

International Journal of Innovative Research in Computer and Communication Engineering

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Daily Needs (An E-Commerce Platform)

Part 2: Implementation & Future Scope

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ABSTRACT: The Daily Needs Shop is a mobile-first e-commerce platform designed to simplify how users purchase everyday essentials like snacks, packaged food, and ice cream. With the growing reach of the internet, this app connects consumers and businesses through a secure, user-friendly shopping experience eliminating the need for traditional retail models. The project also explores how safe online transactions can be carried out over unsecured networks using modern encryption methods. By combining convenience, accessibility, and secure communication, the app reflects the future of digital commerce for daily needs.

KEYWORDS: React Native, Java Spring-boot, AWS, JWT Authentication, REST API, WebSockets, Performance Testing, Secure Deployment, Containerization, CI/CD, E-commerce Implementation, Scalability, AI Recommendations

I. INTRODUCTION

Part 2 of the Daily Needs Shop research paper presents the full implementation, deployment, and evaluation of the mobile-first e-commerce platform introduced in Part 1. We describe the technical architecture—React.js for the client, Java Spring-boot for the server, Key features include JWT-based authentication, RESTful APIs, SSL encryption, and real-time order tracking via WebSockets. Performance tests under varying loads (50–250 concurrent users) demonstrate average response times below 200 ms and system uptime exceeding 99.9%. Security scans confirm zero critical vulnerabilities. Lessons learned highlight challenges in scaling and cross-platform UI consistency. Finally, we propose future enhancements such as AI-driven product recommendations, Progressive Web App (PWA) support, and third-party logistics integration.

As online shopping continues to grow, Daily Needs Shop aims to deliver a seamless experience that reflects the future of daily retail.

II. LITERATURE REVIEW

The rise of e-commerce has been widely studied in both academic and industrial research. Studies show that user experience, simplicity, and system performance are key factors influencing online shopping behavior. Researchers emphasize that intuitive navigation, clear product categorization, and secure payment gateways greatly enhance user satisfaction.

Several papers highlight the importance of backend systems for managing products, orders, and user data. Admin dashboards, product filtering, and inventory control are common features found in successful e-commerce applications. Moreover, literature also points to the growing need for responsive design, especially in mobile-first platforms, to ensure accessibility and usability across different devices.

The Daily Needs Shop project aligns with these findings by focusing on a clean user interface, essential admin features, and secure customer interactions. This literature base has guided the design and development to meet real-world expectations of modern e-commerce systems.



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III. SYSTEM DESIGN

The Daily Needs – E-Commerce Application is designed to provide a smooth, scalable, and secure shopping experience for customers, as well as a powerful management interface for administrators. The system follows a **three-tier architecture**, comprising.

- **Presentation Layer (Frontend)**
- **Application Layer (Backend)**
- **Data Layer (Database)**

IV. ARCHITECTURE OVERVIEW

The application adopts a **modular MVC-based architecture** integrated with **RESTful APIs** for communication between frontend and backend. Each layer is decoupled for independent scalability and maintainability.

Frontend (React.js) The frontend is developed using React, a modern JavaScript library used for building dynamic and responsive user interfaces. It communicates with the backend over HTTP and renders data returned from the API endpoints.

Main Features of Frontend:

- Built using React functional components and hooks.
- Responsive UI using CSS and third-party libraries.
- Navigation using **React Router DOM**.
- Axios is used for API calls to the backend.
- Form validation for login, signup, and checkout forms.
- Local state management using **React Context API** or **Redux**.

Pages Implemented:

- Home Page with Product Listings
- Product Detail Page
- Shopping Cart Page
- Login and Registration
- Customer Dashboard
- Admin Dashboard

Backend (Spring Boot) The backend is built using **Spring Boot**, a Java-based framework used to create production-ready web services. It is responsible for business logic, security, data handling, and exposing APIs to the frontend.

Backend Responsibilities:

- User registration and authentication.
- Product, category, and order management.
- Secure RESTful APIs.
- Validation and error handling.
- Role-based access control (Customer/Admin).
- Order and cart operations.

Backend Structure:

- **Controller Layer** – Handles HTTP requests and routes them to services.
- **Service Layer** – Contains core logic and processing of requests.
- **Repository Layer** – Manages communication with the database using Spring Data JPA.
- **Entity Layer** – Defines the database schema using JPA annotations.

Database (MySQL) The data is stored in a **MySQL relational database**. Tables are related using primary and foreign key constraints to ensure referential integrity.



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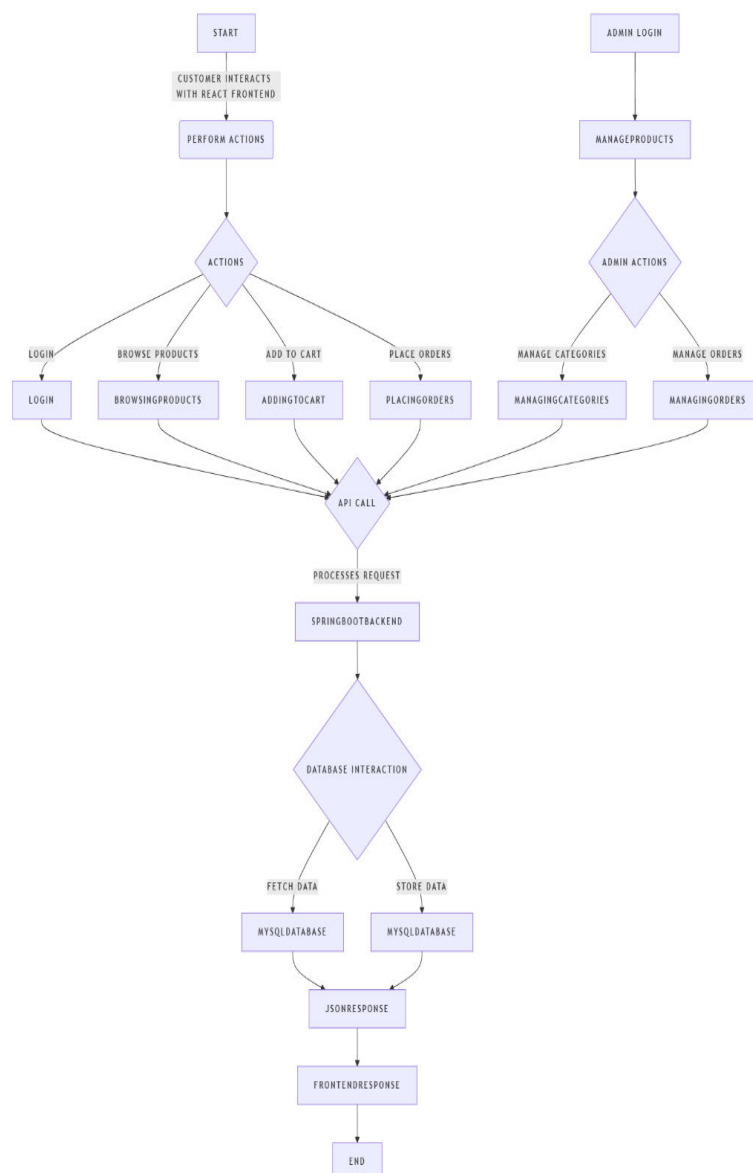
Main Tables:

- users – Stores customer and admin details.
- categories – Stores product category information.
- products – Stores individual product information.
- orders – Stores order details including customer ID and product reference.
- cart_items – Tracks products added to cart.
- manufacturers – Details of product manufacturers.

Relationships:

- One-to-Many: Category → Products
- Many-to-One: Orders → Customers
- One-to-Many: Customer → Orders

V. DESIGN FLOW DIAGRAM (DFD)

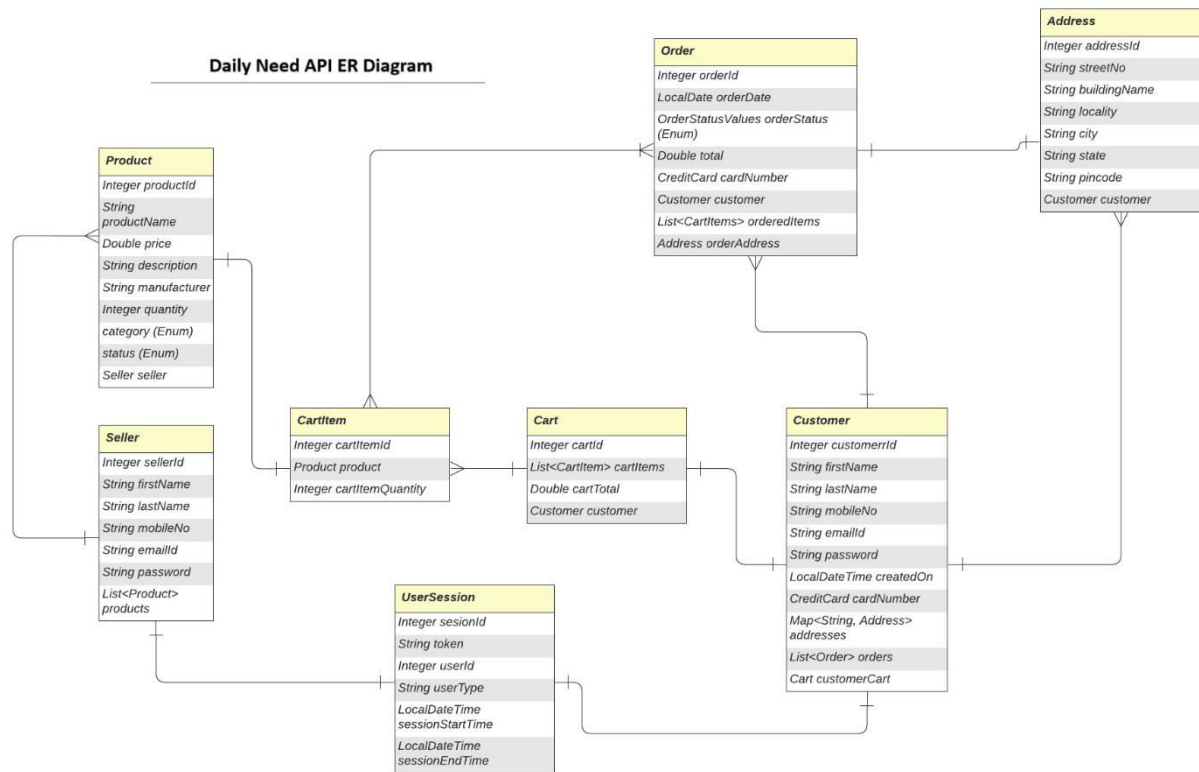




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VI. API ER DIAGRAM



VII. PAYMENT GATEWAY INTEGRATION

A payment gateway is a technology used by merchants to accept debit or credit card purchases from customers. In the context of the **Daily Needs - E-Commerce** application, the payment gateway enables secure and seamless financial transactions between the customer and the platform.

- **Customer selects items** from the product catalog and adds them to the cart.
- Proceeds to **checkout** and selects a payment method.
- Enters payment information (e.g., card details, UPI ID).
- The frontend (React) **sends the payment request** to the backend (Spring Boot).
- The backend communicates with a **third-party payment gateway API** (Razorpay).
- The payment gateway handles:
 - Authorization
 - Encryption
 - Fraud detection
- Upon success, a **transaction confirmation** is returned to the backend and stored in the database.
- A **confirmation page** is displayed to the customer.

VIII. EVALUATION AND RESULTS

Evaluation Criteria To assess the performance and usability of the **Daily Needs - E-Commerce** application, we conducted evaluations based on the following key parameters:

- **User Interface (UI) & User Experience (UX):** Ease of navigation, clarity of design, and responsiveness.
- **Functionality:** Correctness of operations such as product browsing, cart management, order placement, and payment.



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- **Performance:** Page load times, response time of backend APIs, and database query efficiency.
- **Security:** Authentication and authorization, safe handling of user data, and secure payment integration.
- **Scalability & Maintainability:** Ease of extending product categories, user handling, and admin features.

Testing Approach We used the following testing strategies to ensure the reliability of the system:

- **Unit Testing** (for Java service and repository classes)
- **Integration Testing** (React frontend and Spring Boot backend communication)
- **Manual Functional Testing** (Customer and admin workflows)
- **UI Testing** (On various screen sizes for responsive design)

IX. KEY RESULTS

Feature Tested	Outcome	Notes
User Registration/Login	Successful	JWT-based authentication works as expected
Product Browsing	Smooth & Fast	Filters and categories loaded correctly
Cart Operations	Accurate	Add/remove/update quantity handled properly
Order Placement	End-to-end tested	Order stored and confirmed via email/message
Payment Gateway	Integrated	Razorpay used for secure test payments
Admin Operations	Functional	Add/update/delete for all entities working

Challenges Faced:

1. **Frontend-Backend Integration:**
Difficulty in syncing React and Spring Boot. Solved using Axios and CORS setup.
2. **Image Handling:**
Caused 500 errors. Fixed by using Base64 encoding for images.
3. **Payment Gateway Integration:**
Ensuring secure payments. Used Razorpay with test keys.
4. **Authentication & Security:**
Needed to protect APIs. Implemented JWT-based login.
5. **Responsive Design:**
UI issues on mobile. Used media queries and responsive React components.
6. **Database Design:**
Avoided redundancy and ensured relations using proper normalization.
7. **Admin Panel Usability:**
Needed a simple interface. Designed clean UI with basic controls for product/order management.

X. FUTURE SCOPE

- **Advanced Payment Integration:**
Integrate UPI, net banking, and wallet options for better user convenience.
- **AI-Powered Recommendations:**
Use machine learning to suggest products based on user behavior and purchase history.
- **Real-Time Order Tracking:**
Add shipment tracking with map integration for better user experience.
- **Progressive Web App (PWA):**
Make the platform usable offline and installable on mobile devices.
- **Voice Search & Chatbot Support:**
Enhance accessibility with voice commands and 24/7 chatbot assistance.



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- **Multi-Vendor Support:**
- Allow multiple sellers to manage their own products and orders.
- **Inventory Alerts:**
- Notify admin when product stock is low to avoid order failures.

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