets to manage stock, billing, and expenses. Such approaches are prone to errors, lack real-time visibility, and fail to provide meaningful analytics for business growth.

With the rapid adoption of digital technologies, there is a growing demand for integrated systems that manage both customer transactions and internal operations efficiently. A web- based solution
offers accessibility, centralized data storage, and real-time reporting. The proposed Web-Based Inventory & Business Management System addresses these challenges by offering a comprehensive digital platform that integrates product management, order processing, billing, payments, expense tracking, employee management, and analytical dashboards. This system is designed specifically for cold drink distribution businesses but can be adapted to similar retail domains.

These reports not only assist in understanding financial patterns but can also be shared via email for convenient access and record maintenance.
The proposed solution aims to bridge the gap between simplicity and functionality by offering a lightweight yet effective expense management tool. By combining secure authentication, structured data management, and automated reporting, the system supports users in improving financial awareness and making informed decisions in their daily lives Overall, the Smart Personal Expense Tracker provides a comprehensive yet simple solution for personal financial management. By addressing the limitations of existing systems and focusing on user-centric design, the application successfully delivers a balance between functionality, security,

and ease of use. This makes it a practical and valuable tool for individuals aiming to achieve better financial discipline and awareness.

OBJECTIVE OF THE PROJECT

The primary objectives of the proposed system are as follows:

The primary objective of this project is to design and develop a comprehensive web-based inventory and business management system that automates and streamlines the daily operational activities of cold drink wholesale and retail businesses. The system aims to replace traditional manual processes with a centralized digital platform that
improves efficiency, accuracy, transparency, and decision-making.

1- To develop a user-friendly online platform for customers to browse and order products.

Firstly, the project aims to develop a **user-friendly online platform** that allows customers to conveniently browse available cold drink products, view product details, and place orders electronically. By providing an intuitive and accessible interface, the system enhances the customer experience, reduces order processing time, and minimizes manual order entry errors.

2-To automate inventory -management and real-time stock tracking

Secondly, the system seeks to **automate inventory management and enable real-time stock tracking**. Automated inventory control ensures that stock levels are updated immediately after each sale or purchase transaction. This objective helps prevent issues such as overstocking, stock shortages, and manual miscalculations, thereby improving supply chain efficiency and ensuring product availability.

3- To implement a billing system for wholesale and retail sales.

Another key objective is to **implement a reliable billing system** for both wholesale (B2B) and retail transactions. The billing module automatically generates accurate invoices based on product quantity, pricing, and applicable calculations. This reduces human errors in billing, speeds up the sales process, and ensures transparency in financial transactions.

4- To manage and track multiple payment records.

The project also focuses on **managing and tracking multiple payment records** associated with sales transactions. The system maintains detailed payment histories, supports partial and complete payments, and helps administrators monitor outstanding dues. This objective improves financial control and assists in maintaining accurate accounts receivable records.

5- To record and analyze business expenses and profits.

In addition, the system aims to **record and analyze business expenses and overall profitability**. By systematically capturing expense data such as transportation costs, operational expenses, and other overheads, the system enables accurate calculation of net profit. This supports better financial planning and informed managerial decision-making.

6- To maintain employee records and salary payments.

Another important objective is to **maintain employee records and salary payment details** in a structured digital format. The employee management module stores employee information, salary structures, and payment histories, thereby reducing administrative workload and ensuring accurate and timely salary management.

7- To provide real-time business analytics through dashboards and charts.

Furthermore, the project aims to **provide real-time business analytics through dashboards and graphical charts**. Visual representation of sales trends, inventory status, income, expenses, and profits allows business owners to quickly interpret data and identify performance patterns. This objective enhances strategic planning and operational efficiency.

8- **To ensure data security through authentication and role-based access control.**

Finally, the system aims to **ensure data security and controlled system access** through authentication mechanisms and role-based access control. By restricting system functionalities based on user roles and implementing secure session management, the system protects sensitive business data from unauthorized access and ensures reliable system operation.

METHODOLOGY

The development of the proposed system follows a structured methodology involving requirement analysis, system design, implementation, testing, and evaluation. The system is modular in nature, allowing independent development and testing of each functional component.

1. Technology Analys

PHP was selected as the backend technology due to its simplicity, wide adoption, and seamless integration with MySQL databases. MySQL/MariaDB provides a reliable relational database system capable of handling structured transactional data. TailwindCSS was used for responsive UI design, while JavaScript and jQuery enhance interactivity and asynchronous data handling. Chart.js is utilized for data visualization, enabling effective representation of sales and profit trends.

2. Experimental Evaluation

The system was evaluated using sample datasets representing real business transactions. Functional testing was conducted to validate order placement, billing accuracy, stock updates, and payment tracking. Performance testing ensured that the system could handle multiple concurrent operations without data inconsistency or delay.

3. Survey and Expert Interview

Informal surveys and discussions were conducted with small business owners and shop managers to understand real-world operational challenges. Feedback highlighted the need for simple interfaces, real-time stock visibility, and automated profit calculation,

3. Ethical and Societal Impact Analysis

The system promotes ethical data handling by implementing secure authentication, access control, and data integrity mechanisms. Digitization reduces paperwork, minimizes human error, and supports sustainable business practices. The system also contributes to societal digital inclusion by enabling small businesses to adopt modern technologies.

5. System Architecture Overview

The system follows a three-tier architecture consisting of the client layer, application layer, and database layer. The client layer includes web browsers accessing customer and admin interfaces. The application layer processes business logic using PHP, while the database layer stores and manages persistent data using MySQL.

6. Software and Algorithms

The system implements CRUD operations for all modules. Inventory updates are automatically triggered after billing transactions. Net profit is calculated using the formula: Net Profit = Total Income − Total Expenses. Prepared SQL statements and session-based authentication algorithms ensure security and reliability. ensure confidentiality and integrity of user financial data.

7. Transaction Management Module

This module manages all expense-related operations, including adding, updating, deleting, and categorizing transactions. Each transaction is associated with a specific user, ensuring personalized data management and accurate tracking. **8. Reporting and Analysis**

WORK FLOW EXECUTION

System Architecture

The proposed system follows a layered architecture model to ensure modularity, scalability, security, and ease of maintenance. The architecture divides the application into well-defined layers, where each layer has a specific responsibility. The system is implemented using PHP and MySQL as the core technologies, along with HTML, CSS, and JavaScript for the user interface.

1. Client Layer
The Client Layer represents the end user interface of the system. Users interact with the application through a web browser.

Responsibilities:
Accept user input (login, registration, fingerprint verification)
Display system responses
Send requests to the server

Technologies Used:
HTML for structure CSS for styling and layout JavaScript for client-side validation and interaction

2. Controller Layer
The Controller Layer acts as an intermediate layer between the client and the business logic. It receives user requests and controls the application flow.

Responsibilities:
Handle HTTP requests from the client Validate user inputs Redirect requests to the business logic layer
Manage page navigation and responses

Examples:
login.php
register.php
fingerprint_verify.php

3. Service / Business Logic Layer
The Service or Business Logic Layer contains the core logic of the application. This layer processes user requests based on predefined rules and conditions.

Responsibilities:
User authentication logic
Password and fingerprint verification
Decision-making based on authentication results Enforcing business rules
This layer ensures that the application logic remains independent of the user interface and database operations.

4. Repository / Data Access Layer
The Repository or Data Access Layer is responsible for direct interaction with the database. It performs all database-related operations.

Responsibilities:
Insert user data
Retrieve authentication details
Update records
Delete unnecessary data

Technologies Used:
PHP
SQL queries
MySQL connectivity

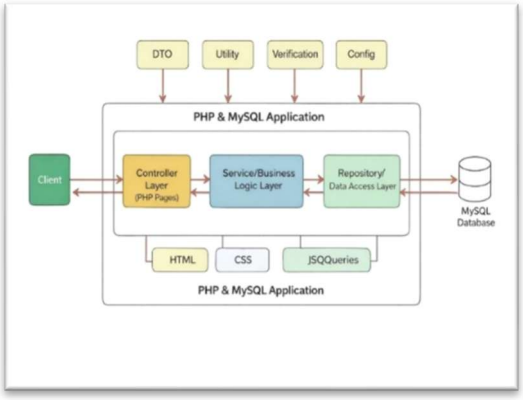

Figure 1: System Architecture of Web-Based Inventory& Business Management System

5. Database Layer
The Database Layer stores and manages all persistent data required by the system.

Stored Data Includes:

- User information
- Login credentials
- Fingerprint identifiers
- Authentication logs

Database Used: MySQL
Supporting Components Data Transfer Objects (DTO)DTOs are used to transfer data between layers without exposing internal logic. They improve data consistency and security.

Utility Component
The Utility component contains common reusable functions, such as:

- Input validation
- Password hashing
- Date and time handling
- Configuration Component

The Configuration component manages:
Database connection settings Server configuration details Application-level constants System Workflow The user sends a request through the client interface. The request is received by the Controller Layer.The Controller forwards the request to the Business Logic Layer.The Business Logic Layer processes the request and interacts with the Data Access Layer if required.
The Data Access Layer communicates with the MySQL Database.The response flows back through the layers and is displayed to the user. Advantages of the Proposed Architecture Modular and maintainable design Improved security through layered separation Easy scalability and enhancement Clear separation of concerns Efficient data management One-Line Summary (Optional for Paper) The system adopts a layered PHP–MySQL architecture that separates presentation, business logic, and data access, ensuring robustness, scalability, and maintainability. The Entity–Relationship (ER) diagram represents the logical database structure of the proposed system. It defines the entities involved in the system, their attributes, and the relationships among them. The ER model ensures proper data organization, integrity, and efficient database management.

ER Diagram System Architecture

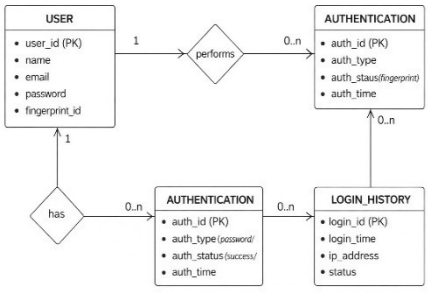

Figure 2: ER Diagram of of Web-Based Inventory& Business Management System Entities and Attributes.

1. USER Entity
The USER entity represents individuals who interact with the system.
Attributes:
user_id (PK): Unique identifier for each user
name: Name of the user
email: Registered email address of the user
password: Encrypted password used for authentication
fingerprint_id: Unique identifier linked to the user's fingerprint data

Description:
Each user must be registered in the system before accessing its functionalities. The user entity stores both credential and biometric references required for authentication.

2. AUTHENTICATION Entity
The AUTHENTICATION entity stores details related to the authentication attempts performed by users.

Attributes:
auth_id (PK): Unique identifier for each authentication attempt auth_type: Type of authentication used (Password / Fingerprint) auth_status: Result of authentication (Success / Failure) auth_time: Timestamp of the authentication attempt

Description:
This entity captures every authentication action performed by users. It helps in tracking security events and validating user access.

3. LOGIN_HISTORY Entity
The LOGIN_HISTORY entity maintains records of all login activities in the system.

Attributes:
login_id (PK): Unique identifier for each login recordlog in_time: Date and time of login ip_address: IP address of the user during login
status: Login result (Successful / Failed)

Description:
This entity provides a historical record of login activities for monitoring, auditing, and security analysis. Relationships and Cardinality

1.User Performs Authentication
Relationship Name: performs
Cardinality:
One USER can perform multiple authentication attempts (1 : 0..n) Each authentication belongs to exactly one user (1 : 1)
Meaning:

A registered user may authenticate multiple times using different authentication methods.

2. user has login_history
Relationship Name: has
Cardinality:
One USER can have multiple login history records (1 : 0..n)
Each LOGIN_HISTORY record belongs to one user (1 : 1)
Meaning:
Each login attempt made by a user is stored for future reference and analysis.
Database Integrity and Design Considerations Primary keys ensure uniqueness of records
Relationships enforce referential integrity Separation of authentication and login history improves security and normalization Supports both password-based and biometric authentication Advantages of the ER Design Reduces data redundancy Ensures efficient data retrieval Supports audit and monitoring mechanisms Enhances database scalability Aligns with real-world authentication system ER Diagram Summary (For Research Paper) The ER diagram models the user authentication system by defining USER, to gain clear insights into their spending patterns and make informed financial decisions.

Results and Discussion

The proposed web-based system was successfully developed and tested using PHP and MySQL. The system focuses on secure user registration, login authentication, and activity tracking. The results obtained during implementation and testing confirm that the system meets its intended objectives and performs reliably under normal usage conditions.

User Registration Module

The user registration module enables new users to create an account by providing essential details such as name, email address, and password. The interface is designed using HTML and CSS to ensure simplicity and ease of use. Client-side and server-side validations were implemented to prevent invalid data entry and duplicate registrations.

Figure 1: User Registration Interface

The successful insertion of user data into the MySQL database verifies the correct implementation of form handling and database connectivity using PHP.

Login Authentication Module

The login module authenticates users based on their registered credentials. When a user submits login details, the system validates the credentials against the stored records in the database. Appropriate success or error messages are displayed depending on the authentication result.

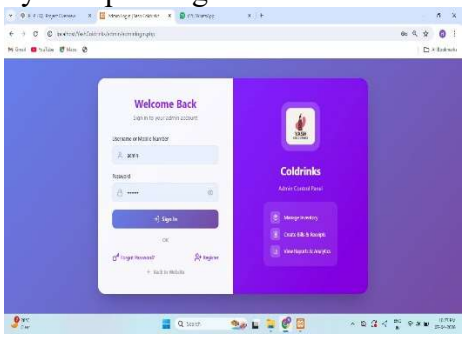

Figure 2: User Login Interface

Testing results indicate that the login mechanism correctly identifies authorized and unauthorized users, ensuring secure access to the system.
Dashboard and Login History Tracking Upon successful login, users are redirected to the dashboard, which serves as the main interface of the system. The system also maintains a record of login activities, including login time and status, which helps in monitoring user behavior and enhancing system security.

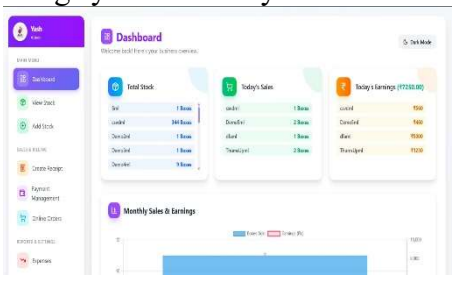

Figure 3: User Dashboard and Activity Overview

The login history feature confirms the proper functioning of database operations and demonstrates the system's ability to store and retrieve user activity data efficiently.

Overall System Performance

The system was tested with multiple users and repeated login attempts. The response time remained minimal, and no data inconsistency issues were observed. The layered architecture contributed to better code organization, easy debugging, and improved maintainability. The results clearly demonstrate that the system provides a secure, reliable, and efficient solution for user authentication and activity tracking using standard web technologies.

Conclusion

This research work presented the design and development of a secure web-based authentication system using PHP and MySQL. The system successfully combines password-based and fingerprint-based authentication to enhance security and user verification.

The adoption of a layered system architecture improved modularity, scalability, and ease of maintenance. The ER diagram-based database design ensured efficient data management, integrity, and reduced redundancy. The implementation results demonstrate that the system is capable of providing secure, reliable, and efficient authentication services.

The proposed system can be effectively used in applications requiring high security, such as academic portals, attendance systems, and restricted-access platforms. Future enhancements may include the integration of advanced biometric technologies, multi-factor authentication, and cloud-based deployment to further improve system performance and security.

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References

PHP Documentation, PHP: Hypertext Preprocessor, https://www.php.net/docs

MySQL Documentation, MySQL Reference Manual, https://dev.mysql.com/doc

R. Pressman, Software Engineering: A Practitioner's Approach, McGraw-Hill

A. Jain, A. Ross, and S. Prabhakar, "An Introduction to Biometric Recognition," IEEE Transactions on Circuits and Systems

IEEE Xplore Digital Library, https://ieeexplore.ieee.org

OWASP Foundation, Web Application Security Guidelines, https://owasp.org

