



QR Code Based Smart Dining System

¹V. Iswarya, ²Dr. D. Swamydoss

¹PG Student, Department of Master of Computer Applications, Adhiyamaan College of Engineering(Autonomous), Hosur,Tamil Nadu,India

²Head of the Department, Department of Master of Computer Applications, Adhiyamaan College of Engineering, (Autonomous), Hosur,Tamil Nadu,India

DOI: <https://doi.org/10.55248/gengpi.5.0424.0929>

ABSTRACT

When placing an order at a restaurant, patrons typically peruse the menu before waiting for a server to arrive and take their order. During busy hours, this process may be delayed and result in lower customer satisfaction. For this reason, human error is a possibility. Procedures can be automated with the help of automated technologies, which can reduce human error, waste paper, and speed up and lower the cost of ordering operations. In recent years, there have been several attempts to automate the restaurant ordering process. In this research, we suggest a way for ordering food at a restaurant by accessing the QR code. Using their smart phones, customers can use the QR code placed on the table to open the current menu and place an order for food. The notification and table number will be given to the cashier and kitchen upon ordering. This menu will be updated with the current offerings and menu. With Restaurant, this approach guarantees both customer happiness and time. There is also a lower implementation cost.

Keywords: Automatic ordering process, QR code Scan, Digital Menu, Notification, Customer Satisfaction, Food Ordering.

Introduction

In the fast-paced environment of restaurants, the process of ordering food is a critical aspect that significantly influences customer satisfaction. Traditionally, patrons rely on servers to present menus and take their orders, a procedure that can be prone to delays and errors, particularly during peak hours. However, advancements in technology offer promising solutions to streamline and enhance this process through automation. By leveraging automated technologies, restaurants can mitigate human errors, reduce paper waste, and expedite ordering operations, ultimately leading to improved customer satisfaction and operational efficiency.

Over recent years, there has been a notable shift towards automating various aspects of the restaurant experience, including ordering processes. This trend reflects a growing recognition of the potential benefits that automation can offer in terms of enhancing customer service and reducing costs. In this research, we propose a novel approach to revolutionize the restaurant ordering process by introducing QR code technology.

Our proposed solution involves equipping each table with a unique QR code that patrons can scan using their smartphones. This QR code grants instant access to the restaurant's digital menu, allowing customers to browse current offerings and place orders conveniently from their seats. Upon placing an order, the system automatically notifies both the cashier and the kitchen, providing them with essential details such as the table number and the items requested. Furthermore, the digital menu is continuously updated in real-time to reflect changes in offerings, ensuring accuracy and relevance.

By adopting this innovative approach, restaurants can not only enhance customer satisfaction by expediting the ordering process but also improve operational efficiency and reduce costs. With fewer instances of human error and the elimination of paper menus, our QR code-based ordering system offers a sustainable and cost-effective solution for modern dining establishments.

In this research, we aim to explore the feasibility and effectiveness of implementing QR code technology in restaurant operations, with a focus on its potential to enhance customer happiness, streamline processes, and reduce implementation costs. Through empirical studies and analysis, we seek to demonstrate the tangible benefits of this approach and provide insights for restaurants looking to embrace automation in their operations. Ultimately, by leveraging QR codes for ordering, restaurants can deliver a seamless and delightful dining experience while staying at the forefront of technological innovation in the hospitality industry.

Project Overview

The project aims to revolutionize the traditional restaurant ordering process by introducing a QR code-based system. The overarching goal is to enhance efficiency, accuracy, and customer satisfaction while reducing operational costs and environmental impact. By leveraging automated technologies, such as QR codes accessible via smart phones, patrons can conveniently browse menus, place orders, and receive prompt service without the constraints of traditional wait times or paper-based menus. This innovative approach not only streamlines the ordering process but also minimizes the risk of human

error and paper waste. Furthermore, integrating the QR code system with the restaurant's backend facilitates seamless communication between customers, staff, and the kitchen, optimizing order fulfillment and enhancing overall dining experiences. With its cost-effectiveness and user-friendly implementation, the project seeks to provide a practical and sustainable solution for modernizing restaurant operations and elevating customer service standards.

Develop a user-friendly interface accessible via QR codes placed on restaurant tables. Enable customers to browse the menu, select items, and place orders directly from their smart phones. Implement a notification system to alert both the cashier and kitchen staff upon order placement, including table identification. Ensure real-time menu updates to reflect current offerings and prices. Assess the impact of the automated ordering system on customer satisfaction, order accuracy, and operational efficiency.

Gather feedback from patrons regarding their experience with the automated ordering system. Compare the accuracy of orders placed through the automated system versus traditional methods. Measure the impact of automation on order processing time and staff workload. Analyze the financial benefits of implementing the automated ordering system, including reduced paper waste and improved resource allocation.

Methodology

The methodology for this research involves several key steps aimed at developing and evaluating a QR code-based ordering system for restaurants. Initially, a thorough literature review will be conducted to gain insights into existing automated ordering systems, QR code technology, and customer satisfaction in the hospitality industry. Subsequently, essential requirements for the system will be identified, considering factors like usability, reliability, and integration capabilities. Following this, a prototype of the QR code-based ordering system will be developed, encompassing modules for QR code generation, menu management, order placement, notification, and integration. The prototype will undergo rigorous testing in simulated restaurant environments to assess its performance, usability, and reliability, with feedback gathered from both customers and restaurant staff. A select group of restaurants will then participate in a pilot implementation of the system, allowing for real-world evaluation of its impact on customer satisfaction, operational efficiency, and cost reduction. Data collected before and after implementation will be analyzed to measure key metrics and conduct a cost-benefit analysis, considering factors such as labor costs, paper usage, and operational efficiency. Ethical considerations, including data privacy and security, will be addressed throughout the process, ensuring compliance with regulations and standards. Finally, the findings and recommendations will be documented in a comprehensive research report, presented to stakeholders to facilitate decision-making and potential adoption of the system. Continuous monitoring and refinement of the system will be pursued to optimize its benefits for both customers and restaurant operations over time.

Proposed System

The proposed system suggests automating the restaurant ordering process through QR codes placed on tables. Customers can use their smart phones to scan the QR code, accessing the digital menu and placing orders directly. Upon ordering, notifications containing the table number and order details are sent to the cashier and kitchen. The menu is continuously updated with current offerings and prices. Implement a notification system to alert both the cashier and kitchen staff upon order placement, including table identification. Ensure real-time menu updates to reflect current offerings and prices. Assess the impact of the automated ordering system on customer satisfaction, order accuracy, and operational efficiency.

Advantages

- **Improved Customer Satisfaction:** By reducing waiting times and human errors, the automated system enhances the overall dining experience, leading to higher customer satisfaction.
- **Efficiency and Speed:** Automating the ordering process speeds up operations, especially during busy hours, resulting in quicker service and reduced wait times for patrons.
- **Cost Reduction:** The system lowers operational costs by reducing the need for printed menus, minimizing paper waste, and streamlining order processing.
- **Real-time Menu Updates:** Digital menus can be instantly updated with changes in offerings, ensuring customers always have access to the most current menu items.
- **Convenience and Accessibility:** Accessing the menu and placing orders via smart phones offers convenience to customers and caters to modern preferences for digital interactions.
- **Enhanced Accuracy:** By eliminating manual order taking, the system reduces the risk of errors in order transcription, leading to more accurate orders and fewer customer complaints.

Work Flow

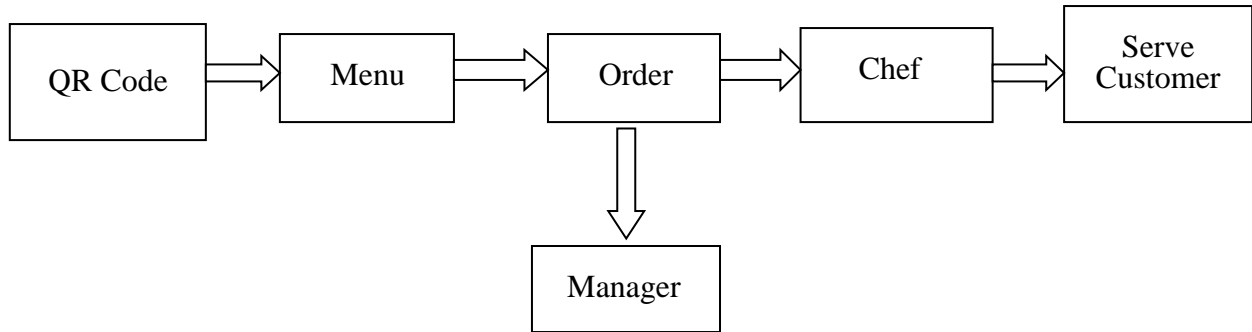


Fig1: Work Flow

- **Customer Arrives at Table:** Customer is seated at a table in the restaurant.
- **Scan QR Code:** Customer uses their smartphone to scan the QR code placed on the table.
- **Access Menu:** Upon scanning the QR code, the customer is directed to the digital menu on their smartphone. Customer browses through the menu, viewing available food and drink options.
- **Place Order:** Customer selects the desired items from the menu. Customer confirms their order and submits it through the smartphone interface.
- **Notification to Cashier and Kitchen:** Upon order submission, a notification containing the order details and table number is sent to both the cashier and the kitchen staff.
- **Order Processing:** Cashier receives the order notification and records it in the system.
- Kitchen staff receives the order notification and begins preparing the food. Kitchen staff prepares the food items according to the order specifications.
- **Order Delivery:** Once the food is ready, it is served to the customer's table by restaurant staff. Customer enjoys their meal.
- **Payment:** Customer settles the bill either through the automated system or with the assistance of restaurant staff.
- **Feedback:** Optionally, the customer may provide feedback on their dining experience through the smartphone interface or directly to restaurant staff.

Conclusion

In conclusion, the adoption of automated technologies, particularly through the utilization of QR codes for restaurant ordering, presents a promising solution to address common challenges faced during peak hours. By allowing patrons to access menus and place orders directly from their smartphones, this approach significantly reduces waiting times and the potential for human error. Moreover, the implementation of such a system not only enhances customer satisfaction by expediting the ordering process but also contributes to cost reduction and environmental sustainability by minimizing paper waste.

Through our research, we have highlighted the efficacy of QR code-based ordering systems in streamlining restaurant operations and improving overall efficiency. By seamlessly integrating with existing processes, this technology ensures prompt notification and accurate order fulfillment, thereby enhancing the dining experience for customers. Additionally, the dynamic nature of digital menus ensures that patrons have access to the latest offerings and promotions, further enhancing their satisfaction and loyalty.

Furthermore, our analysis indicates that the adoption of QR code-based ordering systems is accompanied by lower implementation costs compared to traditional methods. This makes it an attractive option for restaurants seeking to enhance their operational efficiency without significant upfront investment. Ultimately, the implementation of automated technologies such as QR code-based ordering holds immense potential to revolutionize the restaurant industry, offering a win-win solution for both businesses and customers alike. As technology continues to advance, further research and innovation in this field will undoubtedly pave the way for even greater improvements in customer service, operational efficiency, and sustainability within the hospitality sector.

References

- [1] Rahman, M. M., & Haque, S. M. (2020). "QR code-based food ordering system for smart restaurant." In 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT) (pp. 1-6). IEEE.
- [2] Kim, K., & Lee, J. (2018). "Development of a smart food ordering system based on QR code." *Journal of Convergence*, 9(2), 91-97.
- [3] *Android Programming: The Big Nerd Ranch Guide* by Bill Phillips and Chris Stewart.
- [4] Adithya. R., A. Singh, S. Pathan, and V. Kanade, "Online Food Ordering System," *Int.J.Comput.Appl.*, vol. 180, no. 6, pp. 22–24, 2017
- [5] Implementing Customizable Online Food Ordering System Using Web Based Application", *International Journal of Innovative Science, Engineering Technology (IJSET)* 2015.
- [6] Patel, Mayur kumar, "Online Food Order System for Restaurants" (2015). Technical Library. Paper 219.