COLLEGECODE:9528

COLLEGENAME : SCAD COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT : COMPUTER SCIENCE AND ENGINEERING

STUDENTNMID: C90AAB851852669AF3C40AA5C0072C14

Roll no :952823104163

DATE : 10.10.2025

Completed the project named as:

Phase 4

TECHNOLOGY PROJECT NAME :

E-Commerce Product Page

SUBMITTED BY,

NAME : SUGANYA M

MOBILE NO : 8754893885

Phase 4- Enhancement & Deployment

1.Additional Features

To improve the overall user experience and functionality of our e-commerce platform, we introduced several new features:

- Smart Search & Filters: Integrated a real-time, predictive search bar with auto-suggestions and advanced filtering (by price, category, rating). Wishlist &
- Favorites: Users can now save items to their personal wishlist for future purchases.

- Product Recommendations (AI-powered): Implemented a basic algorithm that suggests related products based on browsing history.
- Live Chat Support: Embedded a live chat module using third-party chat APIs (like Tawk.to or Chatwoot).
- User Reviews & Ratings: Customers can leave reviews with star ratings, improving transparency and helping future buyers.
- Dark Mode: For better accessibility and modern aesthetics, we added a toggle for dark/light themes.
- Inventory Alerts: "Only X left in stock" and "Back in stock" notifications added to increase urgency and boost sales.

2. UI/UX Improvements

The platform was redesigned with a focus on user-centric design principles, aiming to enhance usability and engagement:

- Responsive Layouts: Fully mobile-friendly and tablet-optimized design using responsive CSS and Flex/Grid layouts.
- Simplified Checkout Flow: Reduced from 5 to 3 steps, minimizing cart abandonment.
- Clear CTAs: Prominent and consistent "Add to Cart" and "Buy Now" buttons across product listings.
- Visual Hierarchy: Improved typography, color contrasts, and spacing for better readability and navigation.
- Micro-Animations: Subtle transitions and hover effects enhance interactivity without overwhelming the user.
- Error Handling & Feedback: Inline validation for forms and real-time user feedback using toast notifications.

3.API Enhancements

APIs were optimized for performance, scalability, and reliability:

- Improved Product Retrieval APIs: Reduced response time through query optimization.

- Secure Authentication API: Implemented JWT-based authentication for secure user sessions.

- Cart & Wishlist Endpoints: Enhanced backend logic for user-specific data handling.

- Payment Gateway Integration: Integrated APIs like Razorpay/Stripe for secure transactions.

- Order Tracking API: Added endpoint for customers to view real-time order updates.

- Error Handling & Logging: Implemented structured responses for better debugging.

4.Performance & Security Checks

To ensure a robust and reliable product page, multiple optimizations and checks were conducted:
Performance Optimization:
- Implemented lazy loading for images.
- Reduced JavaScript bundle size using code splitting.
- Compressed static assets (CSS, JS, Images

Database Optimization:
- Indexed frequently queried columns.
- Removed redundant queries and optimized joins.

Security Enhancements:
- Implemented HTTPS and secure headers.
- Enforced strong password policies.
- Protected APIs from SQL injection and XSS attacks.
- Conducted penetration and vulnerability testing.

Monitoring Tools: Integrated Lighthouse and Google PageSpeed Insights for performance audits.

5.Testing of Enhancements

Comprehensive testing was done to ensure all new features work smoothly and reliably:
- Functional Testing: Verified the functionality of new modules like wishlist, comparison, and reviews.
- Integration Testing: Ensured seamless communication between frontend and backend APIs.
- Regression Testing: Checked that enhancements didn't break existing functionalities.
- UI/UX Test ing: Assessed responsiveness, layout alignment, and interactive components.
- Performance Testing: Used tools like GTmetrix and Postman for speed and API load tests.
- User Acceptance Testing (UAT): Gathered user feedback before final deployment.

6. Deployment (Netlify, Vercel, or Cloud Platform)

Deployment ensures the product page is live, stable, and accessible to users:

Frontend Deployment:

- Deployed React/Vue frontend on Netlify or Vercel.
- Configured continuous integration and deployment pipelines (CI/CD).
- Set up custom domain and SSL certificates.

Backend Deployment:

- Hosted API services on AWS, Render, or Firebase Functions.
- Connected backend with database (MongoDB Atlas / Firebase Firestore).
- Configured environment variables securely.

Pos t-deployment Monitoring:

- Used tools like UptimeRobot and Google Analytics to monitor performance and user behavior.
- Fixed minor post-deployment issues and optimized build versions.

7.Documen tation & Handover

- Technical Documentation: Detailed explanation of API routes, endpoints, and deployment process.
- User Guide: Instructions on navigating and using features like wishlist, reviews, and checkout.
- Maintenance Plan: Defined update cycles, bug tracking, and future improvement roadmap.
- Version Control: All changes tracked using Git and hosted on GitHub for transparency.