

QR Based Food Ordering & Dine System

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Abstract—The project handles an Application which enables a customer to reserve a table and choose their menu from a restaurant at their own convenience. Manual table reservation is now going obsolete in modern restaurants and increasingly getting popular. Suppliers are now more inclined towards a digital system of booking. In this manual setup, everything relies on the Waiter & booking diary, there's no automated system for keeping the records. The general objective is to create a solution for the restraining problems caused by manual reservation systems. These solutions would include a Reservation System for Table and menu that helps save Time and Money. The modern world heavily relies on tech services, mainly over the internet and so the project is designed to help restaurant owners modernize and automate their business processes. In the proposed Reservation System, we give customers the option to reserve a table, menu, or both, whichever serves their convenience better. The objective of the Online Food Ordering System is to modernize the available manual system using modern device technologies and computer software to meet their stipulated requirements while preserving their critical information.

Keywords—Digital System, Reservation System, Modernize, Automate.

I. INTRODUCTION

This application offers an automated self-service system for table and menu bookings. This system can be modified, control the bookings and also manage restaurant availability and reservations. The owner manages the admin-portal to check the booking and make the availability for the customer. Services offered are customer managed menu and table booking through the system. Primary aim is to issue reservation and ordering service to the customer. The customer and order service system allows admins to manage client's reservations including adding, editing and deleting custom or preset reservations and managing client data and availability. The main goal of this task is to let a restaurant owner interact personally with clients. Besides, he can submit client's demands to search for unoccupied tables as defined by his desired particular specified quantity of places in his choice region. This idea is discovered by the fact that people perceive going to a restaurant as some kind of punishment simply

because of the time it takes to locate the restaurant. It's just as hard to get a booking, not to mention the time it takes to look through and select dishes to order.

With the use of the application, managers can manage their paperwork more efficiently through tracking bookings made via the provided admin portal. First, the client must become a registered member in order to access the later part of the application, and registration is non optional.

With this application, customers have the ability to see if seats are available at the desired time and book them as well. Besides being able to cancel their booking, the clients also have the privilege of viewing the details of the booking made. The client in case of any doubt regarding the location can make use of the location maps of the various restaurants included in the application and can also clear any queries via email or phone.

II. LITERATURE REVIEW

The rapid digital transformation in the food and beverage industry has led to the adoption of smart technologies, including Quick Response (QR) codes, to streamline service delivery and enhance customer experience. QR-based food ordering systems are gaining traction due to their contactless, efficient, and user-friendly nature, especially in the wake of the COVID-19 pandemic, which emphasized the need for minimal physical interaction. QR Code Technology: QR codes are a type of matrix barcode first designed in 1994 by Denso Wave [1] for tracking automotive parts. Over time, their application has broadened to include marketing, payments, and food ordering. QR codes offer high-speed scanning, error correction, and the ability to store significant data, making them ideal for mobile-based systems. Digital Transformation in Restaurants: Traditional food ordering methods, such as manual wait staff orders or self-service kiosks, often suffer from inefficiencies like human error, long wait times, and operational bottlenecks. Studies suggest that integrating technology like mobile apps and QR systems significantly improves order accuracy and customer satisfaction [2], [3]. Benefits of QR-Based Systems: Sharma and Kapoor [4], studied the QR-based food ordering enhances user convenience by allowing customers to access digital menus

and place orders directly from their smartphones without waiting for service staff. Moreover, these systems help restaurants reduce labor costs, streamline order processing, and collect useful customer data for personalization and analytics [5]. **User Interface and Experience:** The success of such systems hinges on intuitive design and usability. Research by Ahmed et al. [6] highlights the importance of simple UI/UX design, multilingual support, and feedback mechanisms in QR-based applications to ensure broad user adoption. **Security and Privacy Concerns:** While the adoption is growing, concerns around data security and user privacy remain. Ensuring encrypted transmission of order and payment data is vital, as outlined in the cybersecurity assessment by Lin and Yu [7]. **Adoption Post-COVID-19:** The pandemic accelerated the shift towards contactless services. According to a 2021 survey, over 70% of customers preferred digital menus via QR codes over physical ones, citing hygiene and convenience [8]. In summary, existing literature underscores the effectiveness of QR-based food ordering systems in enhancing operational efficiency and customer experience. However, ongoing research is required to address challenges related to scalability, integration with POS systems, and user data protection.

III. METHODOLOGY

A. SYSTEM ARCHITECTURE

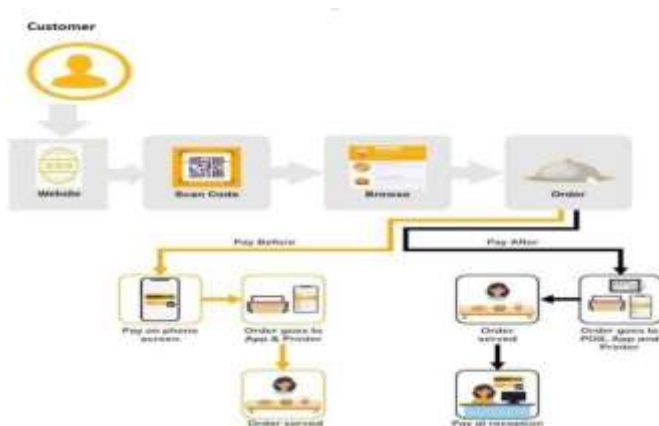


Fig a : System Architecture

The architecture illustrates a streamlined, contactless dining experience where customers can browse menus, place orders, and choose between pre-payment or post-payment options using their mobile devices via QR code scanning.

1. Entry Point: Website Access

the customer initiates the process by accessing the restaurant's website or directly scanning a QR code placed on the table or menu stand. This QR code is unique to each table and redirects the user to a web-based digital menu interface.

2. Menu Browsing and Order Placement

Upon scanning, the user is presented with an interactive menu where they can browse available food items, customize their selection, and place an order through their smartphone.

3. Payment Workflow

The system supports two payment workflows:

Pay Before:

The customer pays directly via the mobile interface.

Once payment is confirmed, the order is sent to the restaurant's app and kitchen printer. The order is prepared and served to the customer without any further action required.

Pay After:

The order is placed and routed to the POS system, mobile app, and printer for preparation.

After the meal is served, the customer proceeds to pay at the reception desk.

4. Integration Components

QR Code System: Unique to each table for location-aware ordering.

Web Interface: Acts as a front-end for menu browsing and ordering.

POS & Printer System: Receives order details for processing and kitchen operations.

Payment Gateway: Enables secure digital transactions.

B. IMPLEMENTATION

1. Registration: User will register using the details like name, number & emailID, etc.
2. Login: User will login using the credentials, if user is not registered it will not direct to login page.
3. Verification & QR generation: After login user has to select time & date & table number to place the order & then he will receive a verification popup & then he has to verify via email using the QR code.
4. Scanning the QR & placing order: Then user has to scan the QR code to access the digital menu for placing the order.
5. Order placed: Order will get placed & this information is now accessible to admin & staff
6. Payment option: User has to pay the bill amount before/after serving the food.
7. Serving the order: Order will be served to the user or customer.
8. Logout: User or customer can log out of the website.

C. ALGORITHM

Authorization algorithm:-

1. Role-Based Access Control (RBAC): This common method assigns users to roles, and then grants permissions to those roles, simplifying access management.

2. Access Control Lists (ACLs): ACLs explicitly define which users or groups have access to specific resources.

QR Code generation:- QR will be generated for ordering or accessing the digital menu in the website.

Recommendation algorithm:-

1. Collaborative Filtering: This approach analyzes user preferences and behaviors to find similar users or items. It can be user-based (recommending items similar to what similar users have liked) or item-based (recommending items similar to those the user has liked).

2. Knowledge-Based Recommendation: This approach uses explicit knowledge about user preferences and item characteristics to make recommendations. It relies on rules and models to match user

3. Content-Based Filtering: This approach recommends items based on the content of the items themselves, such as genre, description, or tags. It analyzes the features of items and recommends items with similar features to those the user has previously liked.

IV. RESULTS AND ANALYSIS

OUTPUT SCREENS

1. This image represents the home page of the restaurant's website.



Figure 1: Home Page

2. This image represents the admin's login page after the home page. This page can be accessed by admin with unique loginID and password.



Figure 2 : Admin Login Page

3. This image represents the admin's home page after login into admins portal.



Figure 3 : Admins Home Page

4. This image represents the admin's dashboard where we can see the customer's reservation information and access them.

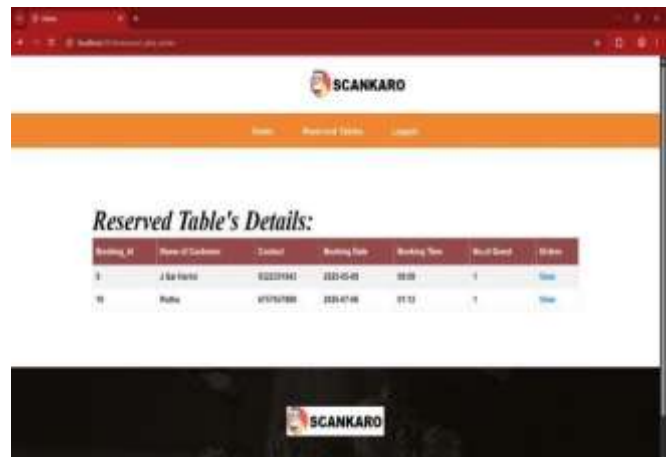


Figure 4 : Admin Dashboard

5. This image represents the customer's registration page , where customer need to register if he/she visits the site for the first time. By providing the required information customer need to register.

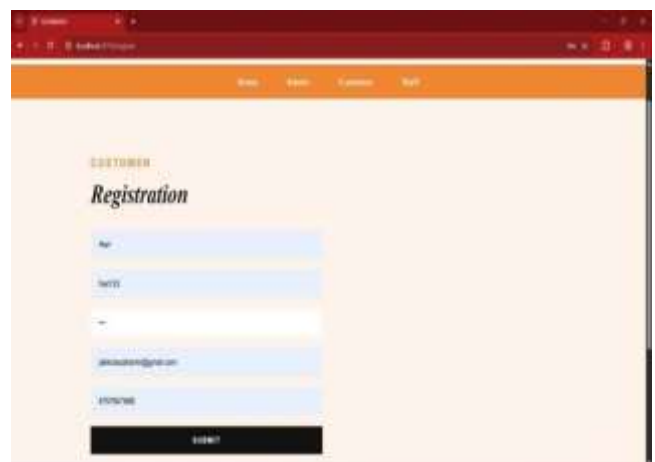


Figure 5 : Customer Registration Page

6. This image represents the page that show pop-up message when the customer registered successfully .



Figure 6 : Registration Successful page

7. This image represents the customer's login page. After registering in the website, customer need to login with the given credentials given in registration page.

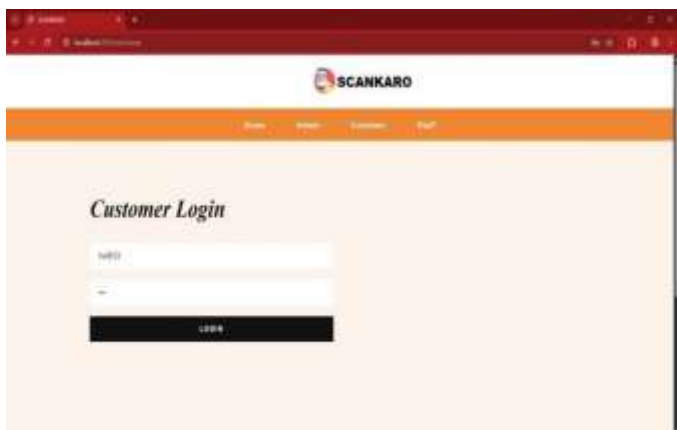


Figure 7 : Customer Login Page

8. This image represents the customer's dashboard after login into the page, here customer can access multiple options.



Figure 8 : Customer Dashboard

9. This image represents the customer's table reservation page, here customer need to book a table by selecting the date and time along with number of guests.

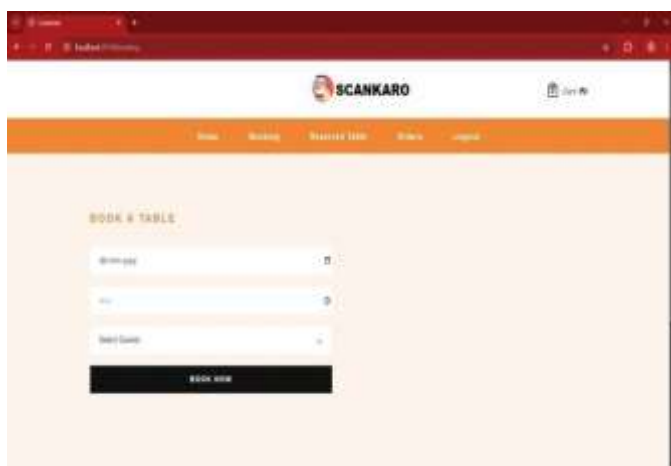


Figure 9 : Customer Reservation page

10. This image represents the page after booking the table, here customer need scan or upload the QR code.



Figure 10 : Scan QR Code

11. This image represents the screenshot of customer mail from the website. The QR code is sent to their respective mailID.



Figure 11 : Customer Mail Page

12. This image represents the menu page for customer. After scanning the QR code this menu will be opened to browse the cart.



Figure 12 : Menu Page

13. This image represents the customer's cart .After selecting the menu items ,the items will be displayed in the cart.



Figure 13 : Customer Cart

14. This image represents the payment page of the customers after ordering the menu.



Figure 14 : Payment Page

15. This image represents the reserved table details to verify once after conformation.



Figure 15 : Reserved Details

16. This image represents the login page for the staff with unique username and password.

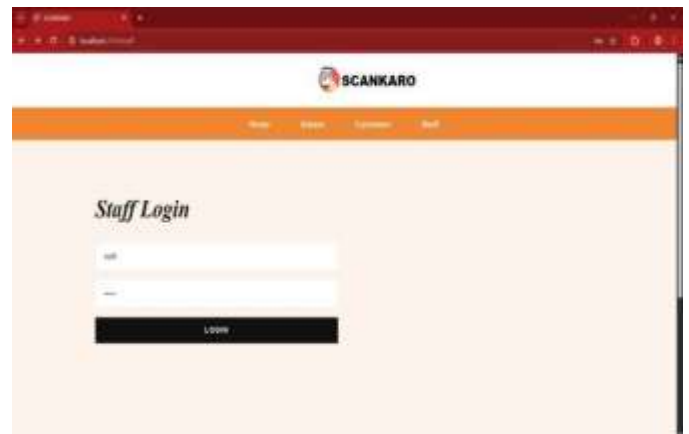


Figure 16 : Staff Login Page

17. This image represents the home page of after staff login into the page.



Figure 17 : Staff Login

18. This image represents the staff dashboard, where they can see the orders of customers to prepare and serve the food.



Figure 18 : Staff Dashboard

V. CONCLUSION

The project has determined that if a customer is ready to walk to any restaurant and there are no tables free, it means the customer has to sit idle for quite some time before a table opens up. This application enables the client to select the wanted table according to the place. E.g. Tables can be reserved as per the number of people. In addition, the customer can conveniently view sophisticated photographs of the restaurant interior which are available on the Application. With respect to the proposed project that provides a set of services which allows the customer to book a table and order a menu in advance through an android application, there is a demand. This application will gain its significance as people continue to shift to android devices and busy lifestyles. The food ordering system based on QR codes changes a restaurant's service for the better as it simplifies the process of placing orders and increases the convenience of not only the guests but also the speed of service in general. It is well known that there is no need to use paper menus nor wait for a waiter to come to the table and take the order; this enables a reduction of service time and human factor errors, as well as contactless service, which is very important today. It has already been shown that this system benefits not only the customers who are served quickly and correctly, but also the restaurant's management through their ability to control and manage orders, receive information, and data about the restaurant's operational efficiency.

VI. FUTURE SCOPE

The QR-based food ordering technology has room for futuristic innovations and wide adoption throughout the food and hospitality sectors. Amid growing digital transformation requirements, this system can be further improved to provide more intelligent, comprehensive, and efficient services. Perhaps the most important avenue is the integration of artificial intelligence (AI) and Machine learning (ML). These technologies can tailor food suggestions, adapt pricing models, and even create ordering forecasts by taking into account the customer's shopping patterns, past orders, diet restrictions, and time-based trends. For example, a system could offer popular breakfast meal suggestions in the morning or discounts to loyal customers on meals that they order frequently. Such moves could increase customer satisfaction as well as business revenues.

Furthermore, adding support for more than one language will serve to improve system accessibility, especially in areas with high tourist traffic. A multilingual interface allows customers from different parts to interact with the platform effortlessly eliminating communication barriers thereby increasing user and customer inclusivity.

The use of voice commands is another enhancement that will enable users to have menu navigation and order placement done through voice rather than typing.

VII. REFERENCES

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