FOOD COURT ORDERING SYSTEM USING QUICK RESPONSE CODE (QR-CODE)

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ABSTRACT

The modern shopping mall experience is often hindered by inefficiencies in food court ordering. Customers typically walk from outlet to outlet, exploring menus and placing orders, which consumes time and causes congestion, especially during peak hours. To address these challenges, we propose a centralized, QR code-based ordering system that streamlines the entire process.

Our system allows customers to scan a QR code placed on every table in the mall's food court. Upon scanning, users are directed to a unified platform where they can view menus from all participating outlets, compare options, and place orders directly from their smartphones. This eliminates the need to physically visit multiple food outlets and wait in line. Orders are processed through the centralized system and forwarded to the respective outlet, which notifies the customer once the order is ready for pickup. By connecting all food court outlets to a single platform, this solution enhances the customer experience, reduces wait times, and boosts operational efficiency for food vendors. Additionally, this system offers significant time savings for mall visitors, providing convenience and a seamless ordering process through mobile technology.

Keywords: Centralized, QR-Code, Food Court, Digital Ordering, Customer Convenience, Menu Integration, Smart Ordering.

I.   INTRODUCTION

In this research paper, we aim to enhance the food ordering system in malls and other locations where multiple food courts operate. Customers often face difficulties in placing orders, viewing menus, and tracking their current orders at a particular food outlet. Additionally, the ordering process can be time-consuming, requiring customers to stand in long queues, leading to frustration and inefficiency. In some cases, customers may struggle to find available seating, further diminishing their overall dining experience. To address these challenges, we propose a QR code-based food ordering system that digitizes and streamlines the entire ordering process. By scanning a QR code placed on tables or designated areas in the food court, customers can instantly access digital menus from multiple outlets, explore ongoing offers, and place orders directly through their smartphones. This eliminates the need to physically visit each vendor, thereby reducing wait times and enhancing customer convenience. Moreover, the system provides real-time order tracking, ensuring that users stay updated on the status of their meals, minimizing confusion and delays. Additionally, the integration of secure digital payment options allows for cashless transactions, further enhancing speed, security, and efficiency. Vendors also benefit from automated order management, reducing manual errors and improving overall operational workflow.

With the growing adoption of mobile technology and digital solutions in the food industry, implementing a QR-based food ordering system represents a significant step toward modernizing food service operations. This innovation bridges the gap between customers and vendors, ensuring a faster, more efficient, and enjoyable dining experience for all parties involved.

The motivation behind this project stems from the need to enhance customer convenience and optimize the ordering experience in busy mall food courts. Traditional methods of food ordering—where customers must move from outlet to outlet, view menus, and wait in long queues—can detract from the overall shopping experience. Crowded environments, long wait times, and the physical effort required to browse multiple food outlets highlight the need for a streamlined system that integrates all vendors on a single platform. With the growing adoption of mobile technology, QR code-based systems offer a modern, user-friendly solution that simplifies the ordering process. This system benefits vendors by reducing in-person order processing and increasing efficiency in managing and fulfilling orders. The centralized platform bridges the gap between

customers and food court vendors, addressing common pain points and ensuring a seamless, faster, and more enjoyable dining experience for all parties involved.

II. OBJECTIVES

- Develop a centralized, QR code-based ordering system to enhance the customer experience in mall food courts.
- Allow customers to scan QR codes placed on tables to access menus from all food outlets in the food court.
- Enable users to browse, compare, and place orders directly from their mobile devices.
- Streamline order management for vendors by automating the ordering process and minimizing manual effort.
- Ensure secure payments and real-time order tracking for a smooth and convenient dining experience.
- Increase customer satisfaction and improve operational workflow for vendors.

III. LITERATURE REVIEW

Food ordering systems have evolved significantly with the integration of digital technologies, addressing key challenges such as long wait times, inefficient order management, and customer dissatisfaction. Several studies have explored solutions ranging from real-time process management to blockchain-based transactions and AI-driven ordering systems. This section reviews relevant research that has contributed to the advancement of food court and restaurant ordering systems.

3.1 Real-Time Order Management System Restaurants

Takeshi Shimmura (2009) proposed a real-time process management system for full-service restaurants, utilizing an advanced Point-of-Sale (POS) system to facilitate seamless communication between kitchen staff and dining hall workers. The system allowed staff to track orders in real time, improving order preparation efficiency and reducing customer complaints about long wait times. The study demonstrated that real-time data sharing in restaurant environments enhances workflow optimization and service quality. This research highlights the importance of instant information sharing in food ordering systems, which is relevant for modern food court management solutions.

3.2 A customizable wireless food ordering system with real-time customer feedback Wireless and Smartphone-Based Food Ordering Systems

In their study, Azah Samsudin (2011) developed a customizable wireless food ordering system that enabled customers to place orders using mobile devices while receiving real-time feedback on order status. This approach replaced traditional PDA-based ordering systems, offering a more interactive and user-friendly experience. The system allowed restaurant owners to update menus dynamically, ensuring greater flexibility and efficiency. Their research validated the effectiveness of mobile ordering systems, aligning with the increasing adoption of QR code-based ordering in food courts today.

3.3 Touchscreen-Based Ordering System for Restaurants

Raviprakash Shriwas (2014) introduced a touchscreen-based ordering system aimed at replacing paper-based menus in restaurants. The system utilized Graphical LCD (GLCD) touchscreens at customer tables, enabling users to browse menus and place orders directly via a digital interface. Orders were then wirelessly transmitted to the kitchen using RF communication technology, reducing manual errors and improving order accuracy. Their findings indicated that touchscreen interfaces enhance the customer experience by making food ordering more intuitive and efficient. This study underscores the importance of digital menu systems, which complement modern QR code-based food court ordering solutions.

3.4 Online Food Court Payment System Using Block-chain Technology

A significant advancement in food court management was introduced by Arun Yadav. (2018), who developed an online food court payment system using block chain technology. Their system allowed customers to place orders via mobile or web applications and complete transactions securely using block chain-based digital payments. By eliminating the need for manual cash handling, the system reduced transaction fraud, improved order processing times, and enhanced security. Their research demonstrated that block chain integration in

food court management can streamline payment processing and order management, ensuring a seamless, fraud-resistant experience for both customers and vendors.

3.5 Foody- Smart Restaurant Management and Ordering Systems

Vindya Liyanage et al. (2018) introduced Foody – A Smart Restaurant Management and Ordering System, which leveraged Artificial Intelligence (AI) and predictive analytics to personalize food recommendations for customers. The system featured a 3D menu visualization that provided an interactive and engaging ordering experience. Additionally, the study implemented real-time table reservations and automated order queue management, reducing customer wait times and improving service efficiency. Their findings indicated that AI-based solutions can enhance customer satisfaction by customizing the dining experience and optimizing restaurant operations. This research highlights the potential of AI integration in food ordering systems, paving the way for smarter, data-driven solutions in food courts.

3.6 Overall Conclusion of Literature Review

The reviewed studies collectively illustrate the technological advancements in food ordering systems in the restaurant, emphasizing real-time order management, mobile-based ordering, digital menus, secure payment methods. These innovations align with the growing demand for fast, efficient, and user-friendly food order management solutions. The insights from these studies serve as a foundation for our research, which aims to develop an enhanced QR code-based food ordering system in the Mall that integrates key technological improvements to optimize customer experience and vendor operations.

IV.   SCOPE

The scope of this project involves the design, development, and implementation of a centralized QR code-based ordering system specifically for mall food courts. The system will connect multiple food outlets on a single digital platform, allowing customers to scan QR codes placed on tables to access a comprehensive menu.

Key components of the project include:

- **QR Code Integration:** Easy access to the menu system.

- **User-Friendly Interface:** A web interface or mobile application where users can browse, select, customize, and place orders seamlessly.

- **Vendor Portal:** An admin interface for vendors to manage their menus, update items, and track orders in real-time.

- **Secure Payment Gateway:** Quick transactions via mobile wallets and credit/debit cards.

- **Real-Time Notifications:** Customers receive updates about their order status.

- **Reporting and Analytics:** Vendors can monitor sales and customer preferences for operational insights.

- **Scalability:** The system can expand to other malls or venues, improving the overall customer experience by reducing wait times and enhancing efficiency.

V.   SYSTEM ARCHITECTURE

The proposed food court ordering system is designed to facilitate a seamless digital ordering experience by integrating QR code scanning, a centralized menu platform, and secure digital payments.

The system consists of three primary components:

Customer Interface: A mobile-friendly web or app interface where customers can scan QR codes, browse menus, place orders, and make payments.

Vendor Portal: A backend system for food vendors to manage their menus, updates food availability, and track incoming orders.

Admin Dashboard: A central control panel that provides analytics, transaction monitoring, and system updates.

5.1 System Workflow:-

- Customer scans QR Code placed on a food court table or entry point.
- The QR code redirects to a unified web/mobile app interface displaying menus from different food vendors.
- The customer browses menus, selects food items, and customizes their order.

- The order is added to the cart, and the customer proceeds to checkout.
- Payment is processed via a secure payment gateway.
- The order is transmitted to the respective vendor's dashboard for preparation.
- The system provides real-time order tracking and notifications.
- Once ready, the customer receives a pickup alert to collect their meal from the food counter.
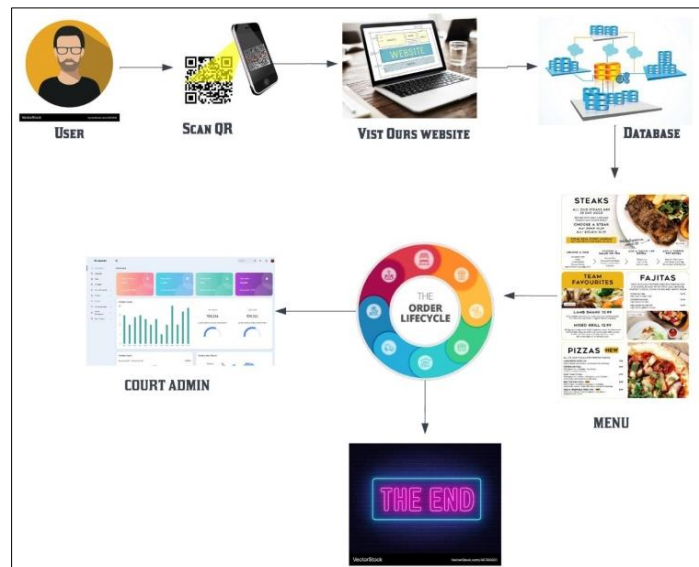
(Fig 1. System Flow)

The System work flow diagram illustrates the flow of the food ordering system process. It begins with the scanning of the QR code placed on the table in the food court or mall. Once scanned, the user can access a single platform displaying various food outlets. The user can then selects an outlet, browse the menu, and place an order after providing basic personal details. The order will be confirmed only after successful payment. Once the payment is processed, the respective food court admin will receive a notification about the order. The vendor will then begin preparing the food, ensuring a smooth and efficient ordering process.

5.2 Technologies Used:-

**Frontend:** React.js, HTML, CSS, JavaScript (for a responsive web interface).

Backend: Node.js with Express.js (to handle API requests and database operations).

Database: MongoDB or MySQL (for storing order details, menu information, and user data).

QR Code Integration: Google Charts API or QR Code Generator API.

Payment Gateway: Integration with Razorpay, PayPal, or Stripe for secure transactions.

Real-Time Notifications: Firebase Cloud Messaging (FCM) or Web-Sockets to provide order updates.
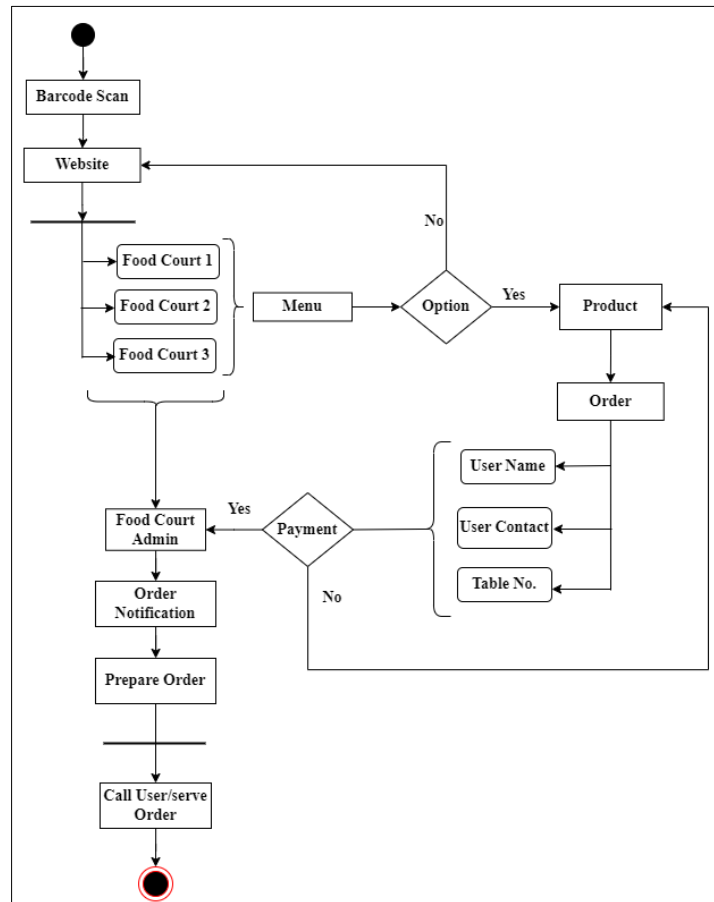
(Fig 2 System Flow Digram)

VI.   RESULTS AND DISCUSSION

The implementation of the QR code-based centralized ordering system in mall food courts has significantly improved both customer experience and vendor operations.

Some of the key improvements observed include:

Reduced Wait Times: Customers no longer need to walk between outlets to view menus and place orders. They can scan a QR code and place orders instantly from their tables.

Enhanced Customer Convenience: The digital platform provides a seamless browsing experience, allowing customers to compare menu options efficiently.

Optimized Vendor Workflow: The system streamlines order management by automating the process and reducing manual errors.

Secure and Fast Payments: The integration of secure payment gateways has simplified transactions, making them quicker and safer.

Data Insights for Vendors: The system provides vendors with valuable analytics, helping them understand sales trends and customer preferences.

While the system has successfully improved food court efficiency, future enhancements could focus on making the platform more accessible for all users, including those less familiar with technology.

VII.   CONCLUSION

The QR code-based centralized ordering system for mall food courts has effectively addressed inefficiencies in traditional food court operations. By digitalizing the ordering process, the system has improved customer convenience, reduced wait times, and optimized vendor operations.

Future improvements could include:

- Expanding payment methods to include UPI, credit card, and other mobile payment solutions.

- Enhancing website security to protect user data and ensure safe transactions.
- Implementing AI-based food recommendations.
- Exploring voice-assisted ordering options for greater accessibility.

This system represents a modernized, scalable approach to food court management, enhancing efficiency and customer satisfaction.

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