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My Menu – Smart QR-Based Outlet System

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Abstract: The "*My Menu – Smart QR-Based Outlet System*" is a digital platform that modernizes how businesses like restaurants, shops, and service providers share their profiles and product lists. Businesses can add details such as name, timings, images, and location, then generate a QR code for customers to access their profile. Built with ReactJS and using localStorage for offline data handling, the system allows dynamic item management (with images, prices, and categories) without needing cloud services. Customers get a read-only view, while owners can manage content via a user-friendly interface. The responsive design supports mobile/desktop use and optional geolocation. This scalable, eco-friendly system offers a modern, cost-effective alternative to printed catalogs.

Keywords: QR Code, ReactJS, Web Application, LocalStorage, Digital Catalog, Contactless System, User Interface, Business Profile, Smart Menu, Frontend Development

I. INTRODUCTION:

1.1 Background

In the modern business environment, digital tools play a crucial role in customer engagement and operational efficiency. Small and medium-sized enterprises (SMEs) across sectors like grocery, retail, and gift shops often lack access to simple, affordable digital systems. Traditional paper-based catalogs or static displays limit interaction and visibility.

My Menu – Smart QR-Based Outlet System offers a solution: a digital platform that allows businesses to display their product catalog via a QR code. Customers can scan the QR using their smartphones to instantly access the business profile, view product listings, and interact with the brand—without requiring any app installation or expensive hardware.

This contactless, user-friendly solution bridges the gap between physical and digital retail, empowering businesses to modernize without complexity or cost.

1.2 Problem Statement

SMEs often struggle with outdated methods of product promotion and customer engagement. Manual catalogs, verbal product descriptions, or printed menus are inefficient and fail to meet the expectations of today's tech-savvy customers who prefer digital interaction.

Without digital presence, these businesses lose potential engagement and sales. Additionally, customers expect real-time access to product information in a convenient format. A cost-effective, easy-to-implement solution is necessary for enabling digital transformation at the local business level.

My Menu addresses this gap by providing a QR-based display platform that creates digital catalogs accessible with a single scan.

1.3 Objective Of The System

The main goal of this project is to create a lightweight, scalable, and accessible system for business digitization. Key objectives include:

- **Business Profile Management:** Create and edit business details like name, logo, contact info.
- **Product Catalog Management:** Add and update item names, prices, images, and descriptions.
- **QR Code Generation:** Automatically generate scannable QR codes linked to the business profile.
- **Customer Interaction:** Provide an interface for customers to view items through QR scanning.

- **Local Data Storage:** Use browser localStorage for data persistence without a backend.
- **Adaptability:** Work across various business types with minimal customization.

1.4 Scope Of The Project

This system serves three types of users:

- **Business Owners:** Create profiles and manage their product catalog.
- **Customers:** Scan QR codes and view item details.
- **Admin (Optional):** Oversee and approve profiles if extended to multi-tenant environments.

The platform intentionally omits e-commerce features like order and payment handling to remain simple and focused. Future expansions could integrate those as optional modules.

1.5 Significance Of The Project

My Menu empowers SMEs to go digital without requiring technical expertise or large investments. It enables businesses to:

- Deliver a modern, contactless browsing experience.
- Instantly update their catalog in real-time.
- Improve visibility and customer engagement.

The project's use of QR codes ensures simplicity and hygiene, while its adaptability across sectors makes it a versatile tool for digital growth.

II. LITERATURE REVIEW / RELATED WORK

In recent years, digital transformation has become crucial for small businesses, especially in areas such as menu management and customer interaction. The adoption of QR code technology has significantly influenced contactless communication, enabling businesses to deliver information and services efficiently.

Several studies and projects have explored QR code-based systems for digital menus and product catalogs. For instance, Kumar et al. (2023) proposed a QR Code Enabled Restaurant Menu system, which allows customers to scan QR codes to access digital menus, enhancing hygiene and customer convenience. Similarly, Patel and Shah (2022) developed a Contactless Ordering System using QR codes integrated with mobile applications, improving order accuracy and reducing service time.

Moreover, ReactJS has emerged as a preferred frontend framework due to its component-based architecture and efficient state management. Research by Singh and Verma (2021) highlights ReactJS's suitability for building scalable and dynamic web applications, which aligns with the goals of the My Menu project.

Despite these advancements, many existing solutions rely on backend databases and complex server configurations, which can be costly and difficult for small businesses to maintain. The My Menu – Smart QR-Based Outlet System addresses this gap by using local browser storage (localStorage) for data persistence, eliminating the need for server infrastructure while still providing dynamic catalog management.

This approach not only reduces implementation complexity but also offers fast, offline-capable access to business profiles and menus. The literature suggests that leveraging frontend technologies alongside QR code integration can significantly improve the accessibility and scalability of digital business solutions.

III. SYSTEM DESIGN

3.1. Architecture Diagram

- Describes the overall structure of the system.
- Explains user interaction, QR code generation, and data flow between modules.
- Referenced in your document as:

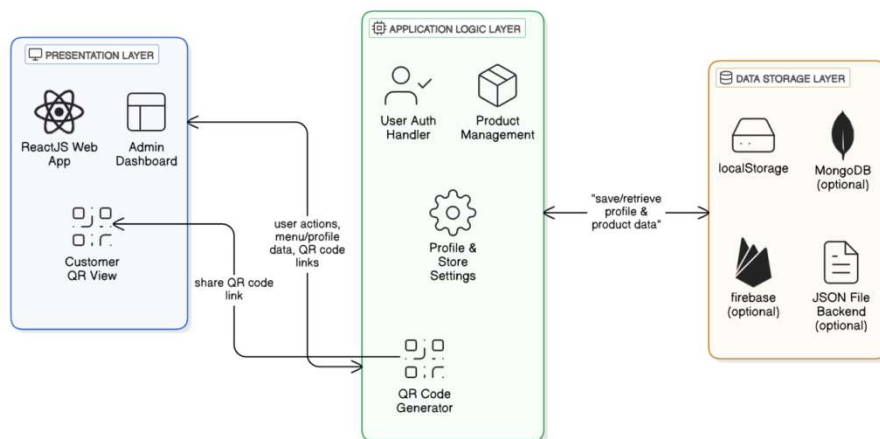


Figure 3.1: Architecture Diagram

3.2. Data Flow Diagram (DFD)

- Illustrates how data moves through the system between components.
- Includes:
 - User Profile Flow
 - Customer Flow
- Referenced as:

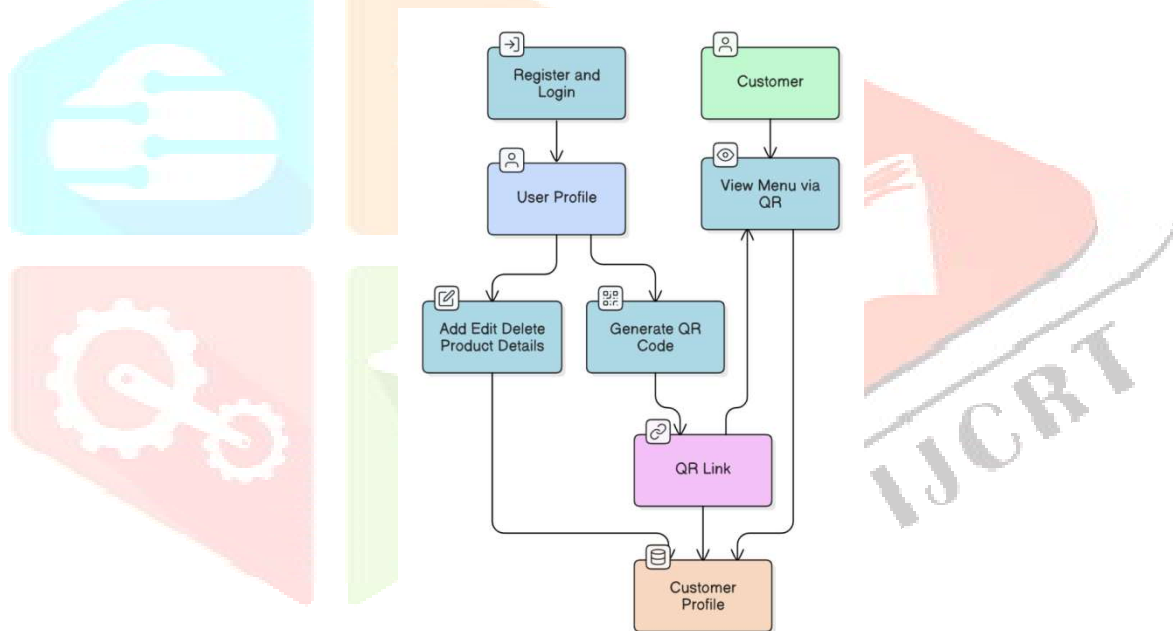


Figure 3.2: Data Flow Diagram

3.3. Use Case Diagrams

- Visual representation of user interactions with the system.
- Includes:
 - Business Owner Use Case (registration, product upload, QR generation)
 - Customer Use Case (scan QR, view catalog)
- Referenced as:

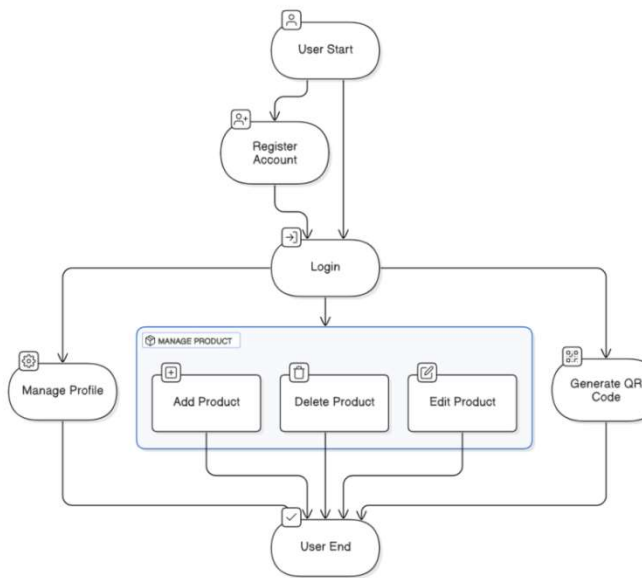


Figure 3.3.1: Use Case Diagram (User Profile)

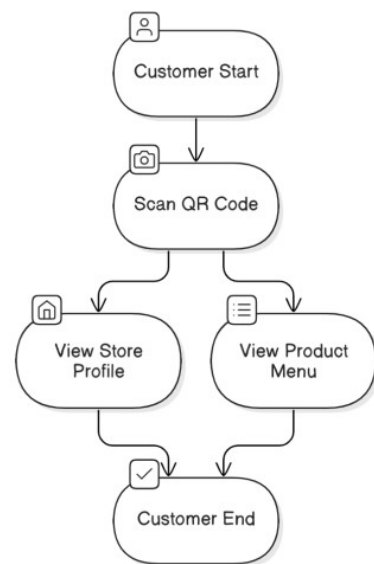


Figure 3.3.2: Use Case Diagram (Customer Profile)

3.4. Sequence Diagram

- Step-by-step flow of actions between system and users.
- Shows:
 - Login → Product add/edit → QR generation → Customer scan
- Referenced as:

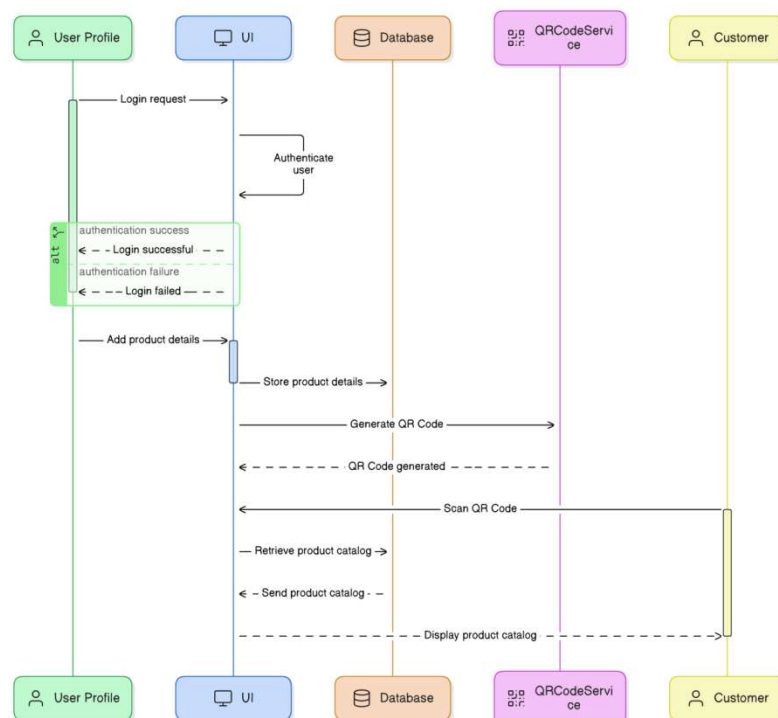


Figure 3.4: Sequence Diagram

3.5. Collaboration Diagram

- Shows component interactions (e.g., UserProfile.js, AddPostModal.js, etc...)
- Referenced as:

Collaboration Diagram – My Menu (QR-Based Product Display System)

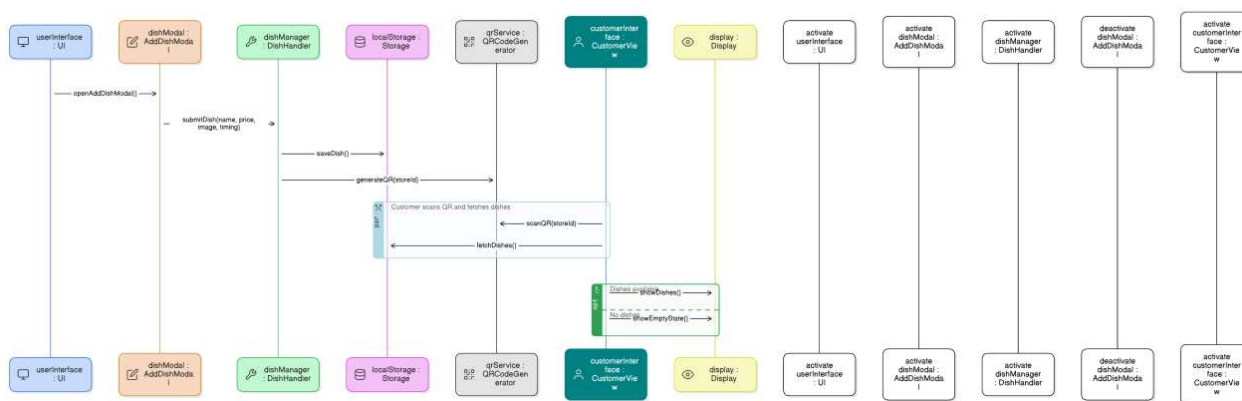


Figure 3.5: Collaborative Diagram

3.6. Database Design

- LocalStorage used as a lightweight database.
- Shows how users, currentUser, and posts are stored.
- Referenced as:

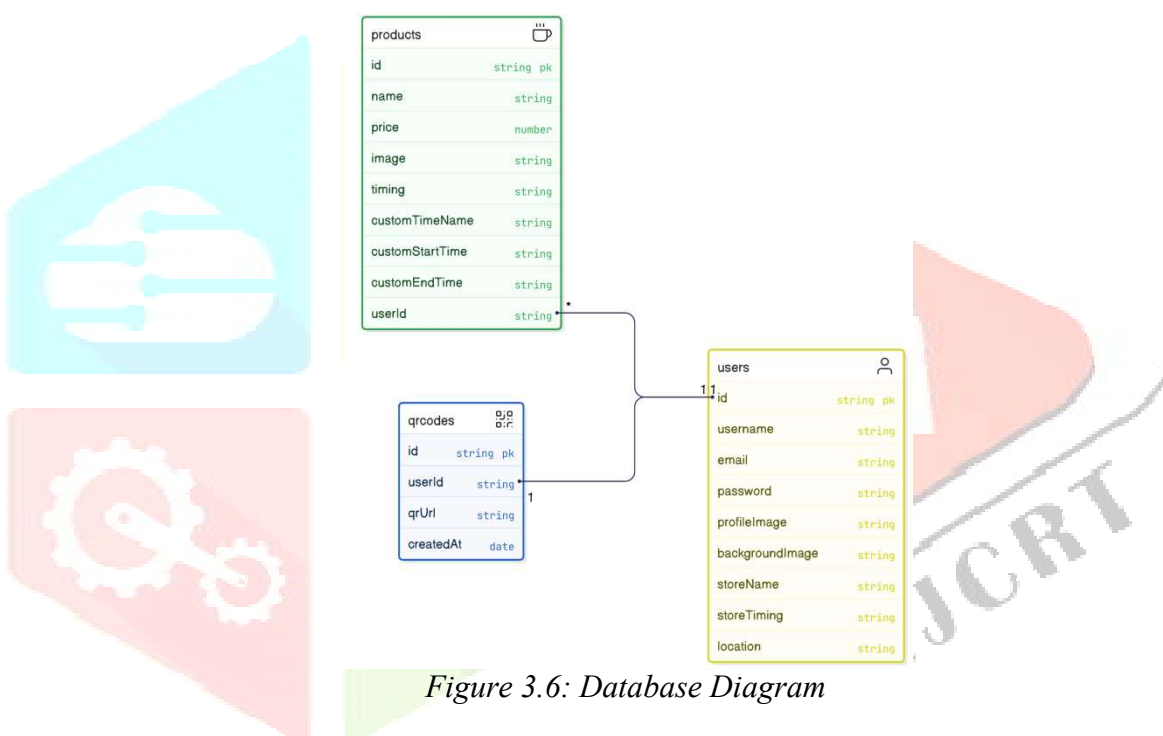


Figure 3.6: Database Diagram

IV. RESEARCH METHODOLOGY

The research methodology employed in the development of the 'My Menu – Smart QR-Based Outlet System' project follows a structured and agile approach. This methodology focuses on delivering a user-centric, scalable, and efficient solution using modern web technologies. The project underwent multiple phases including requirement gathering, design, implementation, testing, and deployment. Below is a detailed breakdown of each phase in the applied methodology:

4.1 Requirement Analysis

Initial research was conducted to identify the pain points in traditional menu and catalog systems, especially for small businesses. Interviews, online sources, and competitor analysis were used to define functional and non-functional requirements.

4.2 Design Phase

The design phase included creating architecture diagrams, data flow diagrams, and UI wireframes. The frontend component architecture was planned using ReactJS, ensuring reusability and maintainability.

4.3 Development Phase

Development was carried out using the ReactJS framework. The application modules were implemented in parallel, including user registration, profile management, item catalog, and QR code integration. LocalStorage was used for persistent data storage without a backend.

4.4 Testing and Validation

Unit testing and manual functional testing were conducted to verify each module's behavior. The application was also tested for responsiveness and cross-browser compatibility. Issues like form validation, dynamic rendering, and data persistence were addressed iteratively.

4.5 Deployment and Review

The final build was reviewed and prepared for deployment on platforms like Vercel for demo purposes. User feedback was collected for usability and visual design, helping shape further enhancements.

4.6 Tools and Technologies Used

- ReactJS for frontend user interface
- JavaScript and JSX for scripting
- CSS for styling
- LocalStorage API for data persistence
- QR code generation libraries

V. TESTING AND RESULTS

5.1 Testing Methodology

To ensure the system functions reliably and efficiently, a combination of manual and functional testing techniques was adopted. The focus was on validating all modules, including user registration, profile management, catalog operations, QR code generation, and customer view accessibility. Testing was performed on multiple devices and browsers to ensure compatibility and responsiveness.

5.2 Types of Testing Performed

- **Unit Testing:** Each component, such as login, registration, and catalog display, was tested independently to verify correctness.
- **Integration Testing:** Confirmed smooth data flow and communication between modules (e.g., profile data correctly populates the catalog).
- **Functional Testing:** Ensured all user actions (add/edit/delete items, generate QR, scan QR) produced expected results.
- **Compatibility Testing:** The application was tested on browsers like Chrome, Firefox, Edge, and on mobile devices with different screen sizes.
- **Usability Testing:** End-user feedback was collected to assess UI intuitiveness and ease of navigation.

5.3 Sample Test Cases

Table 5.1: Sample Test Cases

Test Case	Input	Expected Output	Result
User Registration	Valid username, password, images	New user profile created in LocalStorage	Passed
Catalog Item Addition	Item name, price, image, timing	Item displayed in profile and saved	Passed
QR Code Generation	Active user profile	QR code generated and displayed correctly	Passed
Customer QR Scan	Scan QR code using smartphone	Customer-facing catalog loads successfully	Passed

5.4 Results Summary

The system performed consistently across all testing scenarios. Data persistence using LocalStorage was stable with no loss between sessions. QR code generation and scanning worked flawlessly on all tested devices. Users found the interface simple, responsive, and accessible, confirming the system’s usability and performance goals.

VI. SCREEN SHOTS:

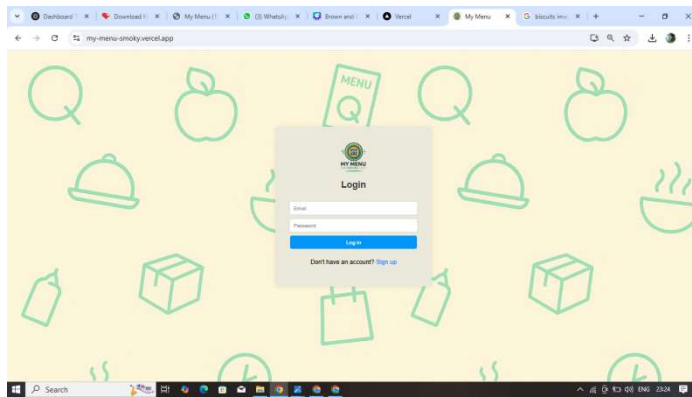


Figure 6.1: Login Page

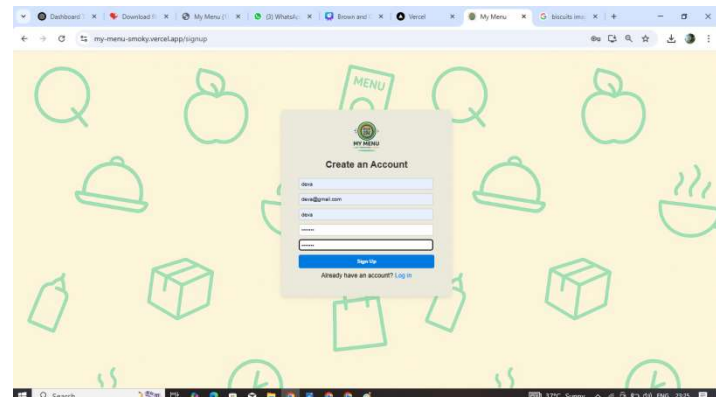


Figure 6.2: Singup Page

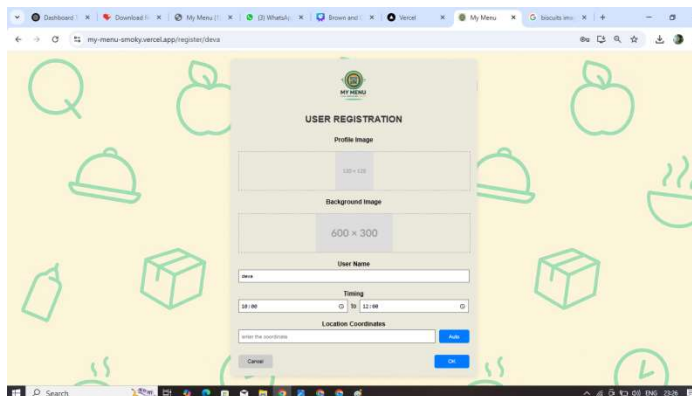


Figure 6.3: User Registeraton Page

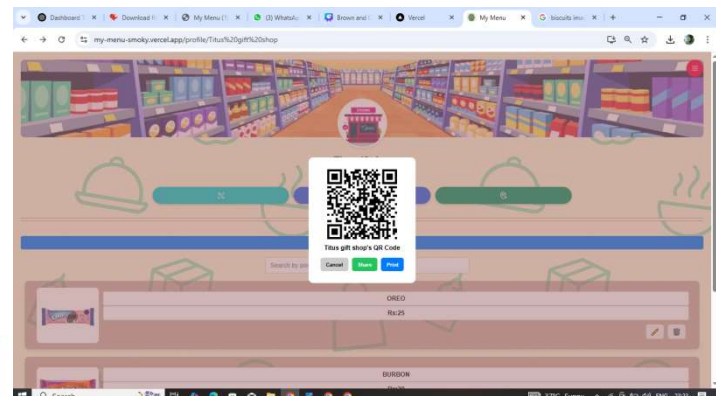


Figure 6.7: Qr Scan Page

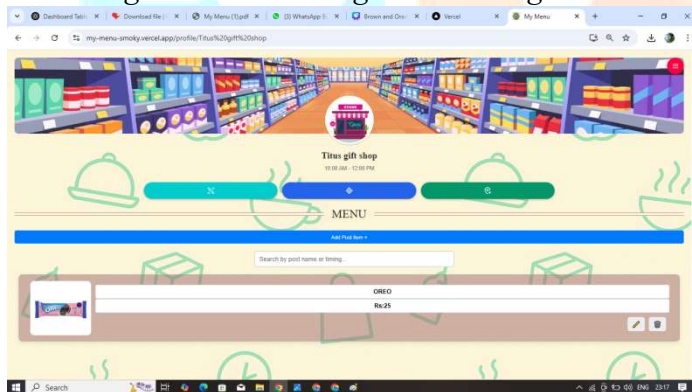


Figure 6.4: User Profile Page

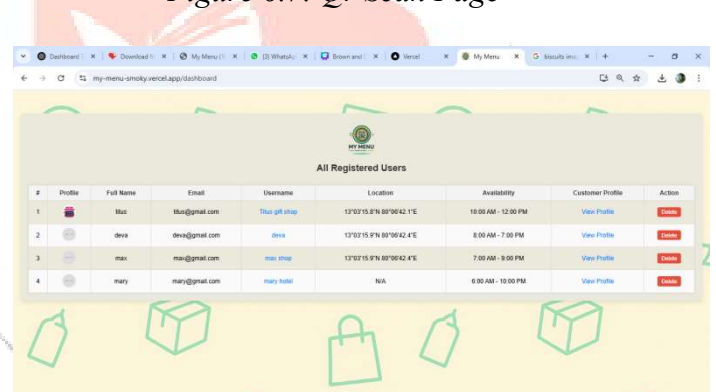


Figure 6.6: Dashboard Page

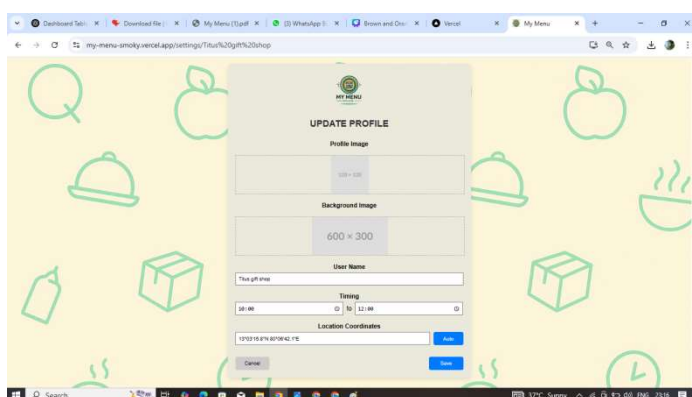


Figure 6.9: User Profile Setting Page

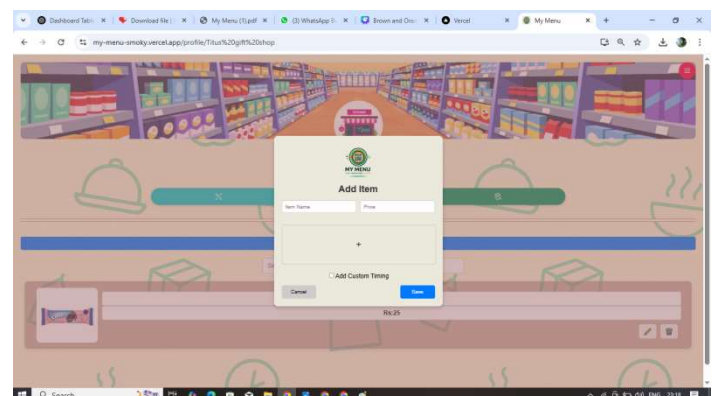


Figure 6.5: Add Item Page

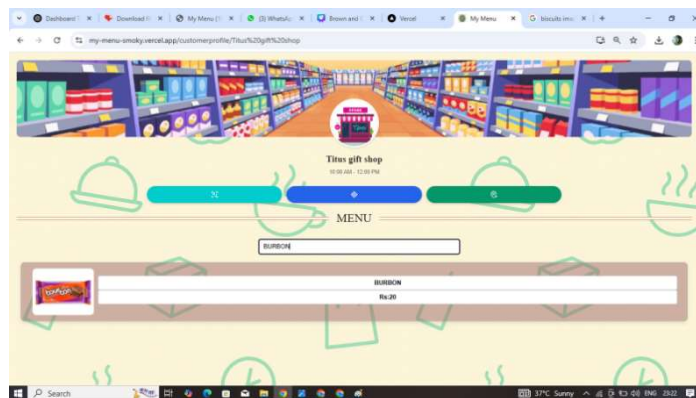


Figure 6.8: Customer Profile Page

VII. CONCLUSION

My Menu – Smart QR-Based Outlet System The has successfully established a platform that facilitates businesses in managing their profiles, products, and customer interactions through a streamlined and accessible interface. By leveraging QR codes, businesses—ranging from grocery stores to gift shops—can provide customers with a dynamic and interactive way to browse products and services without requiring them to physically interact with menus or product catalogs. The core functionality of the system, which includes user authentication, business profile management, product listings, and QR code generation, has been efficiently implemented, offering a seamless experience for both business owners and customers.

The use of **localStorage** for storing user and business data provides a lightweight and efficient solution that minimizes reliance on server-side infrastructure. This approach ensures faster data retrieval, reduces overhead costs, and increases the overall performance of the system. By storing essential data on the client side, the platform is designed to be both scalable and responsive.

The system's modular design allows for easy expansion, providing the flexibility to accommodate new features and functionalities in the future. It is built with adaptability in mind, ensuring that businesses from different sectors can seamlessly integrate and manage their online presence without a steep learning curve. Additionally, the clean and user-friendly interface ensures that customers can quickly scan QR codes, view products, and interact with businesses in an intuitive manner.

Overall, the project successfully fulfills its primary goal of offering businesses an innovative way to engage with their customers through digital means. By leveraging QR codes and a simple product catalog interface, **My Menu** addresses the need for businesses to streamline customer interactions while reducing operational overhead.

VIII. FUTURE ENHANCEMENTS

As the demand for contactless and digital solutions continues to grow across various business sectors, the “My Menu – Smart QR Outlet System” has significant potential for expansion and improvement. The following are planned future enhancements aimed at improving functionality, user experience, and scalability:

- **User Authentication with OTP/Email Verification:** To improve security and prevent unauthorized access, the system will be enhanced with mobile OTP or email-based verification during registration and login processes.
- **Dynamic Admin Dashboard:** A dedicated dashboard for outlet owners will be introduced, providing real-time analytics on menu views, customer engagement, and user location statistics. This will help businesses track trends and optimize their offerings.
- **Multilingual Interface:** To make the platform more inclusive and user-friendly for a diverse audience, support for multiple regional languages will be added for both the owner and customer views.
- **Offline Menu Access:** Future updates will include caching of menu data so that customers can still view the menu by scanning the QR code even when there is limited or no internet connectivity.
- **AI-Based Recommendations:** Machine learning algorithms can be incorporated to recommend top-selling or time-based items (e.g., breakfast, lunch, or dinner-specific highlights) based on user behavior and item popularity.

- **Mobile Application (Android/iOS):** To increase accessibility, a cross-platform mobile app version of the system will be developed using frameworks like React Native or Flutter, offering smoother navigation and native features.
- **Secure Online Payment Gateway (Optional):** If the system evolves to include ordering features, payment gateway integration will allow users to pay directly through the platform using UPI, debit/credit cards, or wallets.

IX. REFERENCE

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