

# Automatic Menu Ordering System for Hotels and Restaurants

Prof. A. O. Nimbargikar<sup>1</sup>, Amruta Mangalpalli<sup>2</sup>, Tejashri Bhudharam<sup>3</sup>,  
Laxmi Shatagar<sup>4</sup>, Aditi Alure<sup>5</sup>

<sup>1</sup>Assistant Professor, Department of Electronics and Telecommunication Engineering,

<sup>2-5</sup>Students, Department of Electronics and Telecommunication Engineering,  
Shree Siddheshwar Women's College of Engineering, Solapur, India

**Abstract:** *The restaurant and hotel industry is rapidly adopting digital technologies to improve customer satisfaction and operational efficiency. Traditional menu ordering methods involve manual interaction between customers and waiters, which often leads to delays, communication errors, and inefficient order management. The Automatic Menu Ordering System for Hotels and Restaurants is a smart digital solution developed to simplify the food ordering process using modern technologies such as QR codes, mobile applications, cloud databases, and automated billing systems. This research paper presents the design and implementation of an automated menu ordering system that enables customers to scan a QR code placed on the table, view the digital menu, place orders directly from their smartphones, and make online payments. The system automatically sends the order to the kitchen section and updates the order status in real time. The proposed system reduces human effort, minimizes waiting time, improves order accuracy, and enhances customer experience. The research also discusses system architecture, technologies used, advantages, limitations, and future enhancements of the automated restaurant ordering system*

**Keywords:** Automatic Ordering System, Smart Restaurant, Digital Menu, QR Code Ordering, Contactless Food Ordering, Cloud Database, Restaurant Automation, Online Payment System

## I. INTRODUCTION

Technology has become an essential part of modern business operations. The restaurant and hotel industry is continuously evolving to improve customer experience, service quality, and operational efficiency. In traditional restaurants, customers depend on waiters for viewing menus, placing food orders, requesting services, and receiving bills. This manual process consumes time and may create several problems such as incorrect order placement, delays in communication, higher manpower requirements, and reduced customer satisfaction.

The increasing use of smartphones and internet technologies has created opportunities for smart restaurant management systems. Customers today prefer faster and more convenient services. During the COVID-19 pandemic, contactless technologies became highly important for maintaining hygiene and reducing physical interaction between customers and restaurant staff. As a result, digital menu systems and QR-code-based ordering solutions became popular worldwide.

The Automatic Menu Ordering System is developed to provide a fully digital restaurant management solution. In this system, customers can scan a QR code placed on their dining table and access the restaurant menu directly on their mobile devices. Customers can browse food categories, check prices, view food images, place orders, and complete online payments without waiting for restaurant staff. The system instantly sends the order details to the kitchen section where chefs can begin food preparation immediately.



The proposed system also provides an admin panel for restaurant management. The admin can add or remove menu items, update food prices, manage customer records, monitor sales, and generate business reports. The kitchen staff receives real-time notifications about customer orders, which improves coordination between departments.

The main objectives of this project are:

- To reduce waiting time in restaurants
- To improve order accuracy
- To provide contactless food ordering
- To automate restaurant management operations
- To improve customer satisfaction
- To reduce manual workload and human errors

The proposed system is useful for restaurants, hotels, cafes, food courts, and smart dining environments where automation can improve operational performance and customer convenience.

## **II. LITERATURE SURVEY**

Many researchers and developers have worked on restaurant automation systems using various technologies to improve restaurant management and customer service efficiency. Several research studies and commercial applications have proposed smart ordering solutions that reduce human effort, improve order accuracy, and enhance customer satisfaction.

**Sharma et al.** developed a smart restaurant ordering system using tablet devices placed on dining tables. The system enabled customers to browse digital menus and place orders directly without relying on waiters. The study concluded that automated ordering systems significantly reduce communication errors and improve overall restaurant operational efficiency. However, the researchers noted that the implementation of tablet-based systems increases hardware installation and maintenance costs.

**Patel and Mehta** proposed a mobile application-based food ordering system that allows customers to place orders using their smartphones. Their research emphasized the importance of user-friendly interfaces and integrated online payment facilities in enhancing customer convenience. The study also highlighted that mobile applications help restaurants maintain digital records of customer orders, billing information, and transaction histories, thereby improving management efficiency.

Overall, the reviewed literature indicates that restaurant automation systems offer several advantages, including reduced waiting time, improved order accuracy, contactless ordering, enhanced hygiene, reduced manpower requirements, and increased customer satisfaction. Previous studies further suggest that the integration of advanced technologies such as QR codes, cloud computing, Artificial Intelligence (AI), the Internet of Things (IoT), and online payment systems can significantly enhance restaurant management efficiency and contribute to the development of smart dining environments.

## **III. PROBLEM STATEMENT**

Traditional restaurant management systems face several operational challenges such as:

- Long waiting time for customers
- Incorrect order placement by waiters
- Communication gaps between customers and kitchen staff
- Delayed billing process
- High dependency on manpower
- Increased operational costs
- Difficulty in maintaining hygiene with physical menu cards
- Lack of real-time order tracking



These problems affect restaurant efficiency and customer satisfaction. Therefore, there is a need for a smart and automated restaurant ordering system that can improve restaurant operations and provide better service quality

#### **IV. PROPOSED SYSTEM**

The proposed Automatic Menu Ordering System is a web-based and mobile-compatible restaurant automation platform designed to simplify food ordering and restaurant management processes. The system consists of multiple modules that communicate with each other through a centralized database.

##### **A. Customer Module :-**

The customer module allows customers to:

- Scan QR codes placed on tables
- View digital restaurant menus
- Browse food categories
- Check food prices and images
- Select and customize food items
- Place orders directly
- Track order preparation status
- Make online payments
- Provide ratings and feedback

This module provides a user-friendly and interactive ordering experience.

##### **B. Admin Module :-**

The admin module is responsible for restaurant management operations. The administrator can:

- Add, update, or remove food items
- Manage food categories
- Update prices and availability
- Monitor customer orders
- Track payment details
- Generate sales and performance reports
- Manage customer records
- Handle employee management

The admin panel helps improve restaurant management efficiency and business monitoring.

##### **C. Kitchen Module :-**

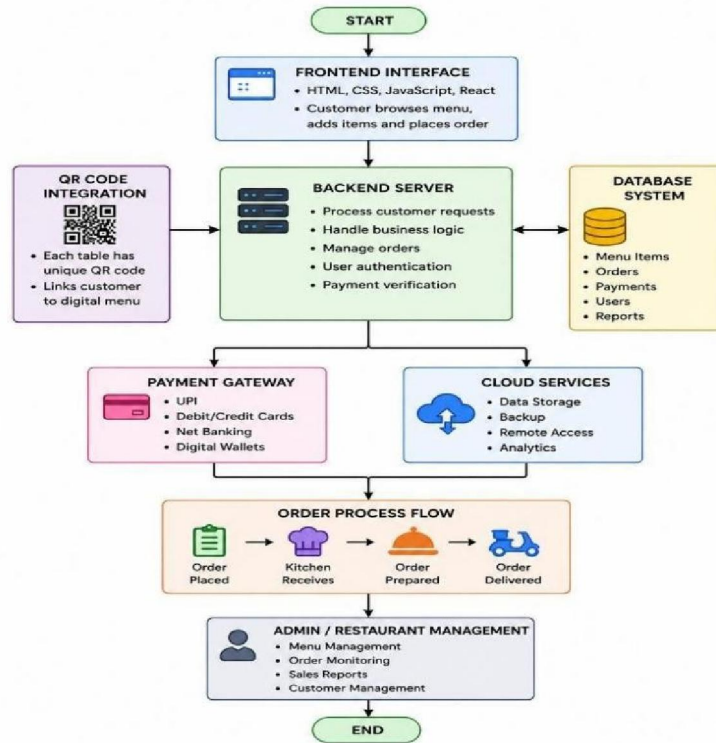
The kitchen module receives customer orders instantly. The kitchen staff can:

- View incoming orders in real time
- Update food preparation status
- Notify completed orders
- Manage order priority
- Reduce communication delays

This module improves kitchen coordination and order processing speed.



**V. SYSTEM ARCHITECTURE**



The architecture of the proposed system contains the following components:

**1. Frontend Interface**

The frontend provides the user interface for customers and administrators. Technologies such as HTML, CSS, JavaScript, Bootstrap, and React can be used to develop responsive web pages and mobile interfaces.

**2. Backend Server**

The backend processes customer requests, handles business logic, and communicates with the database. Backend technologies may include: Python Flask

**3. Database Management System**

The database stores all restaurant information such as:

- Menu items
- Customer orders
- Payment records
- User accounts
- Sales reports

MySQL, MongoDB, or Firebase can be used as the database management system.

**4. QR Code Integration**

Each dining table contains a unique QR code linked to the restaurant menu. Customers scan the QR code to access the ordering interface.



### 5. Payment Gateway Integration

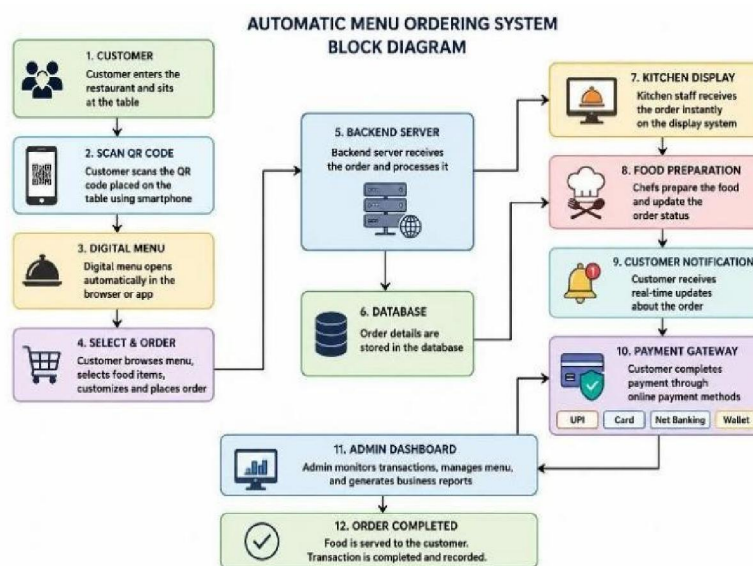
The system supports secure online payment methods including:

- UPI
- Debit/Credit Cards
- Net Banking
- Digital Wallets

### 6. Cloud Services

Cloud technology provides secure data storage, backup facilities, and remote management access for restaurant administrators.

## VI. WORKING OF SYSTEM



### Working of the System

#### • Step 1: Customer Entry

Customer enters the restaurant and sits at a table.

#### • Step 2: QR Code Scanning

A unique QR code is placed on each table. Customer scans the QR code using a smartphone.

#### • Step 3: Digital Menu Access

The restaurant menu opens automatically in the browser or mobile application.

#### • Step 4: Food Selection

Customer browses food categories.

Selects food items and customizes quantity or preferences.

#### • Step 5: Order Placement

Customer confirms and places the order.

• **Step 6: Backend Processing** The backend server receives the order. Order details are stored in the database.

#### • Step 7: Kitchen Notification

Kitchen staff instantly receive the order on the kitchen display system.



• **Step 8: Food Preparation**

Chefs prepare the ordered food.

Order status is updated during preparation.

• **Step 9: Customer Notification**

Customer receives real-time updates about the order status.

• **Step 10: Online Payment** Customer pays through:

o UPI

o Debit/CreditCard

o Net Banking

o Digital Wallet

• **Step 11: Admin Monitoring**

Admin monitors orders and payments.

• Sales reports and business analytics are generated automatically.

**Step 12: Order Completion**

• Food is served to the customer.

• Transaction is completed and stored for future records.

### VII. ADVANTAGES

The proposed system provides several advantages for both restaurants and customers:

- Faster order processing
- Improved order accuracy
- Reduced manpower requirement
- Contactless ordering system
- Better hygiene and safety
- Real-time order tracking
- Easy menu management
- Reduced paper usage
- Digital billing system
- Better customer satisfaction
- Increased restaurant productivity
- Improved business monitoring
- Secure online payments
- Easy sales analysis and report generation

### VIII. APPLICATION

The proposed system can be used in various sectors such as:

- Restaurants
- Hotels
- Cafes
- Food courts
- Smart dining restaurants
- College canteens
- Airport lounges
- Railway catering systems

The system is suitable for any dining environment where digital automation can improve service efficiency.



### **IX. FUTURE SCOPE**

The system can be enhanced using advanced technologies in the future. Some possible improvements include:

- Artificial Intelligence-based food recommendations
- Voice-based ordering systems
- Chatbot customer support
- Multi-language support
- Inventory management integration
- Customer behavior analytics
- Facial recognition systems
- Robotic food serving systems
- Smart table sensors
- Augmented Reality food visualization

These enhancements can make restaurant systems smarter and more interactive

### **X. CONCLUSION**

The Automatic Menu Ordering System for Hotels and Restaurants is an efficient and innovative solution for modern restaurant management. The system successfully reduces manual workload, improves order accuracy, enhances customer satisfaction, and provides faster restaurant services. By integrating QR-code technology, cloud databases, online payment systems, and real-time communication, the proposed system modernizes restaurant operations and creates a smart dining environment.

The research demonstrates that automation technologies can significantly improve restaurant efficiency and customer convenience. The system is cost-effective, scalable, and suitable for various hospitality environments. Future integration with Artificial Intelligence and smart technologies can further improve system performance and business management capabilities.

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