



## ENHANCING CUSTOMER SERVICES WITH A QR-ENABLED FOOD ORDERING SYSTEM

A. Anitha<sup>1\*</sup>, Gugulothu Mamatha<sup>2</sup>, Chidimilla Supraja<sup>2</sup>, Sriramula Mahesh<sup>2</sup>, Lunavath Suman<sup>2</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>UG Student, <sup>1,2</sup>Department of Computer Science and Engineering

Vaagdevi College of Engineering(UGC - Autonomus), Bollikunta, Warangal, Telangana.

\*Corresponding author: A. Anitha ([aanitha109@gmail.com](mailto:aanitha109@gmail.com))

### ABSTRACT

The use of technology in the food industry has grown significantly, with a focus on enhancing user experience and efficiency. In a traditional food ordering system, customers rely on printed menus, face-to-face interactions, and manual payment methods. This system can be time-consuming, prone to errors, and less convenient for both customers and restaurant staff. In the modern era, there is a growing need for more efficient and contactless systems, especially in the context of the global pandemic. Therefore, this work aims to develop a QR-based food ordering system that leverages QR codes to allow customers to place orders conveniently. In addition, this work utilized Django, which is a high-level Python web framework that facilitates the development of robust and scalable web applications. The significance of employing the proposed system lies in its capacity to streamline and fortify the development process. Django's adherence to the "Don't Repeat Yourself" (DRY) principle facilitates rapid development, reducing redundancy in code and expediting the implementation of feature-rich functionalities. Security is paramount in systems managing sensitive information, and Django's built-in security features fortify the application against common web vulnerabilities. Moreover, the framework's scalability ensures that the system can seamlessly expand to accommodate increasing user loads as the business grows. Lastly, the extensive community support and documentation surrounding Django empower developers to troubleshoot issues effectively, ensuring the continuous improvement of the QR-based food ordering system.

**Keywords:** Restaurant, Django, QR-based ordering, rapid development, reducing redundancy

### 1. INTRODUCTION

The QR-based food ordering system is a modern solution designed to streamline restaurant operations by replacing traditional menu and ordering methods with a digital, contactless alternative. Customers can simply scan a QR code on their smartphones to access a dynamic digital menu, place orders, and complete payments. This system eliminates the need for printed menus, reduces manual errors, and enhances efficiency in order processing. The research is implemented using Django, a robust Python web framework known for its scalability, security, and rapid development capabilities. It provides a centralized platform for restaurant owners to manage menus, track orders, and optimize service delivery. Additionally, the system offers real-time updates, ensuring seamless communication between customers and restaurant staff. By integrating QR code technology, the project enhances user convenience while minimizing physical contact, making it an ideal solution in the post-pandemic era. Traditional food ordering systems rely heavily on physical menus, human interaction, and manual order processing, which can introduce several inefficiencies, including Slow service delivery, as customers wait for menu availability, order taking, and bill processing. Human errors in order transcription,



leading to incorrect deliveries and customer dissatisfaction. Hygiene concerns related to shared menus and cash transactions, especially in the wake of global health concerns.

## 2. LITERATURE SURVEY

[1] K. Khairunnisa et al. (2009) discussed the development and implementation of a wireless food ordering system that replaces traditional manual order-taking methods with a digital approach. The study highlighted how wireless technology significantly enhances order accuracy, reduces human error, and speeds up service in restaurants. The research findings suggest that integrating wireless ordering systems improves operational efficiency, enhances customer satisfaction, and optimizes workflow in the food industry. [2] D. Sharma (2017) analyzed the structure of QR codes and their application in encryption and decryption processes. The research examined various cryptographic techniques to secure data stored in QR codes, ensuring safe transactions and reliable authentication. The study emphasized how QR code-based systems can facilitate quick access to information while maintaining security and ease of use. The findings highlight that QR codes serve as an efficient tool for modern businesses requiring secure digital interactions. [3] J. Qianyu (2014) explored the benefits of QR code technology for businesses and its role in enhancing operational efficiency. The research outlined how QR codes simplify transactions, improve customer engagement, and enable seamless access to information. The study demonstrated that companies leveraging QR-based solutions experience increased automation and improved data accessibility. The findings suggest that QR code integration contributes to business growth and digital transformation in multiple sectors. [4] M. Sadiku et al. (2020) investigated the impact of big data analytics on the food industry, focusing on how data-driven decision-making enhances restaurant management. The research explained how analyzing customer preferences helps businesses personalize recommendations, optimize inventory, and minimize food wastage. The study found that big data enables real-time insights, leading to efficient supply chain management and improved customer service. The findings reinforce the importance of data analytics in modernizing food service operations. [5] H. Smaya (2022) examined the influence of big data analytics across industries, emphasizing its role in automating decision-making processes. The study discussed how businesses leverage large-scale data to track customer behaviors, improve service efficiency, and predict future trends. The research highlighted the significance of big data in food ordering systems, where customer purchase history can refine menu offerings and improve operational workflow. The findings suggest that adopting big data solutions enhances competitiveness and innovation.

[6] Ashwini Bankar and Mamta Mahajan focused on the development of a touch-based digital ordering system for Android platforms. The study highlighted how mobile applications provide a convenient interface for users to place orders, reducing dependency on physical menus. The research demonstrated that such systems improve order processing speed, minimize miscommunication, and offer secure payment options. The findings indicate that digital ordering enhances customer engagement and streamlines restaurant management. [7] Sowndarya H. K. et al. conducted a survey on intelligent food menu ordering systems and the technologies that facilitate automated restaurant operations. The research identified key benefits such as reduced waiting times, improved accuracy in order processing, and enhanced user experience. The study also explored the integration of AI-driven recommendations, allowing personalized dining experiences based on previous orders. The findings emphasize that smart food ordering systems contribute to a more efficient and customer-centric restaurant environment. [8] N. M. Z. Hashim et al. (2013) developed a Bluetooth-based smart ordering system aimed at improving communication between customers and restaurant servers. The study analyzed how Bluetooth



technology enables fast and secure data transmission, reducing order processing time and eliminating manual errors. The research demonstrated that such systems enhance service quality, allowing restaurants to optimize order management and customer interactions. The findings suggest that wireless connectivity is essential for modernizing restaurant operations. [9] The International Journal of Innovative Science, Engineering, and Technology (2015) presented an online food ordering system that allows users to customize orders via web-based platforms. The study emphasized the importance of flexible ordering options, where customers can modify ingredients and request personalized meal preferences. The research highlighted how web-based ordering enhances efficiency by automating the communication between customers and kitchens. The findings support the adoption of customizable food ordering systems for improved user satisfaction. [10] Patel Mayurkumar (2015) investigated the implementation of an online food ordering system for restaurants, focusing on how digital platforms streamline order management. The study explored real-time tracking, digital payment integration, and automated notifications as key features that enhance user experience. The research found that online ordering systems improve convenience, reduce operational errors, and optimize kitchen workflows. The findings indicate that web-based ordering solutions contribute to enhanced restaurant service and customer retention.

### 3. PROPOSED SYSTEM

The proposed QR-based food ordering system aims to revolutionize traditional restaurant operations by integrating QR code technology with an efficient Django-based web application. Customers can scan a QR code generated for each restaurant or menu item, browse digital menus, place orders, and make payments seamlessly using their smartphones. The system eliminates the need for physical menus, manual order-taking, and cash-based transactions, improving both efficiency and hygiene. This system is designed using Django as the backend framework for managing user authentication, restaurant menus, and orders, while the frontend ensures a smooth and interactive user experience. The QR code generation mechanism is integrated within the system to assign unique codes for restaurants and menu items, ensuring quick access and streamlined operations.

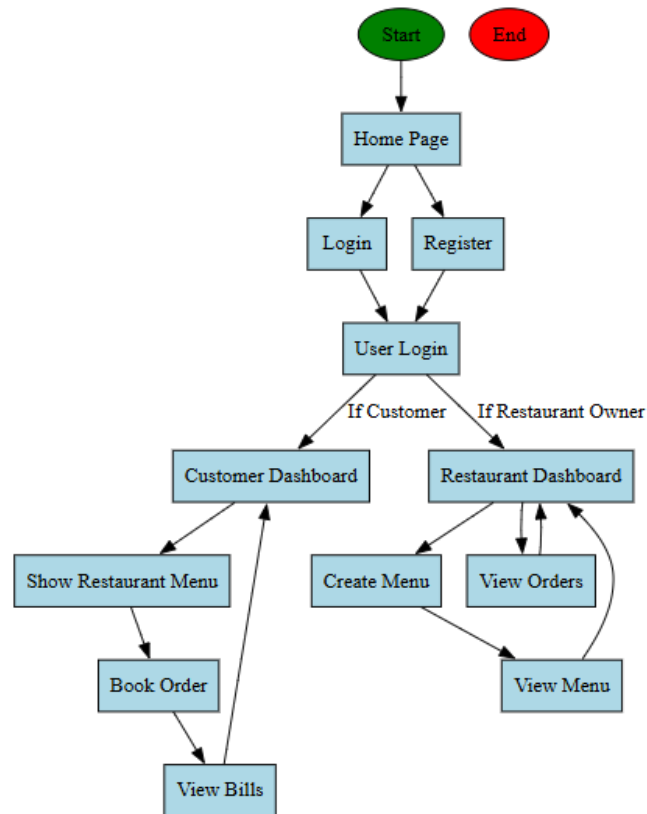


Fig 1: Block Diagram of The Proposed System.

### Step 1: Planning and Requirements Gathering

- Identify the core functionalities required, such as:
  - QR Code Generation for Restaurants and Menu Items
  - Digital Menu Display & Order Placement
  - User Authentication (Restaurant Owners & Customers)
  - Payment Integration for Seamless Transactions
  - Order Tracking and Management System
- Define the database structure to store user credentials, menu details, orders, and payment records.
- Select the technology stack: Django (Backend), HTML/CSS & JavaScript (Frontend), MySQL (Database), and PyQRCode for QR Code Generation.

### Step 2: Developing the Backend Using Django

Set up a **Django project** with appropriate apps:

- Users – Handles authentication & authorization for restaurant owners and customers.
- Menu – Stores menu items, prices, and images.
- Orders – Manages order processing, history, and status updates.



- QR Generator – Generates unique QR codes for restaurants and menu items.

### Step 3: Developing the User Interface

- Design a user-friendly UI for:
  - Customers – View digital menus, place orders, and make payments.
  - Restaurant Owners – Add menu items, generate QR codes, and manage orders.
- Build HTML templates with Bootstrap and JavaScript for responsive design.
- Implement AJAX for dynamic order updates.
- Use Django's template engine to render data dynamically.

### Step 4: Integrating QR Code with Backend and UI

- Assign QR codes to restaurant profiles and menu items.
- Display QR codes on the user interface for customers to scan.
- Ensure secure redirection upon scanning.

### Step 5: Testing the Application

- Functional Testing: Verify all features, including QR code scanning, menu loading, order placement, and payments.
- Usability Testing: Ensure the UI/UX is seamless for customers and restaurant owners.
- Performance Testing: Check system response time and database efficiency under high traffic.
- Security Testing: Prevent SQL injection, XSS attacks, and unauthorized access.
- Final Deployment: Host the system on a cloud server (AWS, Heroku, or DigitalOcean) for accessibility.

## What is Django?

Django is a high-level Python web framework designed for rapid development and clean, pragmatic design. It follows the Model-View-Template (MVT) architectural pattern, making it highly organized, scalable, and secure for web application development. Django's built-in security features and automated admin interface streamline the development process, making it an ideal choice for projects requiring robust data handling, like QR-based food ordering systems.

## Django and QR Code Integration

Django provides a seamless way to integrate QR code generation and management into a food ordering system. By using Python libraries such as pyqrcode and Pillow, developers can generate unique QR codes for each restaurant and menu item. These QR codes, once scanned, direct users to a Django-powered web page, displaying the menu and allowing customers to place orders. This integration eliminates manual order processing, enhances efficiency, and improves the overall customer experience.

1. User Interface (Frontend) – Customers scan QR codes, browse menus, and place orders.



2. Django Backend (MVT Architecture) – Processes user requests, authenticates orders, and manages database interactions.
3. Database (MySQL/PostgreSQL) – Stores user profiles, menu details, and order history.
4. QR Code Generation Module – Generates and assigns unique QR codes for easy access.
5. Security Layer – Implements authentication, prevents unauthorized access, and ensures data integrity.

#### 4.RESULTS AND DISCUSSION

Figure 2 shows interface of the QR-enabled food ordering system prominently features a clean and intuitive navigation bar at the top, containing essential buttons such as Home, Login, and Sign-up. These elements ensure easy access and seamless navigation for both new and returning users. Centered below the navigation bar, the system's is clearly displayed, reflecting the platform's objective of improving dining experiences through streamlined digital ordering. The layout emphasizes user-friendliness, encouraging quick engagement and accessibility for customers.

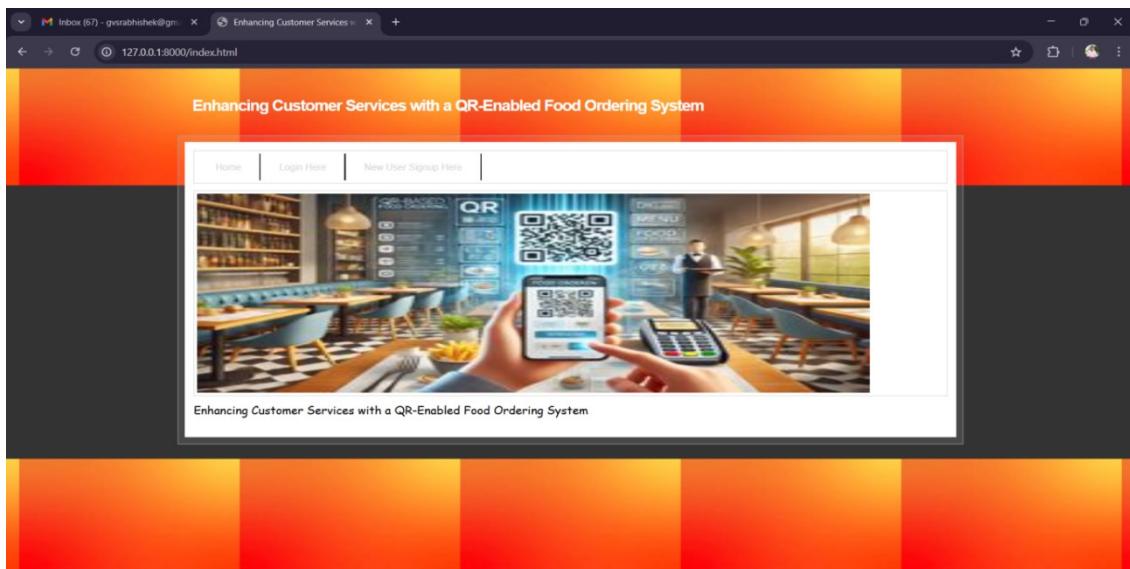


Fig 2: Home Page

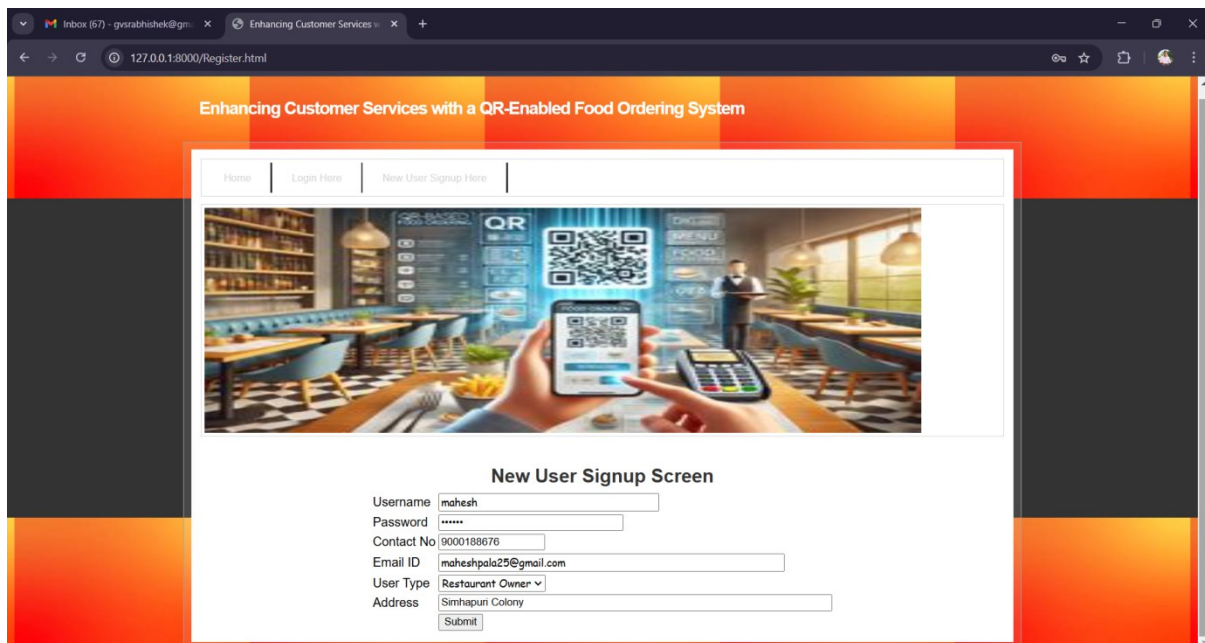




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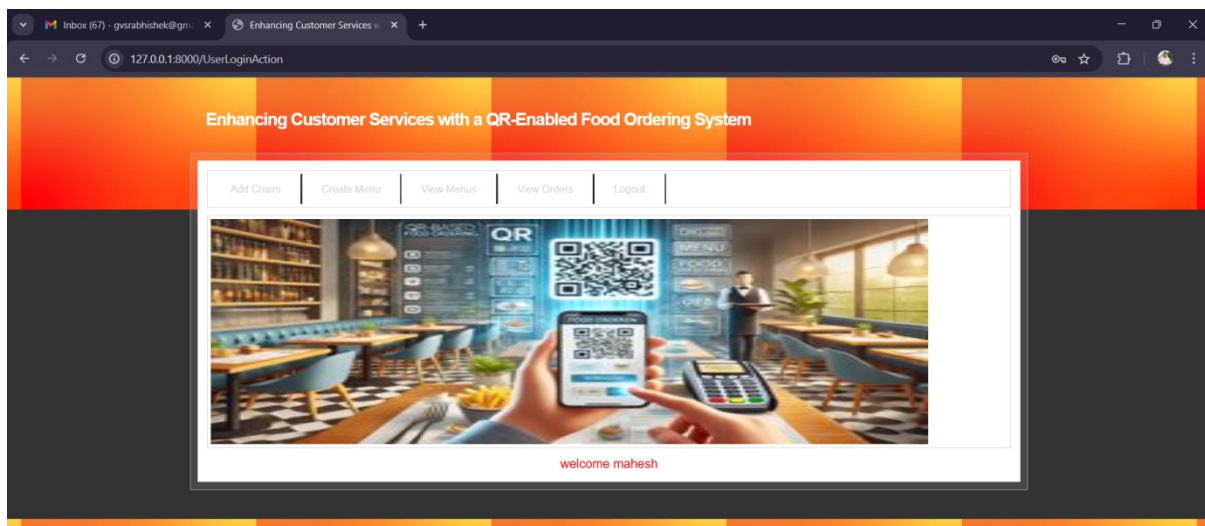
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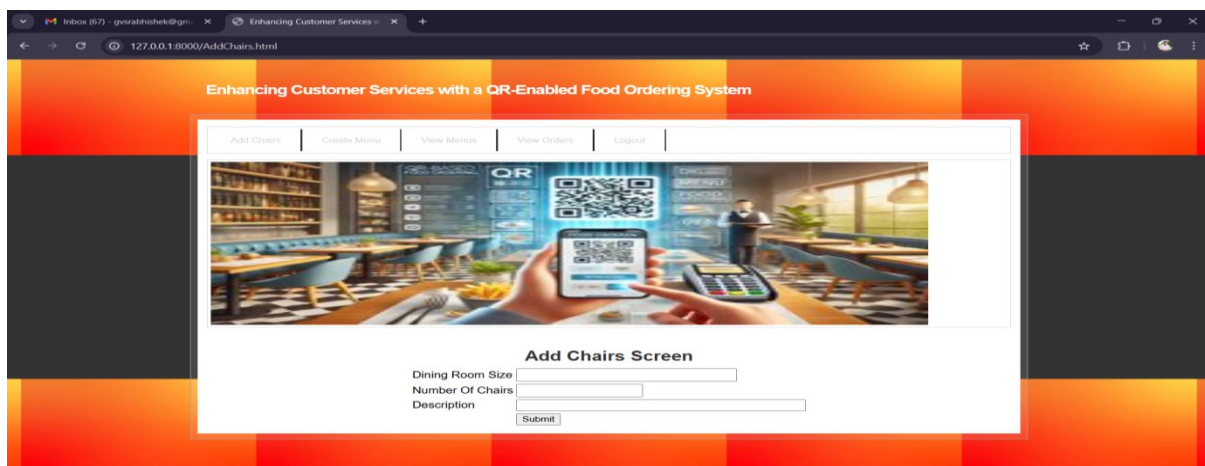
The screenshot shows a web browser window with the title "Enhancing Customer Services with a QR-Enabled Food Ordering System". The URL bar shows "127.0.0.1:8000/Register.html". The page has a navigation bar with links: Home, Login Here, and New User Signup Here. Below the navigation bar is a large image of a restaurant interior with a QR code on a table. Below the image is a "New User Signup Screen" with the following fields: Username (mahesh), Password (\*\*\*\*\*), Contact No (9000188676), Email ID (maheshpola25@gmail.com), User Type (Restaurant Owner), and Address (Simhapuri Colony). A "Submit" button is at the bottom right of the form.

Fig 3: New Signup Page



The screenshot shows a web browser window with the title "Enhancing Customer Services with a QR-Enabled Food Ordering System". The URL bar shows "127.0.0.1:8000/UserLoginAction". The page has a navigation bar with links: Add Chairs, Create Menu, View Menus, View Orders, and Logout. Below the navigation bar is a large image of a restaurant interior with a QR code on a table. Below the image is a "welcome mahesh" message.

Fig 4: Restaurant Dashboard



The screenshot shows a web browser window with the title "Enhancing Customer Services with a QR-Enabled Food Ordering System". The URL bar shows "127.0.0.1:8000/AddChairs.html". The page has a navigation bar with links: Add Chairs, Create Menu, View Menus, View Orders, and Logout. Below the navigation bar is a large image of a restaurant interior with a QR code on a table. Below the image is an "Add Chairs Screen" with the following fields: Dining Room Size, Number Of Chairs, and Description. A "Submit" button is at the bottom right of the form.



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Fig 5: Add chairs screen

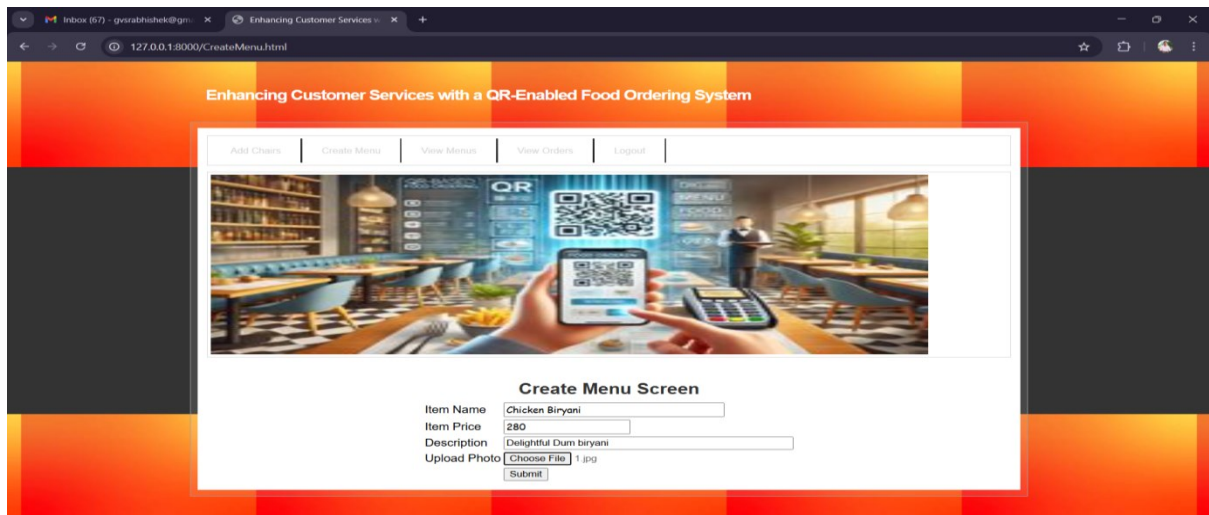


Fig 6: Create Menu Screen

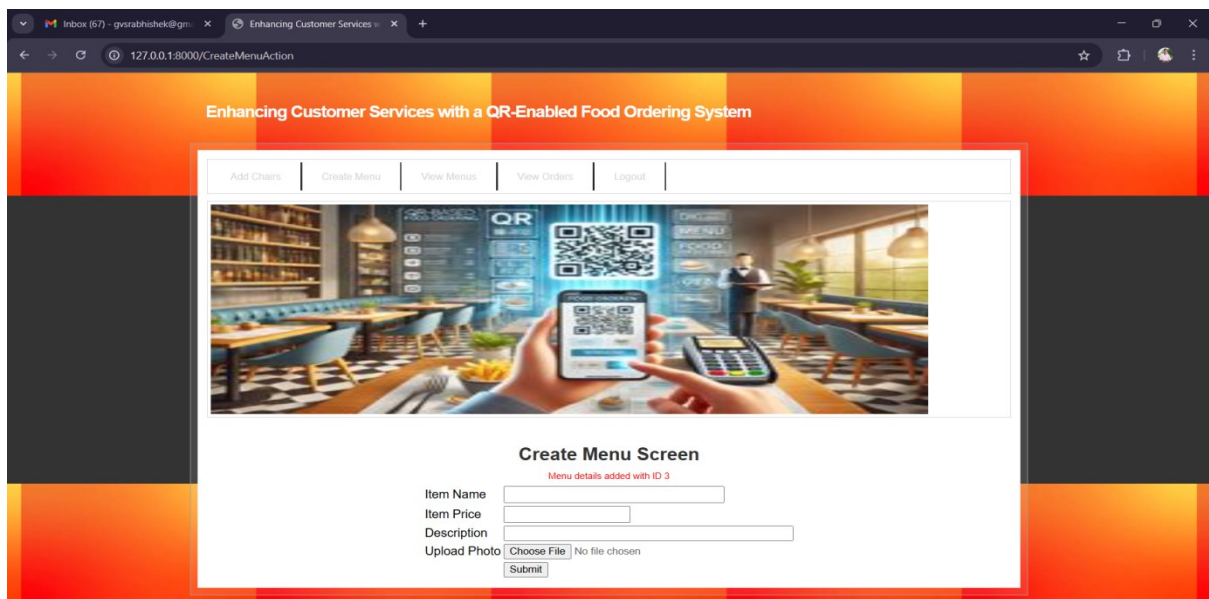


Fig 7: Create Menu





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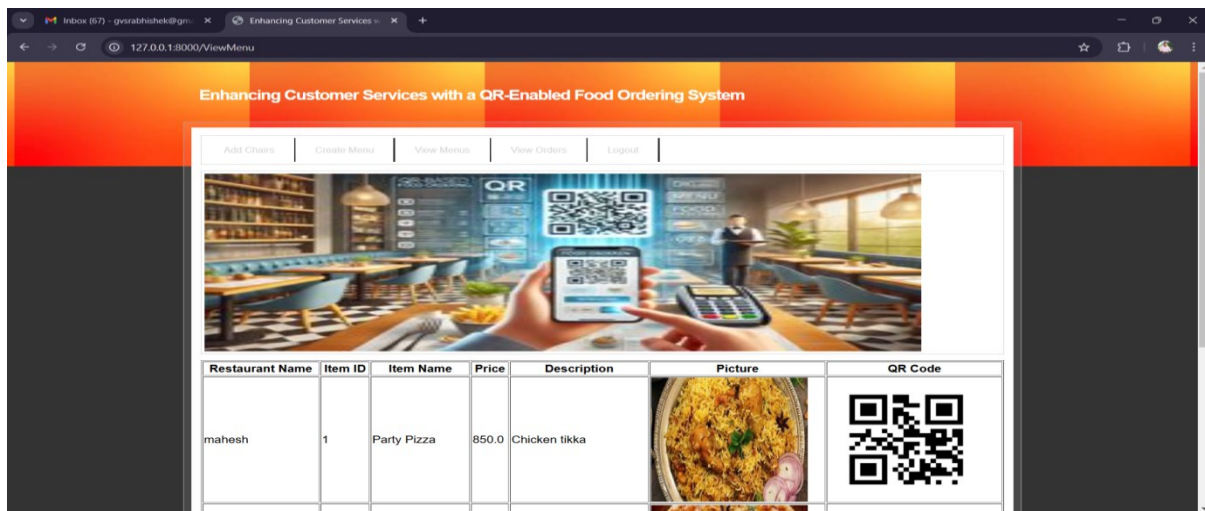


Fig 8: QR generated for Item

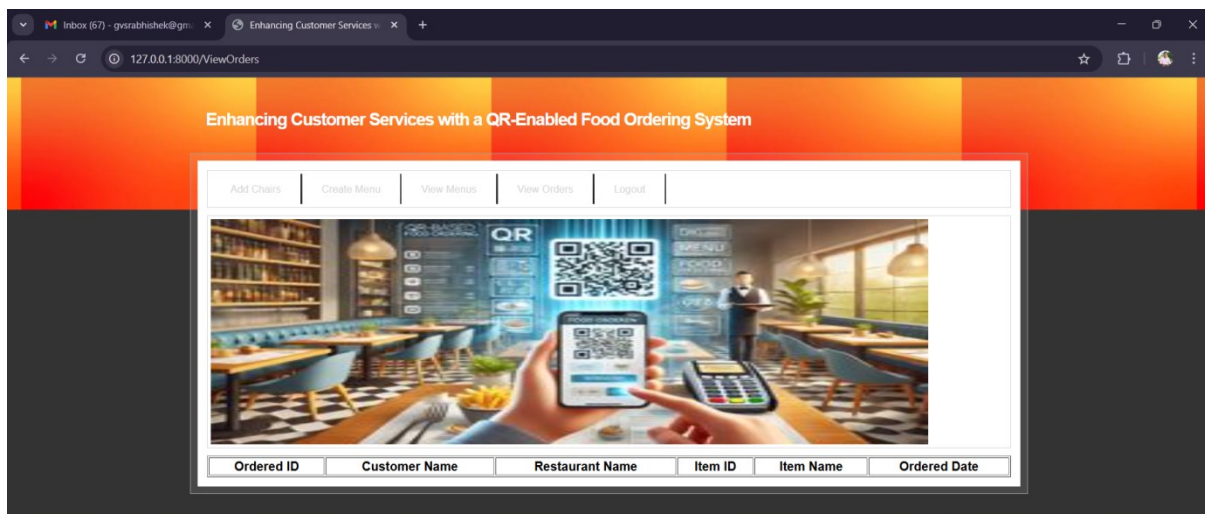


Fig 9: Orders View Page

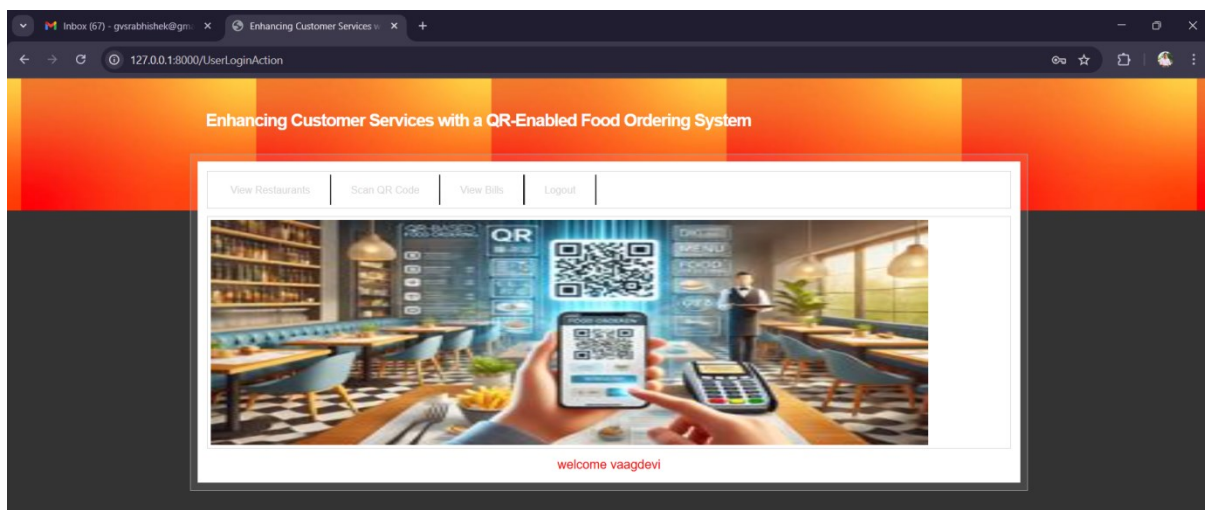


Fig 10: Customer Page



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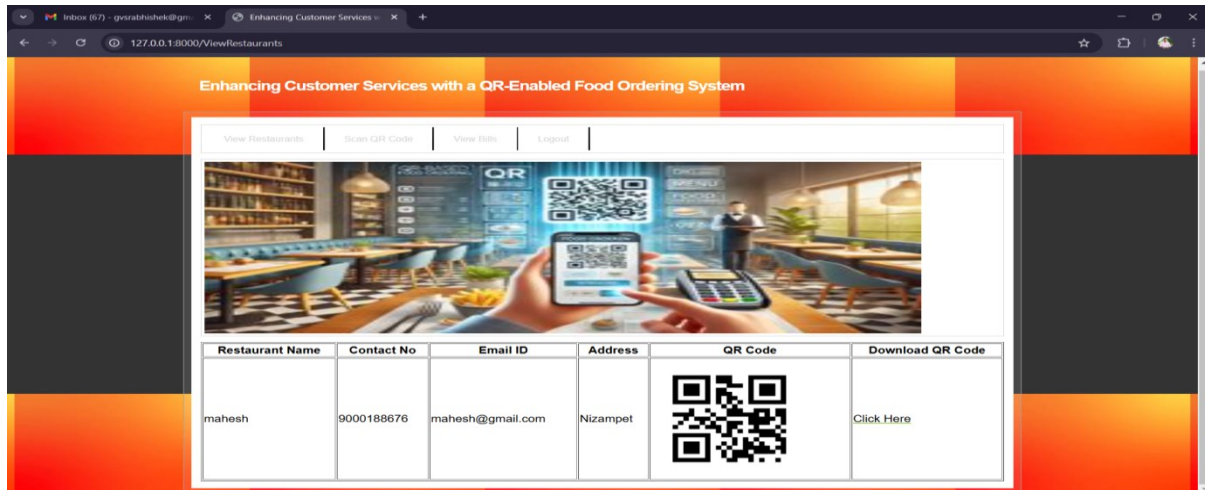


Fig 11: Items List With QR

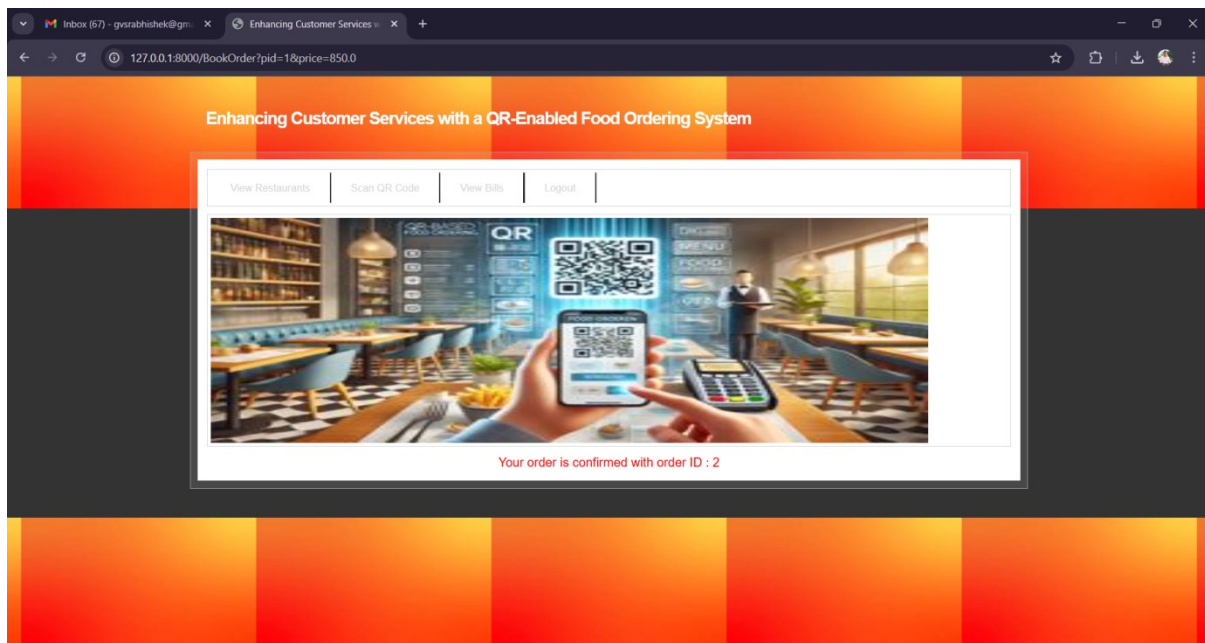


Fig 12 Order Created Successfully

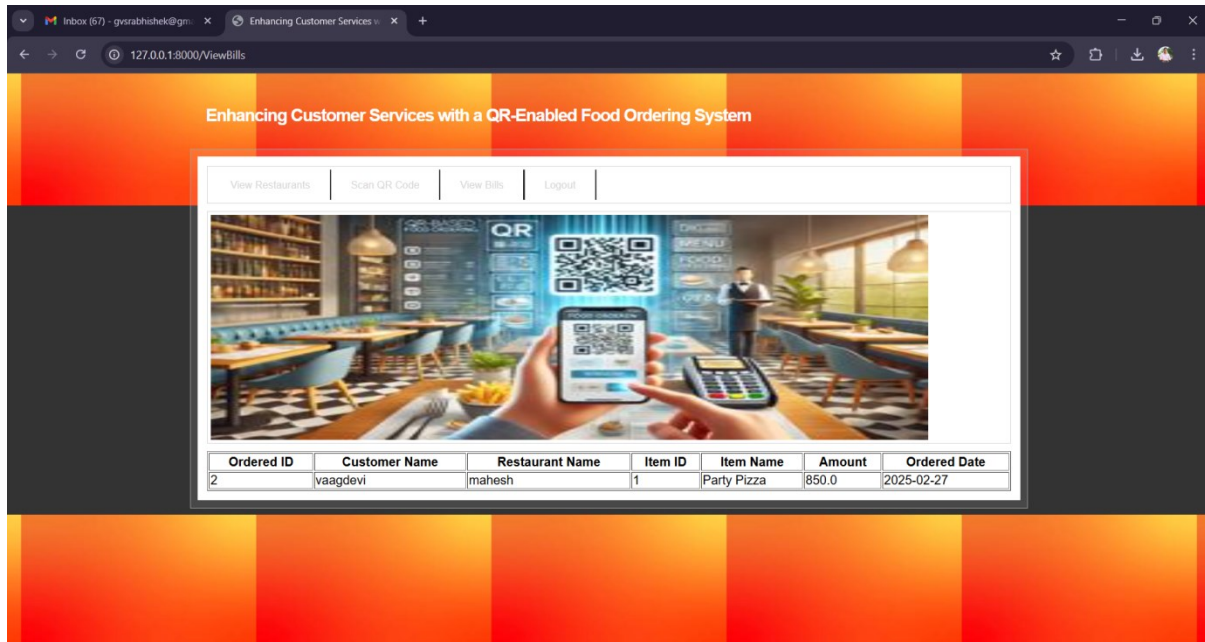


Fig 13 Order received to Restaurant

## 5.CONCLUSION

The QR-enabled food ordering system revolutionizes the dining experience by integrating modern technology to enhance efficiency, accuracy, and user satisfaction. Traditional food ordering methods often involve manual interactions, leading to delays, errors, and inconvenience. This system overcomes these challenges by introducing a contactless, streamlined, and automated approach, improving restaurant operations and customer engagement. By leveraging QR code technology, customers can seamlessly access digital menus, browse available items, and place orders using their smartphones. This eliminates the need for physical menus, reducing costs for restaurant owners while maintaining an eco-friendly approach. The system also ensures accuracy in order placement, preventing human errors commonly associated with manual processes. Orders are processed in real time, enabling restaurant staff to efficiently manage multiple requests without confusion or miscommunication. The secure authentication mechanism ensures role-based access, allowing restaurant owners to manage menus, monitor orders, and handle payments effectively. Customers benefit from a user-friendly interface that facilitates smooth navigation and a convenient ordering process. The automated notification system keeps both parties informed about order statuses, minimizing uncertainties and enhancing communication. Another key strength of this system is the integration of secure online payment gateways, enabling fast and safe transactions. The elimination of cash handling enhances security while reducing wait times, improving overall service efficiency. Furthermore, the real-time seating and table management module allows customers to check table availability, ensuring a hassle-free dining experience. From a security standpoint, the system incorporates data encryption, authentication protocols, and access control measures to protect user information and prevent unauthorized access. It adheres to best security practices, ensuring customer trust and compliance with industry standards.

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