

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

AN-NAJAH NATIONAL UNIVERSITY



FACULTY OF ENGINEERING AND INFORMATION
TECHNOLOGY

Computer Engineering Department

Software Graduation Project

E-store

students

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I dedicate this humble work to our steadfast people in Gaza, to our brave fighters in the fields of struggle, and to our prisoners in the occupation's prisons.

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Abstract:

When you want to buy an electronic product, you may go to the market and search for it for a long time, and you may forget the appropriate prices. You need to change the way you shop and purchase these products. The app will combine several features to help you shop and purchase online.

Due to the high rental costs of traditional shops in the town of Qabatiya, there was a need to find a practical and efficient alternative for displaying products and reaching more customers. This project aims to develop an e-commerce store that enables the owner to manage and showcase products across the entire West Bank, providing a flexible and cost-effective solution compared to physical shops. The system allows the store owner to add and categorize products, manage orders, and communicate directly with customers. Key features of the system include ease of use, accessibility from anywhere, reduced operational costs, and the ability to expand the customer base beyond the geographical limitations of a traditional store.

1 Introduction

1.1 Motivation

With the continuous increase in the costs of establishing traditional shops, especially in the town of Qabatiya, it has become necessary to look for practical and efficient alternatives to manage small businesses. The main motivation behind this project is to reduce the costs of setting up a physical store while providing a modern solution for displaying and marketing products online. Moreover, relying on an e-commerce platform enables expanding the customer base across the West Bank, which increases sales opportunities and provides greater marketing momentum compared to the traditional approach limited by geographical location.

Price comparison is one of the problems many people face when shopping . When the user wants to see the appropriate prices for his budget,he may need to go to several markets at once. Also,many users face problems by for getting the order list while shopping,Also,there are somepeople who do not know where the market is and who is closer to them than the market As aresult,we developed an project that makes the user familiar with all the products on the market and allows him to choose between products from several markets,enabling them to make better choices.

1.2 Project Objectives

The project aims to develop a fully functional e-commerce store that enables the store owner to:

- Display and categorize products in an organized manner.
- Efficiently manage orders and customers.
- Reduce operational costs compared to physical stores.
- Expand the customer base to cover multiple regions beyond the local market.
- Enhance marketing through a user-friendly interface.
- Ensure system flexibility and scalability by designing it to integrate with other services such as electronic payment systems and automated shipping solutions, thus allowing future expansion and adaptation as the business grows.

1.3 Scope of the Work

The scope of this project is limited to developing an e-commerce platform for a small store in Qabatiya while making it accessible to customers across the West Bank. The work includes designing a simple and user-friendly interface, providing an admin panel for managing products and orders, and implementing core features such as search, filtering, and direct communication with customers. Additionally, the system is designed with scalability in mind, enabling future integration with online payment systems and automated shipping solutions to deliver a more complete and professional e-commerce experience.

1.4 Organization

This report is organized as follows:

- **Chapter One:** Provides an overview of the project, including motivation, objectives, and scope.
- **Chapter Two:** Discusses constraints, standards, and the relation with earlier coursework.
- **Chapter Three:** Reviews related studies and similar projects.
- **Chapter Four:** Describes the methodology, tools, and technologies used in building the system, including database design and system interfaces.
- **Chapter Five:** Presents the results and discusses the challenges faced during implementation.
- **Chapter Six:** Concludes with a summary of the project and recommendations for future work.

2 Constraints, Standards and Earlier Coursework

2.1 Constraints & Limitations

The project encountered several challenges during development, including:

- **Selecting the most appropriate tools and technologies** to build a scalable and high-performance e-commerce system.
- **Adapting the system to local culture and the technological reality in the West Bank**, where certain payment and shipping services may not be readily available, requiring flexible and future-proof solutions.
- **Limited time**, as developing a fully functional e-commerce application typically requires several months to meet both functional and

non-functional requirements.

- **Security challenges**, such as preventing SQL Injection, XSS attacks, and ensuring the protection of sensitive customer data.

2.2 Standards & Technologies

The application was developed using modern web and mobile technologies, with emphasis on scalability, performance, and security:

- **Frontend:**
 - React.js for building an interactive and responsive web interface.
 - React Native for developing a cross-platform mobile application (Android & iOS).
- **Backend:**
 - Node.js with Express.js to implement a RESTful API.
 - Clear separation of concerns across presentation, business logic, and data layers.
- **Database:**
 - MySQL for relational data storage.
 - Sequelize ORM for secure and simplified database interactions.
- **Security Standards:**
 - JWT-based authentication.
 - Role-Based Access Control (RBAC).
 - Password hashing with bcrypt.

- SQL Injection and XSS protection.
- HTTPS enforcement for secure communication.
- **External Integrations:**
 - Online payment through **Stripe API**, ensuring compliance with **PCI DSS**.
 - Future integration with automated shipping systems and advanced AI services.
- **Additional Features:**
 - Real-time inventory management.
 - AI-powered product recommendation engine.
 - Push notifications for mobile users.
 - Comprehensive analytics tracking for monitoring store performance and user behavior.

2.3 Earlier Coursework

The successful implementation of this project was supported by knowledge gained from several university courses and practical experiences:

- **Web Development course:** provided the foundation in HTML, CSS, and JavaScript, later extended to advanced frameworks like React.js.
- **Database course:** enabled effective relational database design, applied through MySQL and Sequelize ORM.
- **Software Engineering course:** guided the development process using **Agile methodology** and iterative **sprints**.
- **Collaboration with graduates and peers in the industry** enriched the project with real-world practices, particularly in application security and payment system integration.

3 Literature Review

3.1 Introduction

In e-commerce, scalability and integration with payment and shipping systems are important for the success and sustainability of a platform. Studying some local websites shows that many focus only on basic functions like product display and order management, without considering future expansion or integration with other systems, especially projects managed by freelancers or small startups.

3.2 Local Systems Review

Most small e-commerce stores in Palestine rely on ready-made platforms or simple development covering basic functions. These systems work well initially but may face difficulties in expanding or integrating with advanced payment and shipping services, limiting growth over time.

3.3 Global Systems Review

Global platforms like Amazon, Noon, and eBay provide advanced features such as inventory management, smart recommendations, and integration with payment and logistics services. However, these systems are very complex and require large resources, making them unsuitable for small local stores without simplified and adapted solutions.

3.4 Gap Addressed by the Project

The current e-commerce project aims to fill this gap by:

- Developing a simple and flexible system suitable for small stores in Palestine.
- Allowing future scalability and integration with payment and shipping systems when needed.
- Designing a user-friendly interface adapted to the local technological culture.
- Applying basic security standards to protect user data and transactions.

3.5 Conclusion

Previous studies show that projects not designed for scalability and integration may face limitations over time. Therefore, this project focuses on providing a practical, simple, and secure local solution with the possibility of future development to meet the needs of the Palestinian market.

4 Methodology

This chapter explains step-by-step how the project was built, the tools used, database design, and system feature implementation.

4.1 System Architecture

4.1.1 Overall Architecture Overview

The E-store application follows a three-tier architecture pattern consisting of presentation, business logic, and data layers. This architecture provides clear separation of concerns, enabling maintainability, scalability, and testability.

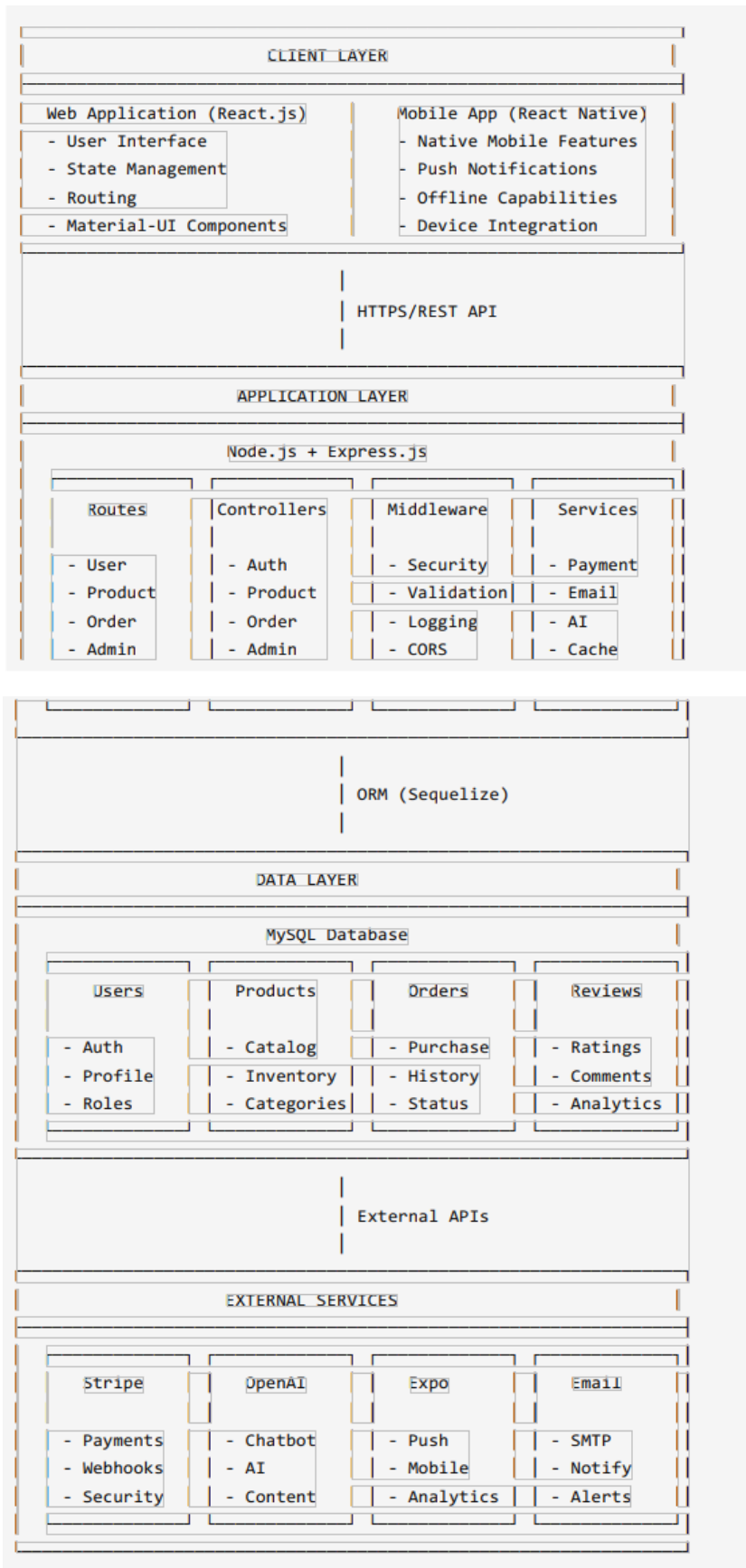


Figure 1: System Architecture Diagram

4.2 Tools, Methods, and Programming Languages

4.2.1 Frontend:

- React.js library with MUI components for responsive and user-friendly web interfaces.
- React Native for mobile applications (Android & iOS).

4.2.2 Backend:

- Node.js with Express.js framework to handle requests and create RESTful APIs.
- MVC design pattern to structure code clearly and efficiently.
- JWT for authentication and secure login.
- Integration with third-party services like Mail Box Namecheap (SMTP) and Chat GPT AI model.
- Real-time push notifications via Expo Push Notifications.

4.2.3 Database:

- MySQL for storing products, orders, and user data.
- Sequelize ORM for secure and flexible database management.

4.2.4 Methods:

- Agile / Iterative Sprints for gradual development and iterative improvement.
- Manual testing to ensure all system components work correctly.

4.2.5 Additional Tools

- Xampp.
- expo go
- Git/GitHub for version control and collaboration.
- Postman for API testing.
- Code editors like VS Code.

4.3 Database Design

Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/> addresses	★ Browse Structure Search Insert Empty Drop	2	InnoDB	utf8mb4_general_ci	32.0 KiB	-
<input type="checkbox"/> banners	★ Browse Structure Search Insert Empty Drop	2	InnoDB	utf8mb4_general_ci	80.0 KiB	-
<input type="checkbox"/> cart	★ Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_general_ci	32.0 KiB	-
<input type="checkbox"/> cart_item	★ Browse Structure Search Insert Empty Drop	5	InnoDB	utf8mb4_general_ci	48.0 KiB	-
<input type="checkbox"/> categories	★ Browse Structure Search Insert Empty Drop	11	InnoDB	utf8mb4_general_ci	32.0 KiB	-
<input type="checkbox"/> contact	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
<input type="checkbox"/> password_reset_otps	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
<input type="checkbox"/> products	★ Browse Structure Search Insert Empty Drop	71	InnoDB	utf8mb4_general_ci	96.0 KiB	-
<input type="checkbox"/> purchases	★ Browse Structure Search Insert Empty Drop	1	InnoDB	utf8mb4_general_ci	176.0 KiB	-
<input type="checkbox"/> purchase_history	★ Browse Structure Search Insert Empty Drop	6	InnoDB	utf8mb4_general_ci	64.0 KiB	-
<input type="checkbox"/> purchase_items	★ Browse Structure Search Insert Empty Drop	1	InnoDB	utf8mb4_general_ci	64.0 KiB	-
<input type="checkbox"/> reviews	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	96.0 KiB	-
<input type="checkbox"/> settings	★ Browse Structure Search Insert Empty Drop	5	InnoDB	utf8mb4_general_ci	32.0 KiB	-
<input type="checkbox"/> users	★ Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_general_ci	80.0 KiB	-
14 tables	Sum	110	InnoDB	utf8mb4_general_ci	880.0 KiB	0 B

Check all With selected:

Figure 2 : All Tables.

- **Main Tables:** Products, Users, Purchases, Categories.

MySQL "purchases"

edit inline | Edit | Explain SQL | Create PHP code | Refresh

Number of rows: 25 Filter rows: Search this table Sort by key: None

	id	user_id	purchase_number	status	payment_status	payment_method	payment_transaction_id	subtotal	discounted_subtotal	tax_amount	shipping_amount	discount_amount	discount_percentage	total_am
Copy Delete	40	13	PUR-20250828-4290	delivered	paid	credit_card	cc_1756371284581_yovcifo20	269.99	256.49	21.80	0.00	13.50	5.00	278.29
Copy Delete	41	19	PUR-20250831-2018	processing	paid	credit_card	cc_1756634029051_mqk07sem	2769.98	2631.48	223.68	15.00	138.50	5.00	2870.16
Copy Delete	42	18	PUR-20250831-6827	delivered	paid	credit_card	cc_1756634103011_0h65pt9ng	2000.00	1900.00	161.50	0.00	100.00	5.00	2061.50
Copy Delete	43	18	PUR-20250831-9537	pending	paid	credit_card	cc_1756634145238_x4p25axgd	1099.99	1044.99	88.82	0.00	55.00	5.00	1133.81
Copy Delete	44	18	PUR-20250831-8585	shipped	pending	cash_on_delivery	NULL	129.99	123.49	10.50	0.00	6.50	5.00	133.99
Copy Delete	45	19	PUR-20250831-1164	processing	pending	cash_on_delivery	NULL	69.99	66.49	5.65	15.00	3.50	5.00	87.14

Check all With selected: Edit Copy Delete Export

Number of rows: 25 Filter rows: Search this table Sort by key: None

Figure 3 : Purchases Table.

id	name	description	price	image	stock	category_id	created_at
108	Fitbit Charge 6	Fitness tracker with heart rate, GPS, 7-day batter...	159.99	/uploads/products/product-1756297294-1990.jpg	93	8	2024-01-10 09:00:00
109	iPhone 14 Pro	Latest iPhone with A14 Pro chip, 48MP camera, and ...	1000.00	/uploads/products/product-1756297417-5350.jpg	19	1	2025-07-26 17:05:48
111	hp omen 15	Latest labtop	2000.00	/uploads/products/product-1756297353-3177.jpg	25	2	2025-07-26 18:22:41
112	Samsung Galaxy S24 Ultra	Flagship Android phone with 200MP camera, Snapdra...	1299.99	/uploads/products/product-1756297623-1687.jpg	35	1	2025-08-18 21:28:24
113	Xiaomi 14 Pro	Premium phone with Leica camera system and Snapdra...	999.99	/uploads/products/product-1756297900-9658.jpg	28	1	2025-08-18 21:28:24
114	HP Spectre x360	Premium convertible laptop with OLED display and L...	1499.99	/uploads/products/product-1756297363-7689.jpg	22	2	2025-08-18 21:28:24
115	MSI Stealth 17 Studio	Gaming laptop with RTX 4080, i9-13900HX and 17" QH...	2599.99	/uploads/products/product-1756297512-4277.jpg	18	2	2025-08-18 21:28:24
116	Microsoft Surface Pro 10	Business tablet with 13" touchscreen and Intel Cor...	1299.99	/uploads/products/product-1756297505-5854.jpg	32	3	2025-08-18 21:28:24
117	Huawei MatePad Pro 13.2	Ultra-thin tablet with Kirin 9000s and near-border...	899.99	/uploads/products/product-1756297372-8807.jpg	26	3	2025-08-18 21:28:24
118	Apple MagSafe Charger	Magnetic wireless charger for iPhone with 15W fast...	39.99	/uploads/products/product-1756297154-6758.jpg	200	4	2025-08-18 21:28:24
119	Samsung 45W Fast Charger	USB-C GaN charger with PPS technology for super fa...	49.99	/uploads/products/product-1756297608-4423.jpg	180	4	2025-08-18 21:28:24
120	Anker 737 Power Bank	24K mAh portable charger with 140W Power Delivery	149.99	/uploads/products/product-1756297107-9373.jpg	90	4	2025-08-18 21:28:24
121	Bose QuietComfort Ultra	Premium noise-cancelling headphones with immersive...	429.99	/uploads/products/product-1756297242-8172.jpg	42	5	2025-08-18 21:28:24
122	Sennheiser Momentum 4	Wireless headphones with 60-hour battery and adapt...	349.99	/uploads/products/product-1756297774-5458.jpg	38	5	2025-08-18 21:28:24
123	Steam Deck OLED	Handheld gaming PC with 7.4" HDR OLED display	549.99	/uploads/products/product-1756297868-6361.jpg	27	6	2025-08-18 21:28:24
124	Meta Quest 3	Mixed reality headset with pancake lenses and Snap...	499.99	/uploads/products/product-1756297497-6049.png	33	6	2025-08-18 21:28:24
125	Apple HomePod 2	Smart speaker with spatial audio and Siri integrat...	299.99	/uploads/products/product-1756297141-3368.jpeg	65	7	2025-08-18 21:28:24
126	Nest Learning Thermostat	Energy-saving smart thermostat with automatic scie...	249.99	/uploads/products/product-1756297521-9283.jpg	55	7	2025-08-18 21:28:24

Figure 4: Products Table.

id	name	email	password	role	created_at	active	image	pushToken
13	Rami	om.mos3b99@gmail.com	\$2a\$10\$nwIFS9220KOpiXILXgze/ZYwdYsOxjJ0r1n3tx.W...	admin	2025-08-03 19:22:34	1	http://localhost:8080/uploads/users/user-1755595467...	ExponentPushToken
18	Mosab12	mos3b h2017@gmail.com	\$2a\$10\$gkKJZ2srevEsBUZVchLheJ1uSUJrIS46w8C8kGc84E...	user	2025-08-18 08:58:46	1	http://localhost:8080/uploads/users/user-175655548...	ExponentPushToken
19	test9	ahmadwnabhan2023@gmail.com	\$2a\$10\$\$S2H8LbZG14EmvELgT4adu5HcszG6ZyfkjwWdVlO...	user	2025-08-21 10:28:57	1	NULL	ExponentPushToken

Figure 5 : Users Table.

- **Relationships:** One-to-Many and Many-to-Many.
- **Key Fields:** e.g., *product_name*, *price*, *stock*, *user_id*.
- **Constraints:** Primary Key, Foreign Key to maintain data integrity.
- **Database Function:** Organize products, manage orders, track inventory.

- **ER Diagram** to illustrate table relationships.

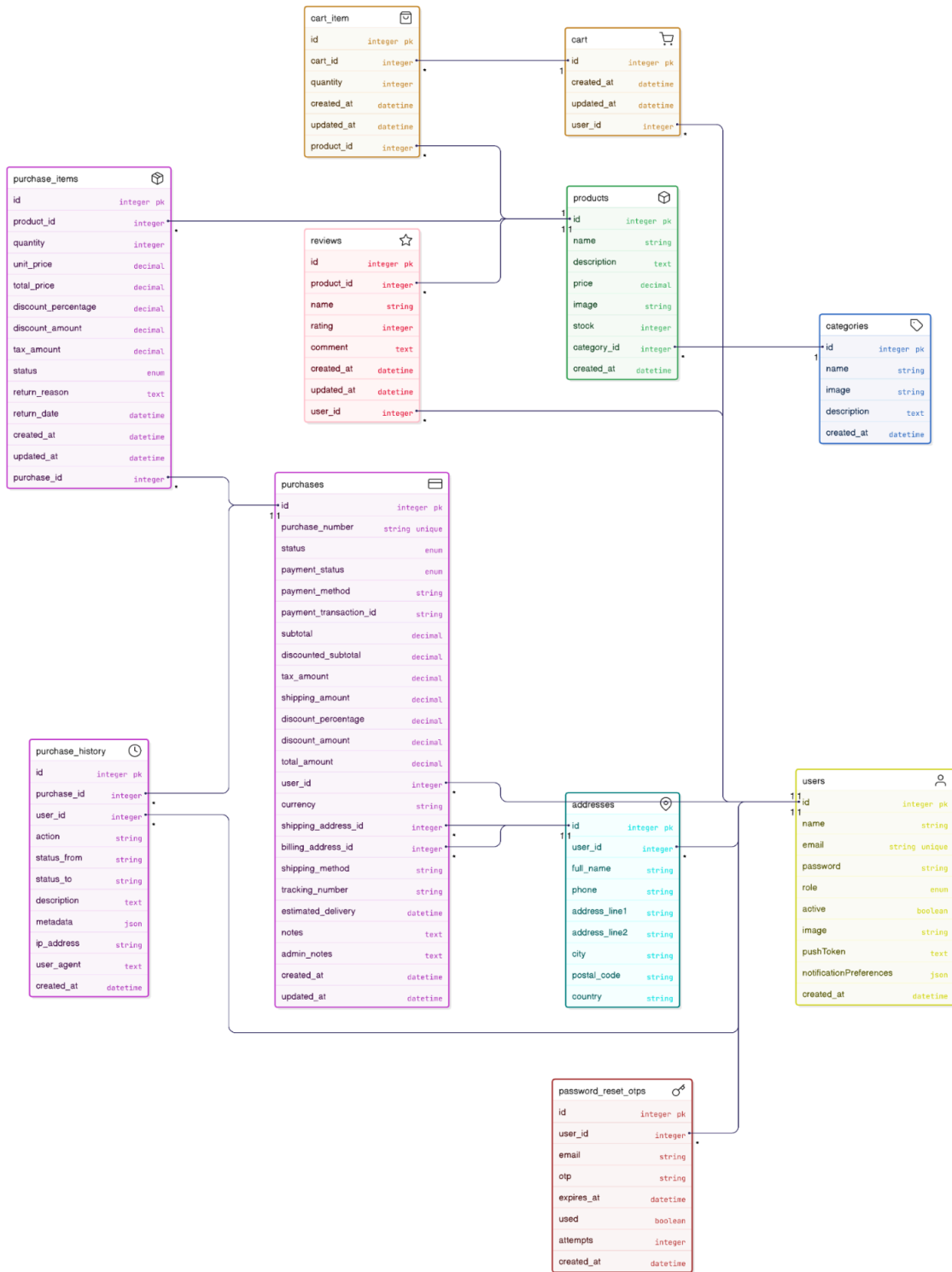


Figure 6 : ER Diagram for my database..

4.4 System Features Implementation

4.4.1 Admin Interface:

- Dashboard Page: Showing All Analytics & Charts & Overview For My Store.

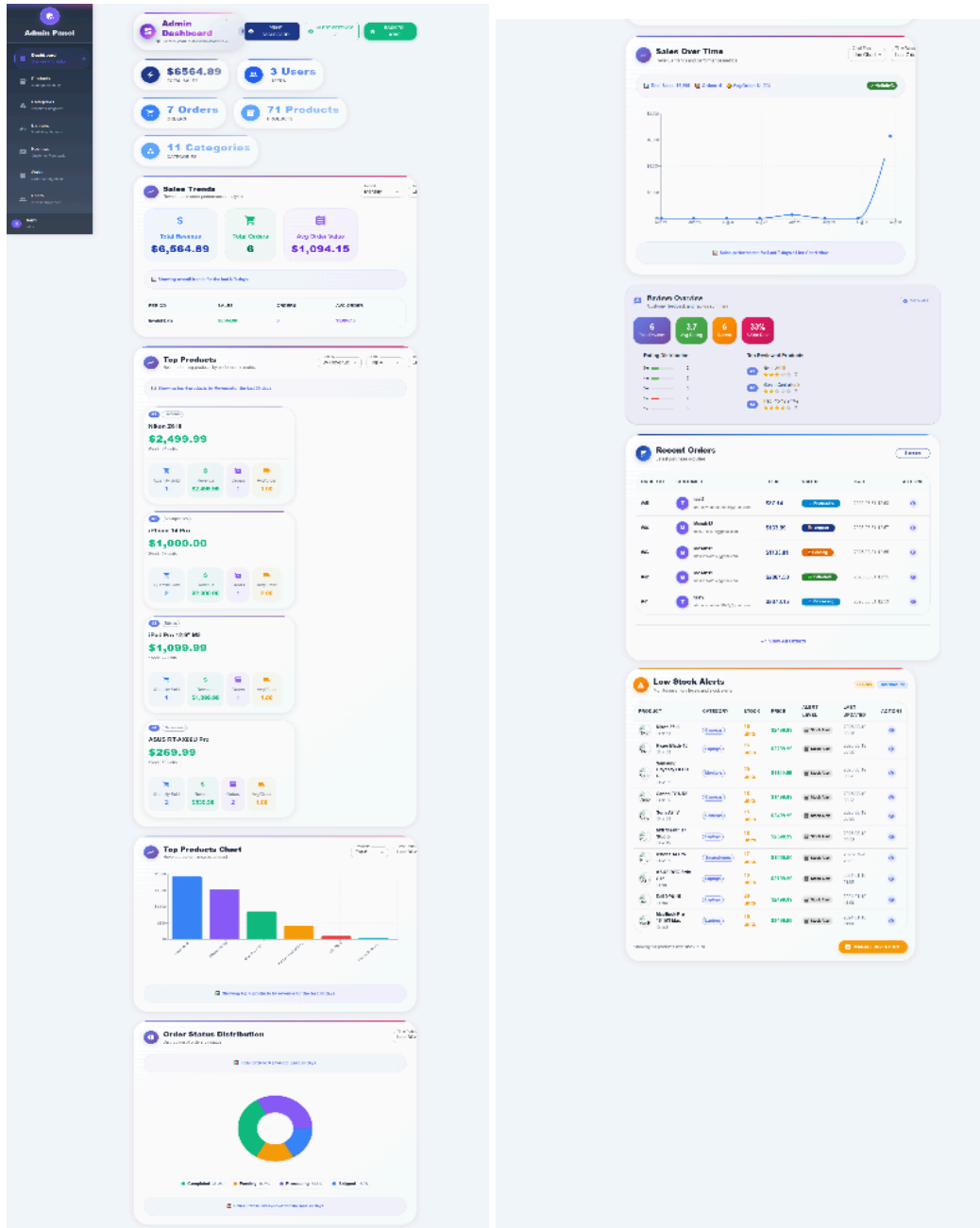


Figure 7: Dashboard Page.

- Add, edit, and delete products.

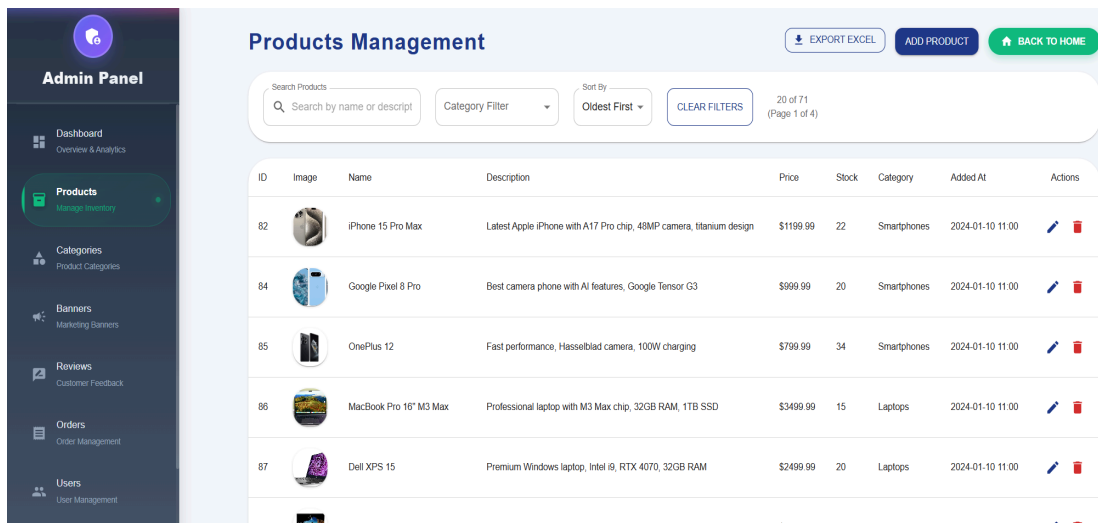


Figure 8 : Products page For Admin.

- Add, edit, and delete categories.

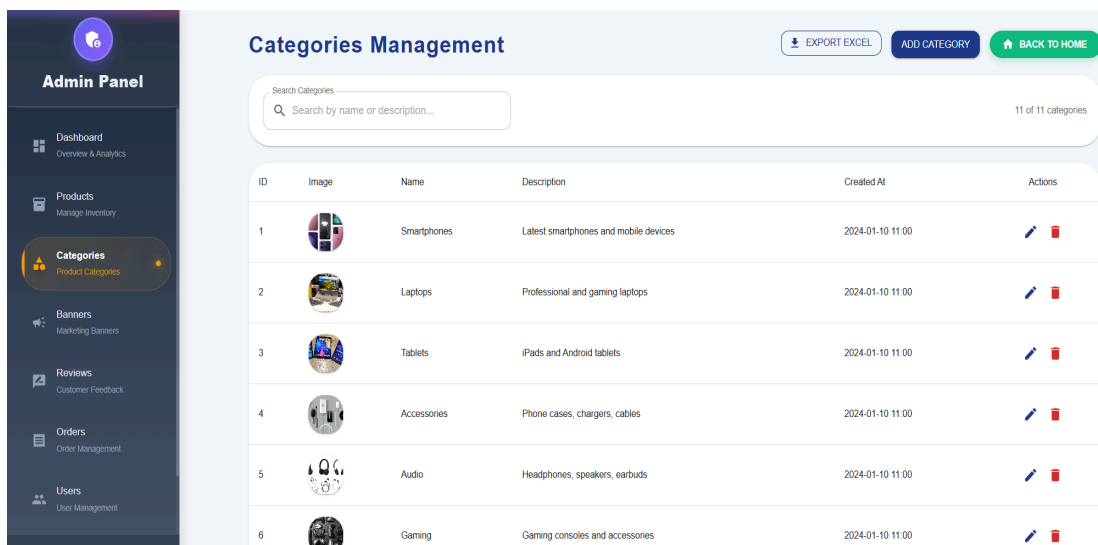


Figure 9 : Categories page For Admin.

- Manage orders (Purchases) and order status.

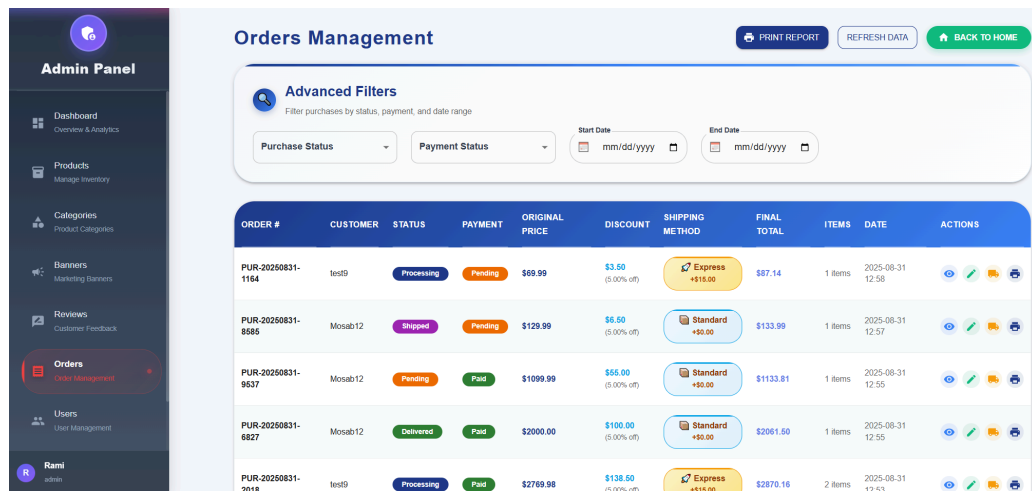


Figure 10 : Orders Management.

- Manage users and role-based access.

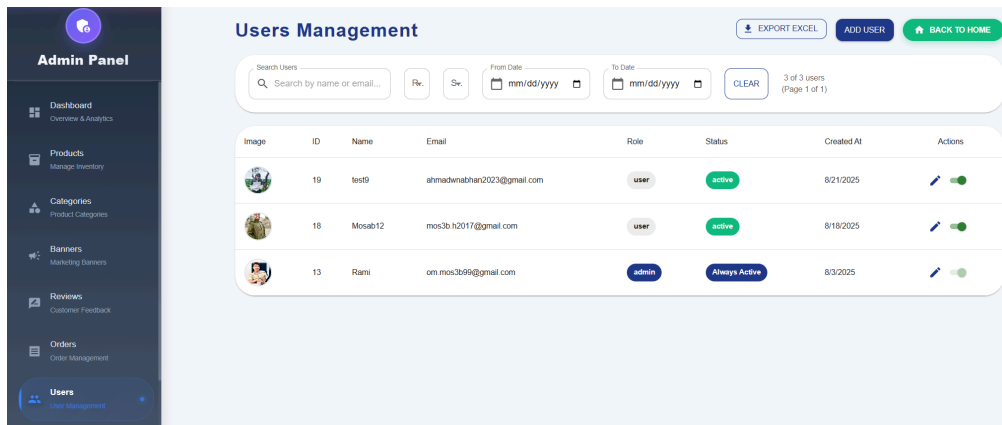


Figure 11 : Users page.

- View All Reviews and Analysis for them.

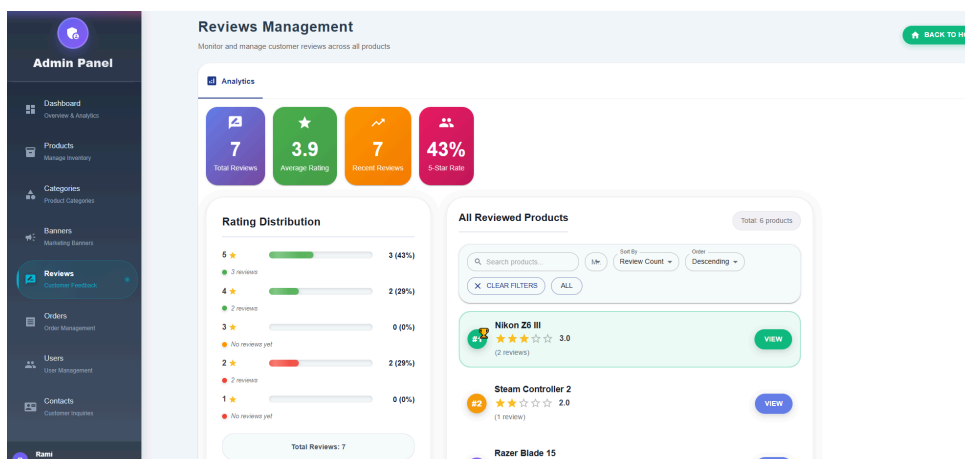


Figure 12 : Reviews page.

- Add , Edit , delete Banners.

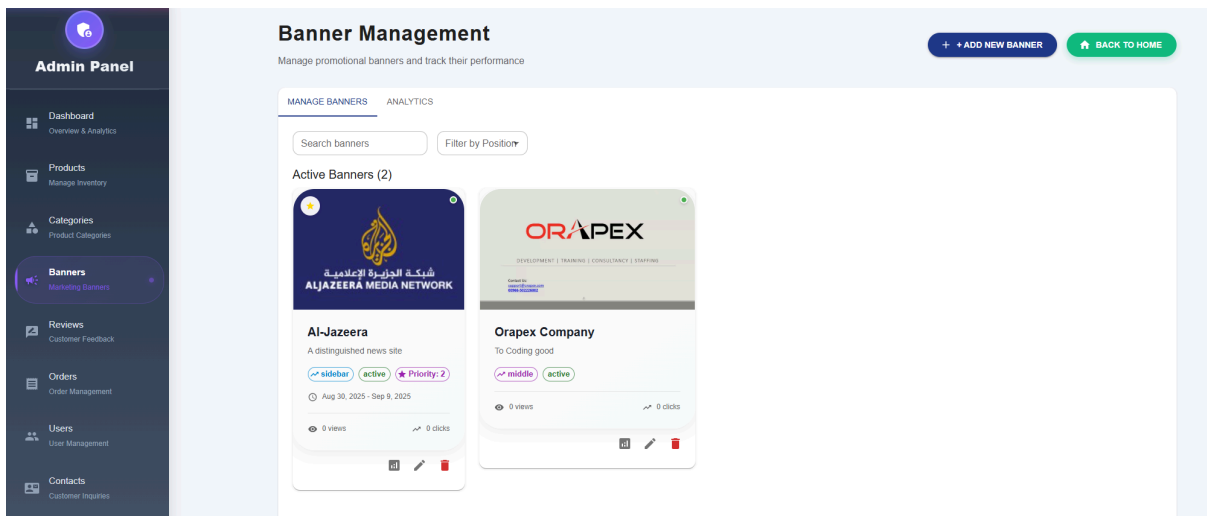


Figure 13 : Banners Management page.

4.4.2 User Interface:

- User Registration and login.

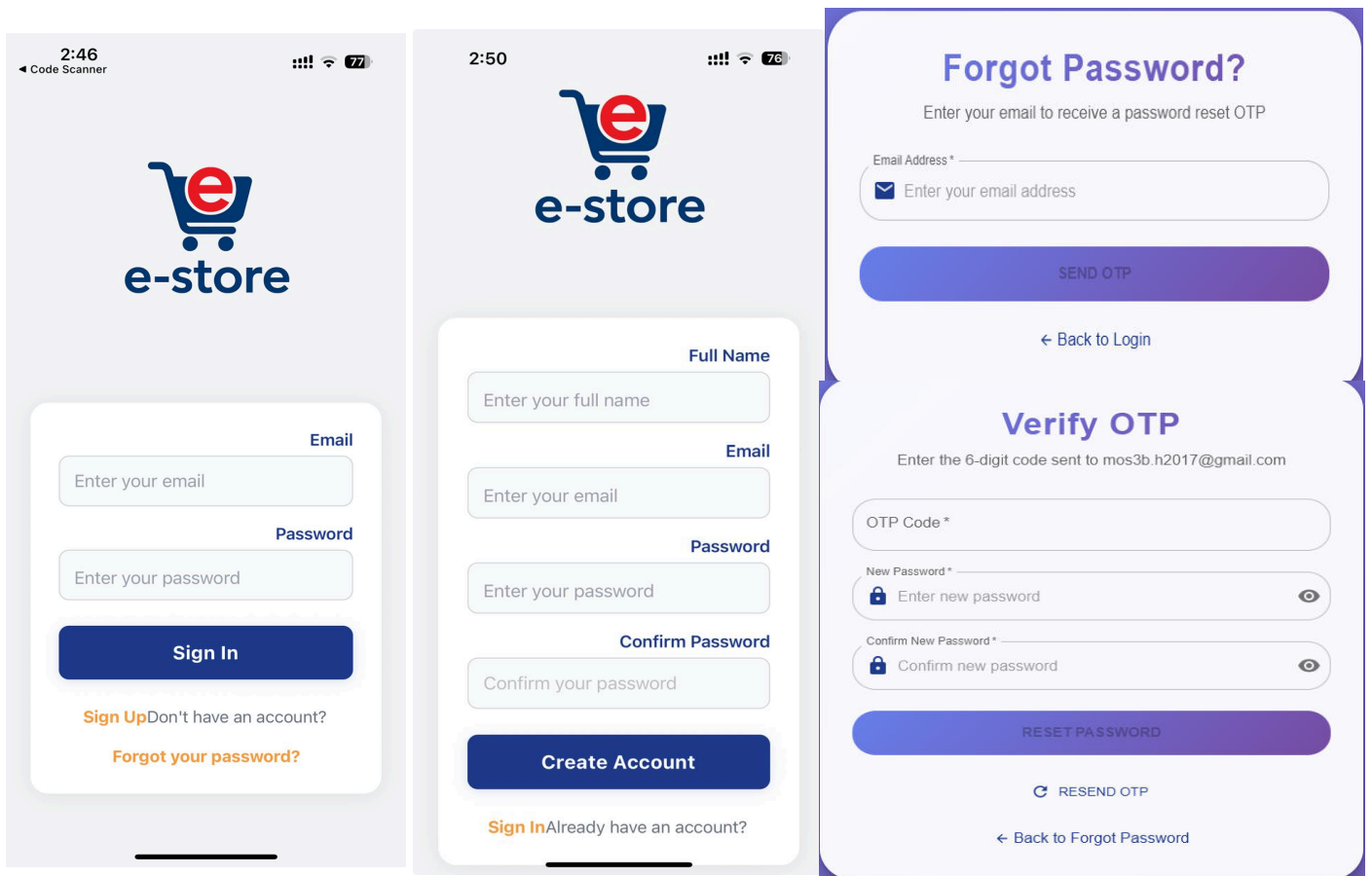


Figure 14 : Login page Registration page and forgot password pages for users.

- Display products with images, descriptions, and prices.

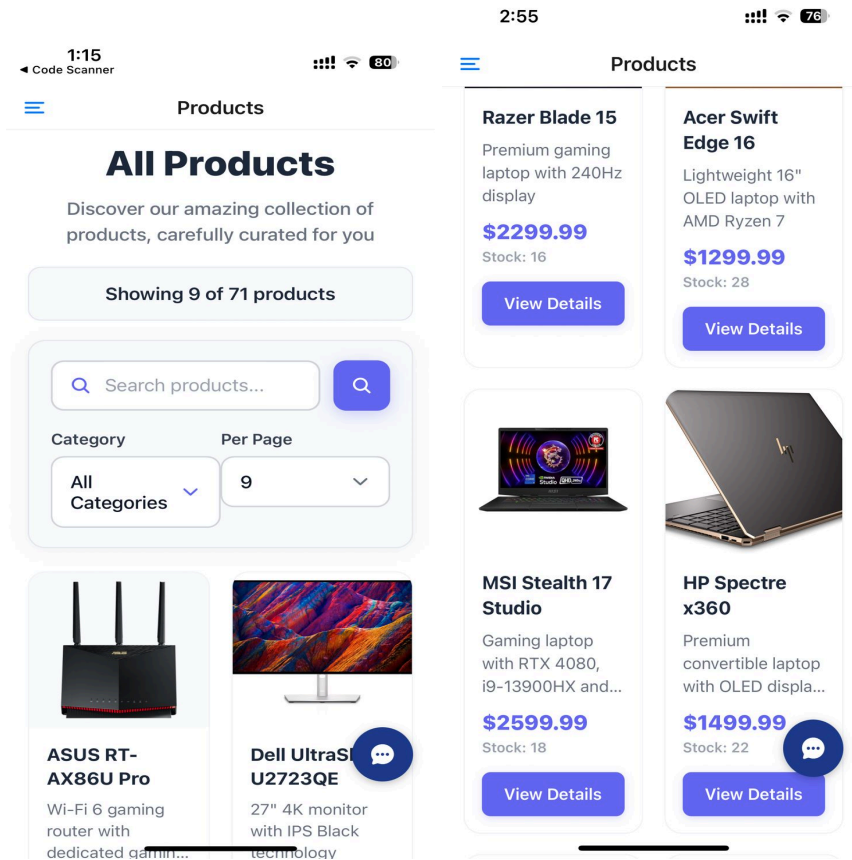


Figure 15 : Products page For Users (from mobile app).

- Search and filter products by category or price.
- Track orders and communicate with the store.

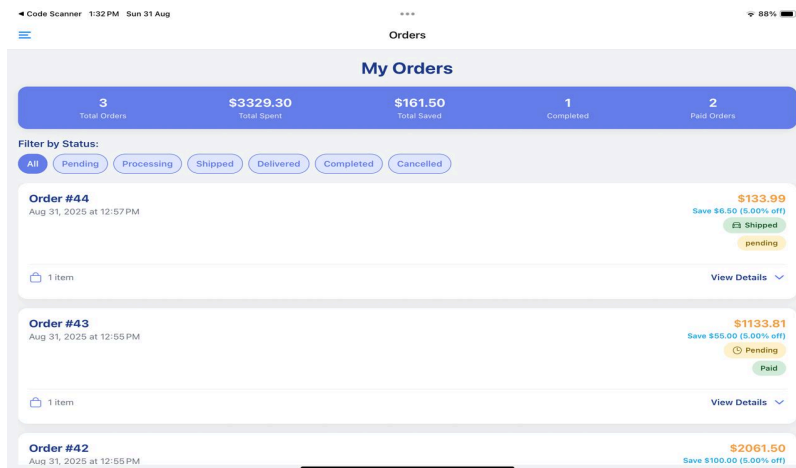


Figure 16 : Order page for Users (from mobile app).

- Add Products to cart and Add Address And checkout.

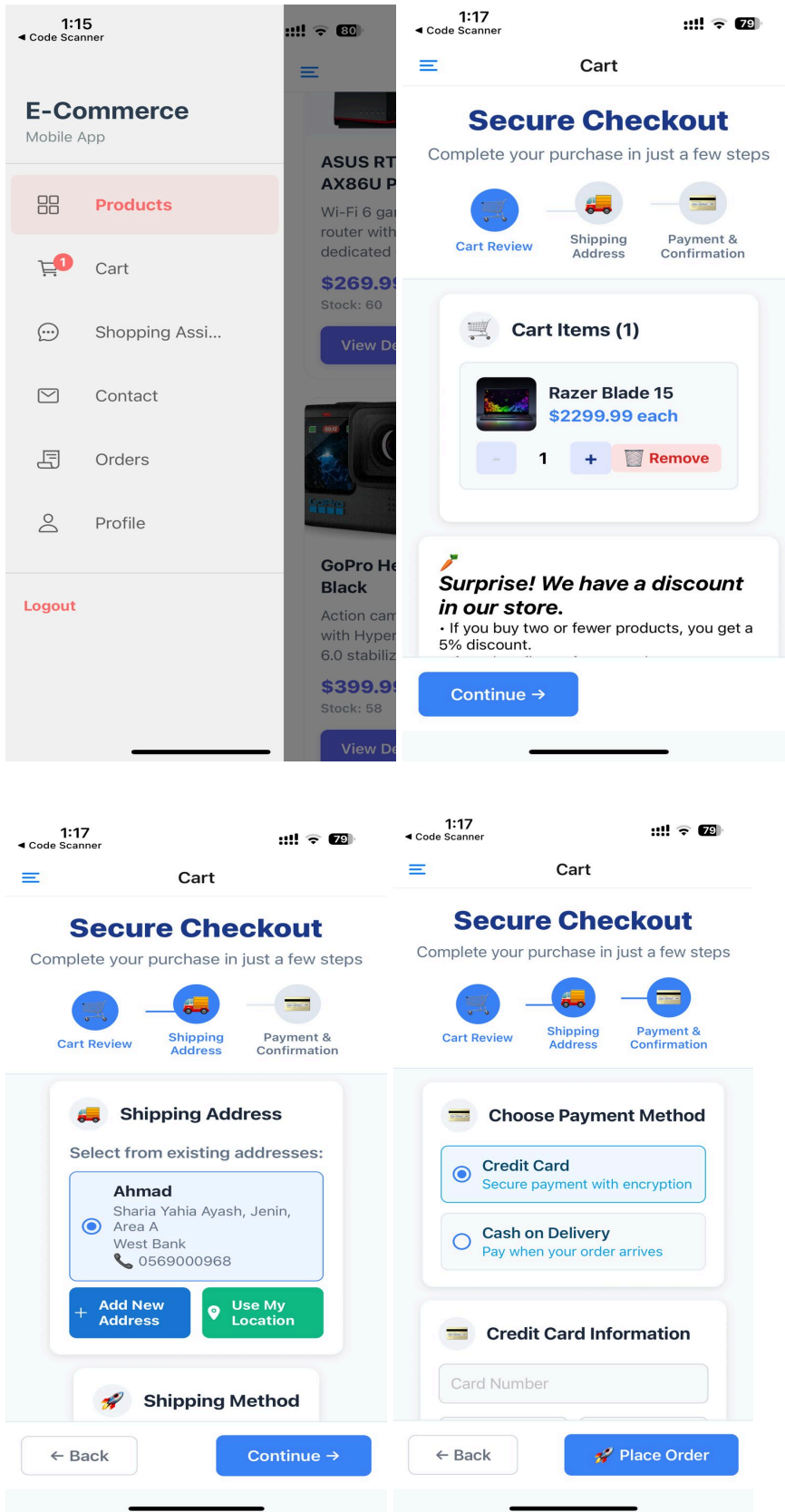


Figure 17 : Cart page for Users (from mobile app).

- Use the map to determine the location accurately and quickly, making it easier for the user.

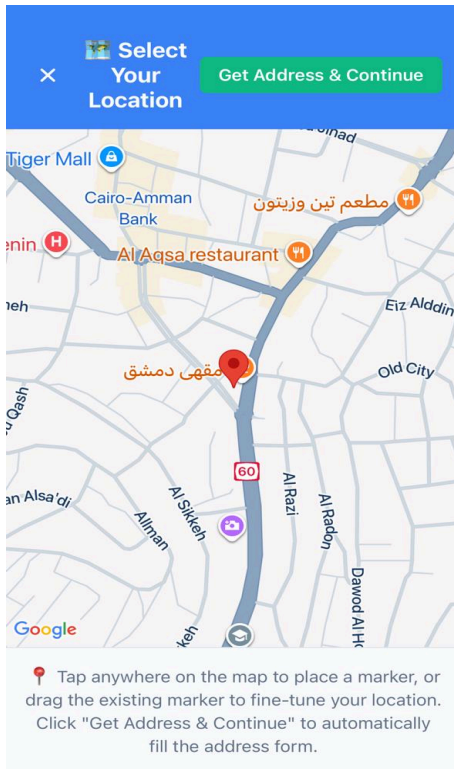


Figure 18 : Select Your Location page for Users (from mobile app).

- Receive push notifications and AI recommendations.

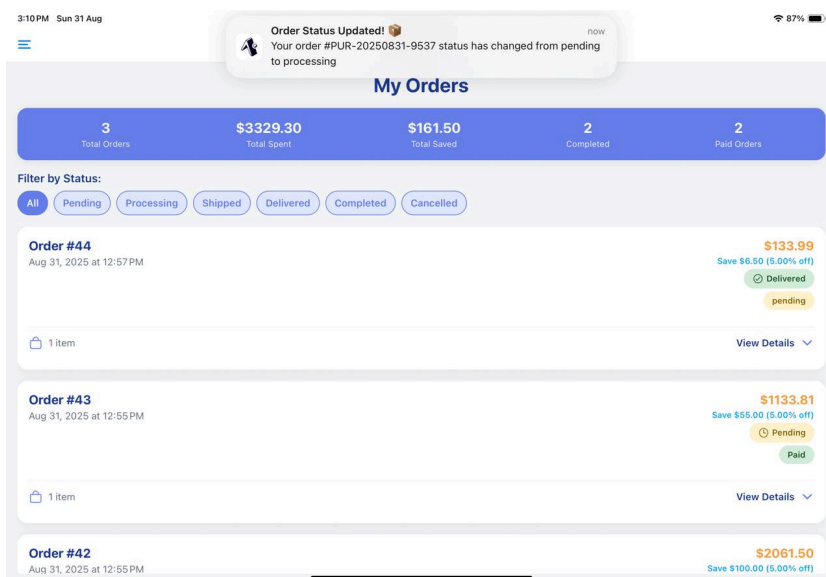


Figure 19 : Push Notifications .

- Using a smart bot to assist with product search and purchasing.

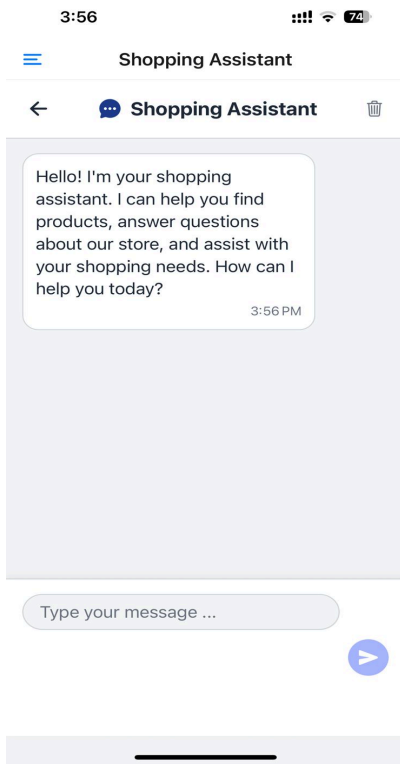


Figure 20 : Shopping Assistant page for Users (from mobile app).

- Edit , Update and change Password in Profile page.

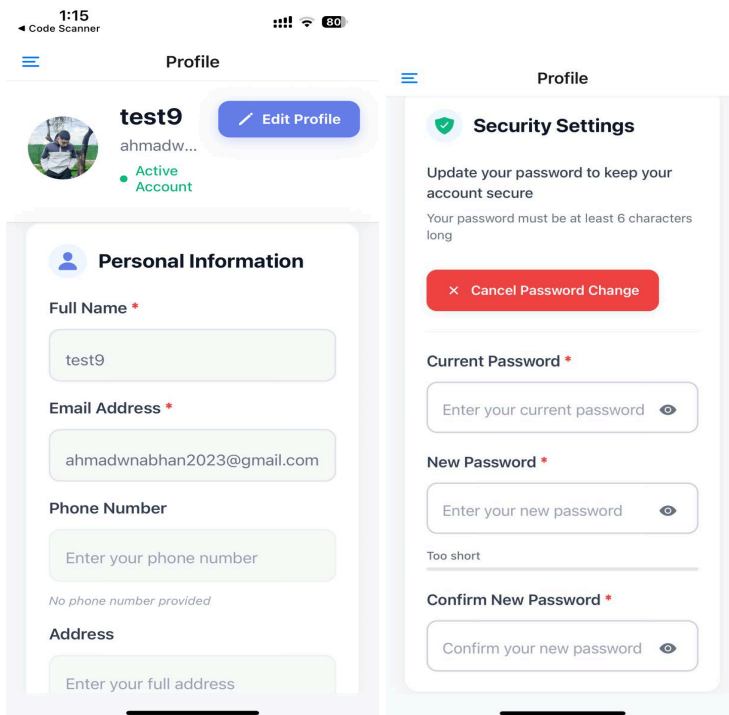


Figure 21 : Profile page for Users (from mobile app).

4.4.3 Integration / Optional Features:

- Online payment integration (Stripe) with future scalability.
- Future integration with automated shipping systems.
- Real-time inventory management.
- Integration with external services like SMTP and Chat GPT AI for enhanced user experience.

5 Results and Discussion

5.1 Challenges and Solutions

The project team faced several challenges during development, including:

1. **Tool and technology selection:** Multiple frameworks and libraries were tested before settling on React.js, React Native, Node.js, Express.js, and Sequelize.
2. **Paid tools and services:** Some services like AWS were paid, so the team relied on local image uploads and used Namecheap for mailbox services.
3. **Geolocation:** Due to limitations with Google Maps APIs, the free Leaflet tool was used for mapping functionality.
4. **Security and data protection:** While no formal security testing was performed, JWT authentication and bcrypt password hashing were implemented to provide a basic level of protection.
5. **Performance and responsiveness:** Performance was improved using database query optimization and RESTful API design.
6. **Local context adaptation:** Some features were adjusted to fit the technological and cultural context in the West Bank, with future scalability planned for integration with online payment and automated shipping systems.

5.2 Achievements

5.2.1 Primary Objectives Assessment

- **Responsive and user-friendly interface:** Material-UI components with responsive design created an intuitive interface, with users expressing high satisfaction.
- **User registration and management:** JWT-based authentication and bcrypt password hashing provided a basic level of security and smooth session handling.
- **Dynamic product catalog with search and filtering:** Includes advanced search, category filtering, and real-time inventory updates, with acceptable response times for a good user experience.
- **Comprehensive admin panel:** Admins can manage users, products, orders, and view basic reports.

5.2.2 Secondary Objectives Assessment

- **AI-powered product recommendations:** OpenAI integration enabled smart product suggestions and chatbot support, improving user engagement even without precise conversion testing.
- **Mobile application development:** React Native supports push notifications, offline functionality, and good cross-platform compatibility.
- **Analytics and reporting:** Provides initial insights into user behavior and sales performance through basic dashboards.
- **Scalability and performance:** Database and API design support current users, with the possibility of future expansion to accommodate more users.

6 Conclusion

We have provided an application that helps all people in the purchasing process and Browse through many products with a distinctive appearance

6.1 Project Summary

The **E-Store** application was developed to simplify the shopping experience for users. It allows dynamic display of products, advanced search and filtering by category, and easy order management. The application also provides a comprehensive admin panel to manage users, products, orders, and monitor performance.

Key features implemented in the project include:

- Dynamic product catalog with search, filtering, and category management.
- User registration and authentication using JWT and password hashing.
- Comprehensive admin panel for managing users, products, and orders.
- AI-powered product recommendations via OpenAI integration.
- Mobile application supporting push notifications and cross-platform compatibility.
- Basic analytics system to gain insights into user behavior and sales performance.

Despite challenges such as limited paid tools and mapping service constraints, a practical and functional version of the project was achieved, meeting most of the primary and secondary objectives.

6.2 Future Work

The project can be further developed in the future to add more intelligent features and enhance user experience. The proposed improvements include:

1. **User Experience (UX) Enhancement:**
 - Conduct direct user testing to identify navigation and usability issues within the website or mobile application.
 - Utilize intelligent analytics to pinpoint weaknesses and improve the user interface, making the shopping experience easier and faster.
 - Analyze user feedback using artificial intelligence to understand user sentiment (satisfied, neutral, dissatisfied) and assist

management in improving product quality and service.

2. Personalized Offers and Marketing:

- Develop an intelligent system that recommends promotions and discounts based on user preferences and purchase history, helping to increase sales and retain customers.

3. Integration with Smart Shipping and Inventory Management:

- Employ artificial intelligence to monitor inventory more efficiently and optimize shipping planning, saving time and reducing operational costs.