



# EMPOWERING SMALL RESTAURANTS WITH A REAL-TIME ONLINE ORDERING SYSTEM

**Shantam Kumar<sup>1</sup>, Himanshu Saurav<sup>2</sup>, Sumit Kumar<sup>3</sup>, Mr. Sartaj Khan<sup>4</sup>**

Student, B.Tech -CSE , Shivalik College of Engineering, Dehradun, India, Email id – shantamkrstm@gmail.com<sup>1</sup>

Student, B.Tech -CSE , Shivalik College of Engineering, Dehradun, India, Email id –hsaurav6@gmail.com<sup>2</sup>

Student, B.Tech -CSE , Shivalik College of Engineering, Dehradun, India, Email id - [sumitkumaryks@gmail.com](mailto:sumitkumaryks@gmail.com)<sup>3</sup>

Assistant Professor, Shivalik College of Engineering, Dehradun, India, sartaj.khan@sce.org.in<sup>4</sup>

**Abstract :- The online food ordering system discussed in this paper is designed to meet a specific market need by providing small restaurants with an affordable solution to offer their customers online ordering without the high cost and time investment typically associated with custom software development. This highly customizable system allows restaurant staff to easily manage the site content, particularly the menu, through an intuitive graphical interface. The website, which is the only part seen by customers, is dynamically designed to reflect the current state of the system, so any changes made are visible in real-time.**

**Registered users visiting the website can easily navigate the menu, add food items to their order, and choose delivery options with just a few clicks, greatly streamlining the ordering process. Inside the restaurant, orders are promptly retrieved and displayed in an easily readable format for efficient processing. This paper aims to provide detailed descriptions of the system's design and implementation, including a comprehensive overview of available features and plans for future development. Additionally, it includes user manuals and troubleshooting tips for all three components of the system, providing readers with a clear understanding of the expected use cases.**

**Keywords:** Facial recognition, AIML, Privacy, Efficiency, Real-world, Image processing, Attendance, Algorithms, PCA, Development .

## I. INTRODUCTION

It is widely recognized that starting a new small-scale business in today's competitive market can be exceptionally challenging, especially when facing competition from well-established businesses. In a fast-paced world where people are often pressed for time, consumers prefer convenient solutions, and this is particularly true when it comes to ordering food. Online food ordering not only offers convenience but also provides customers with visibility into the menu, pricing, and a streamlined ordering process.

The online ordering system described in this paper is designed to address these needs by simplifying the food ordering process for both customers and restaurants. It features an interactive, up-to-date menu that allows customers to easily select one or more items to add to their order, with all details displayed in a simple and user-friendly manner. Customers can view their selections in a virtual shopping cart, make adjustments, and then proceed to checkout. Upon placing an order, the system confirms the order details and records them in a database, enabling restaurant staff to process orders in near real-time.

This approach benefits both the customer and the restaurant. Customers enjoy a seamless ordering experience with clear navigation, while restaurants can efficiently manage orders with minimal delays or confusion. The system's design ensures a smooth interaction between the admin, customer, restaurant, and delivery teams, with regular updates to ensure all available options are current and easy to use.

Given the increasing trend toward eating out or ordering food online due to busy work schedules, the proposed online ordering system has significant potential to improve the operational efficiency of small-scale restaurants while providing customers with the convenience they seek. The system is designed to help small businesses compete in a market dominated by larger, more established players, by offering an affordable and scalable solution that enhances the overall customer experience. This paper explores the functionality and impact of the proposed system, demonstrating how it can streamline operations for small-scale restaurants and facilitate a better experience for customers

### Literature Review

The demand for online food delivery services has been rising, and researchers have proposed various models and systems to enhance these services. The current landscape is marked by significant technological advancements and a growing focus on efficiency and customer satisfaction. Singh et al. [1] suggested an online food ordering system leveraging Android smartphones and tablets. The system allows users to manage orders efficiently, catering to various customer needs. This application also aids administrators in understanding client requirements, enhancing the overall user experience. He et al. [2] proposed an agent-based online-to-offline food ordering model (AOFOM). This model features three types of agents: customers, restaurants, and the online food ordering system. It assesses the food quality and location strategies for restaurants, suggesting ways to optimize these factors. The model's emphasis on location and quality could lead to better customer satisfaction and competitive advantage in the food delivery market.

Trupthi et al. [3] highlighted the high cost of human labor in the food industry. Their work discusses using technology to replace certain human roles, such as implementing an e-menu card to automate order processing. This technology can streamline the food ordering process and reduce operational costs.

Chimote and Dhole [4] explored using GPS in food delivery applications. GPS provides real-time location data, which can enhance the food delivery process by reducing manual tasks. This technology integration saves time and resources, offering more efficient service delivery. Patel [5] developed an online ordering system that simplifies the ordering process for both customers and restaurants. The system uses JavaScript, JSP, HTML, and Java for the front end, while Oracle handles the backend. This design facilitates swift order processing and minimizes delays, thus improving customer satisfaction. Abraham [6] examined the impact of social media on online food applications. As online media consumption grows, businesses must adapt by integrating social media strategies into their operations. This adaptation allows restaurants to offer Made-to-Order (MTO) food without a physical store, contributing to a more agile business model.

More et al. [7] focused on the impact of COVID-19 on the food delivery industry. The pandemic forced many people to prefer online modes of interaction, leading to a surge in online food ordering. The study shows the shift in consumer behavior and the importance of incorporating technology to maintain service during challenging times.

Gupta [8] investigated the influence of food delivery apps like Swiggy and Zomato on restaurant businesses. The study finds that home delivery and takeaway formats have attracted additional customers, especially in malls, offices, and residential complexes. This trend underscores the growing importance of online food delivery platforms.

Saxena [9] analyzed the convenience of online food ordering, where customers can easily choose from multiple restaurants without relying on physical menus. This user-friendly approach promotes innovation and growth in the food delivery sector. Other studies have explored similar themes, focusing on touchpad-based food ordering systems [10], customizable online food ordering systems [11], and digital dining in restaurants using Android [12]. These studies collectively demonstrate the continuous evolution of the food delivery industry, driven by technological advancements and changing consumer preferences.

### Proposed Framework

The proposed system aims to streamline the food ordering and delivery process by integrating a user-friendly interface with efficient backend operations. The following steps outline the complete process:

**User Interface and Restaurant Discovery:** Customers access an online application, which serves as a centralized platform to browse restaurant menus and explore various dining options. This platform may encompass in-house restaurants or third-party aggregators. The user interface is designed to provide intuitive navigation, allowing customers to quickly find their desired restaurants or cuisine types.

**Order Selection and Customization:** Customers select a restaurant of their choice and browse through its menu to identify the food items they wish to order. The system allows customization of orders, enabling users to adjust ingredients,

portion sizes, or additional toppings as desired. This level of customization enhances customer satisfaction by offering a personalized dining experience.

**Order Confirmation and Payment:** Once customers have made their selections, they proceed to confirm their orders. The system then prompts users to choose a payment method, offering a range of options, including online payments via credit/debit cards, mobile wallets, or cash on delivery (COD). This flexibility in payment methods accommodates a broader customer base.

**Order Processing and Notification:** Upon receiving the order, the restaurant is notified through an admin panel. This panel provides the restaurant with detailed information about the order, including the food items, special requests, and payment status. The restaurant then begins preparing the meal and packaging it for delivery. The system may also send real-time notifications to customers, keeping them informed about the order status and estimated delivery time.

**Coordination with Delivery Personnel:** After the order is prepared, the restaurant coordinates with the delivery service or in-house delivery staff to arrange the delivery. This coordination involves notifying delivery personnel through a dedicated app or communication system, providing them with relevant order details and customer addresses. The system may include geolocation features to help delivery personnel navigate efficiently.

**Delivery and Customer Feedback:** Delivery personnel transport the orders to the individual customers, ensuring timely and accurate delivery. The system tracks delivery progress and updates customers with real-time information on the delivery status. Once the order is delivered, customers may be prompted to provide feedback on the service quality, allowing the system to collect valuable insights for further improvement.

**Data Analytics and Continuous Improvement:** The system incorporates data analytics to gather insights from customer interactions, order trends, and delivery performance. This data is used to identify areas for improvement, optimize restaurant operations, and enhance customer satisfaction. The analytics module may also support marketing strategies by identifying customer preferences and recommending personalized offers.

### 3.1 Proposed Features and Functionalities

The proposed system aims to enhance the online food ordering experience by addressing the limitations of existing systems and introducing improved features. It focuses on providing secure transactions, reducing manual labor, and offering a range of options for users. The key components and functionalities are outlined below:

**Admin Panel:** The system includes an admin panel that allows administrators to manage various aspects of the application. This panel provides access to key controls, enabling efficient oversight of food orders, user management, revenue tracking, and more.

**Client-Side Interface:** The client-side interface serves as the primary point of interaction for users. It offers an intuitive design that allows customers to browse restaurant menus, place orders, make payments, and track delivery status in real time.

**Online Food Ordering:** The core functionality of the system revolves around online food ordering. Users can select from a variety of restaurants, customize their orders, and submit them through the application. This feature streamlines the ordering process, providing a seamless experience for customers.

**Management of Food Categories and Items:** Administrators can manage food categories and individual food items through the system. This capability allows restaurants to update their menus, add new dishes, and categorize items for easier browsing. The flexibility to modify food offerings ensures that customers always have access to the latest options.

**Food Order Management:** The system includes robust food order management features, enabling restaurants to receive, process, and track orders efficiently. This functionality ensures smooth coordination between the restaurant and delivery personnel, reducing errors and improving order fulfillment.

**Online Accommodation:** Beyond food ordering, the system extends its capabilities to online accommodation booking. Customers can reserve rooms in various hotels and resorts, offering a broader range of services. This feature complements the food ordering system, providing a comprehensive experience for users.

**Management of Room Categories and Customers:** Administrators can manage room categories and customer profiles. This functionality enables hotels to maintain an organized inventory of available rooms and keep track of customer bookings. By having a unified system for food ordering and accommodation, businesses can offer more integrated services.

**System User Management:** User management is a critical component of the proposed system. Administrators can create and manage user accounts, assign roles, and control access levels. This feature ensures that the system operates smoothly and securely, with only authorized personnel having access to sensitive data.

**Total Revenue Tracking and Overview Information:** The system provides tools for tracking total revenue and other critical metrics. Administrators can view an overview of the system's performance, allowing for better decision-making and business insights. This functionality supports ongoing analysis and continuous improvement.

### Key Functionalities

**Data Collection and Verification:** The system collects data from customers and verifies it with restaurants to ensure the availability of ordered items. This step helps prevent errors and ensures a smooth ordering process.

**Order Confirmation:** Once the order is verified, the system sends a confirmation message to the customer, providing assurance that their order has been received.

**Customer Analytics:** The system uses data analytics to offer restaurant suggestions based on customer orders and regional trends. This feature enhances the user experience by recommending relevant dining options.

**Customer Feedback and Ratings:** Customers can rate their experiences, providing valuable feedback for system improvements. This feedback loop helps maintain service quality and identifies areas for enhancement.

**Secure Payment Methods:** The system supports multiple payment methods, ensuring safe and secure online transactions. This flexibility accommodates various customer preferences and promotes trust in the system.

**Live Order Tracking:** Customers can track their orders in real time, providing visibility into the delivery process. This feature enhances transparency and reduces uncertainty for customers.

### System Requirements:

**Operating System:** Server: Linux-based systems or Windows Server for hosting the backend.

Client: Windows, macOS, Android, or iOS for end-user devices.

**Database Management:** A relational database like MySQL or PostgreSQL for storing and managing user data, orders, and other structured information.

**Backend Development Tools:** Frameworks like Node.js, Django, or Ruby on Rails to build the backend of the system.

**Web Servers:** Nginx or Apache for hosting the backend and serving the front-end content.

**Frontend Development:** HTML5, CSS3, and JavaScript for creating user interfaces. Frameworks like React.js, Angular, or Vue.js for a dynamic and interactive user experience.

**Security Features:** SSL/TLS certificates to ensure secure communication between users and servers.

User authentication methods, such as OAuth 2.0 or JSON Web Tokens (JWT), to manage user access.

Regular security updates and vulnerability assessments to keep the system secure.

**Payment Gateways:** Integration with services like Stripe or PayPal to process online payments securely.

Support for multiple payment methods, including credit/debit cards and digital wallets.

**Data Backup and Recovery:** Regular backup processes to protect user data. Disaster recovery plans to handle unexpected system failures or data loss.

### Hardware Requirements

**Server Infrastructure:** Multi-core processors with at least 8 GB RAM for small to medium-sized systems. Larger systems may require 16 GB or more.

**Storage:** Solid-state drives (SSDs) for faster data access and improved system responsiveness. Consider a minimum of 256 GB for basic setups.

**Network:** High-speed internet connectivity for reliable data transfer.

### Client Devices:

**Mobile:** Android and iOS devices for mobile application users.

**Desktop/Laptop:** Windows or macOS-based computers for web users.

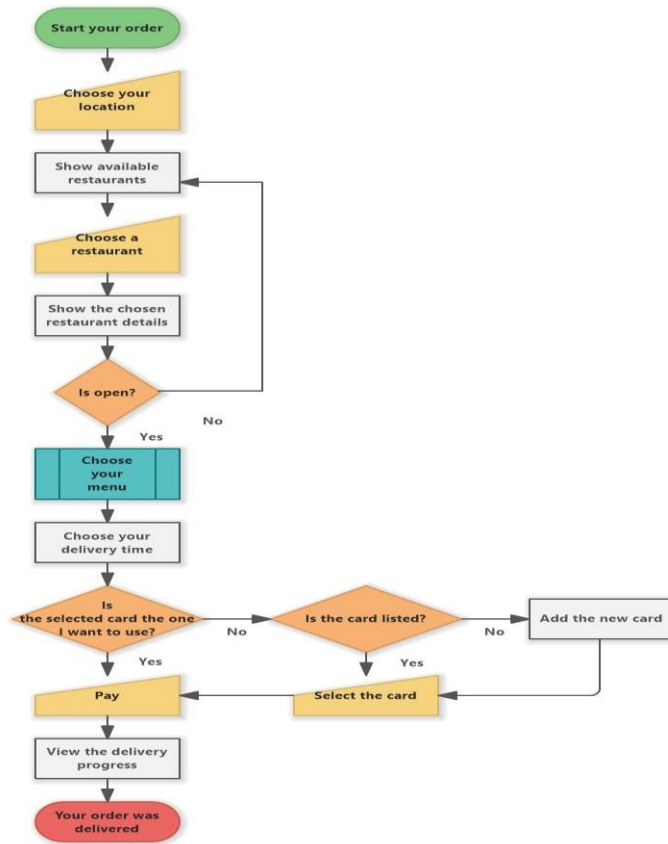
### Development and Testing Environment:

**Development Servers:** A separate environment for development and testing to avoid affecting production data.

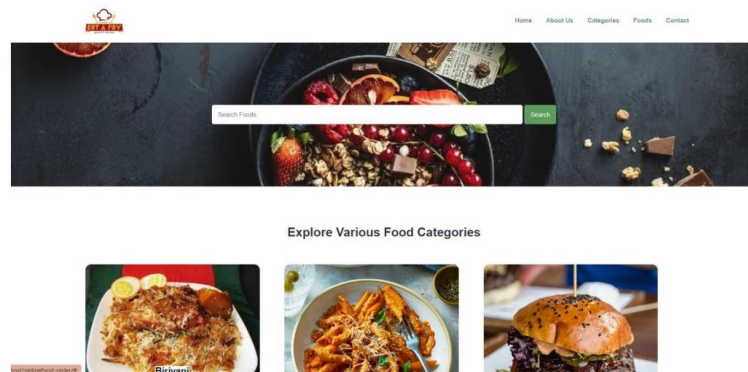
**Virtualization Tools:** Docker or VirtualBox for creating isolated development and testing environments.

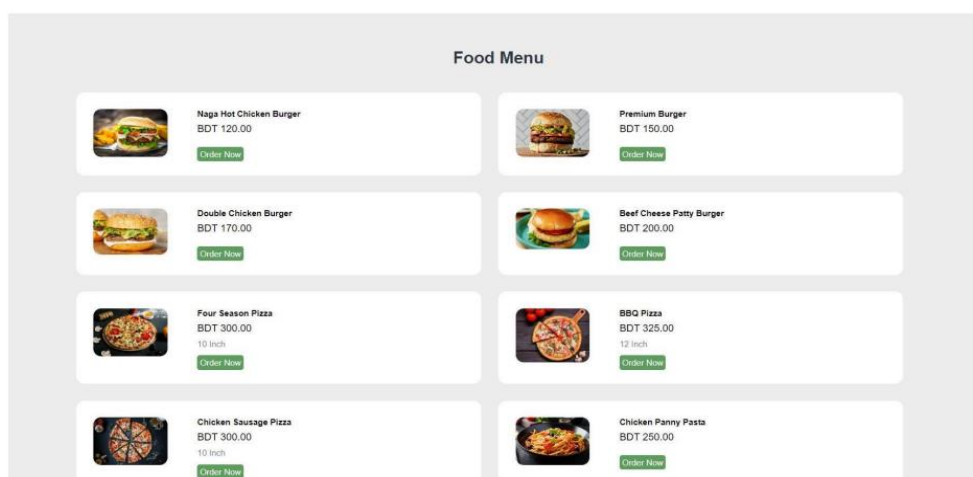
### System Design:

A system flowchart is a visual tool that maps out the major components and steps in a process. It shows how these parts are related and interact, without delving into minor details.



### Results and Analysis:





The final output is a complete web-based Restaurant Management System, which can be used in any kind of restaurant. This Restaurant Management System can help to manage the Restaurant more effectively, efficiently and smoothly. This is more secured and there will be speedy and well-ordered authentication procedure for the maintenance of records. At present time, in this technology-based world, people likes and wants everything to be smooth and efficient through the use of data and information. In this perspective, our Restaurant Management System can be an ideal platform for the users. Its user-friendly interface can help the customers to find his/her desired menu item and place order with a few clicks. Customers can easily place an online order by browsing the menu options, pick what they want sitting at home. And can also receive their food in a short period of time.

#### Limitations of the System

The system has certain other restrictions as well. There are only a few basic functions in the system's shopping cart, and it cannot be extensively customized. Additionally, practically all of the functionality of the application, including validation, is handled by server-side programming. It increases the server's workload, especially when a large number of users access the program. This issue can be resolved by using client-side languages, such as JavaScript or HTML 5, to check data. Additionally, the order model has been created.

#### Future Scope of the Project:

The future development of this project encompasses a range of enhancements and scalability features that will significantly improve the functionality and robustness of the online food ordering system.

##### Enhancements for Improved Operations

**Integration with Printers:** The system could be integrated with printers, allowing restaurants to automatically print order receipts or kitchen tickets for more efficient food preparation and order management.

**Advanced Package with Additional Features:** The project aims to introduce an enhanced software package that provides more advanced features for the online food ordering system. These features could include personalized user experiences, AI-driven recommendations, and enhanced loyalty programs.

**Global Accessibility:** To make the platform accessible worldwide, the project can be hosted on online servers with a robust cloud infrastructure. This will enable users from different regions to access the platform without geographical limitations.

##### Technical Improvements for Scalability

**Load Balancing:** The system could incorporate multiple load balancers to distribute traffic and ensure consistent performance, even during peak times. This enhancement would improve system resilience and reduce the risk of downtime due to server overload.

**Master-Slave Database Architecture:** Introducing a master-slave database structure will reduce data query overload and improve response times. This architecture allows for better distribution of database tasks, leading to improved scalability and reliability.

**Regular Backups and Disaster Recovery:** Implementing a robust backup mechanism ensures that both the codebase and the database are regularly backed up on different servers. This approach enhances data security and allows for quick recovery in case of system failure or data loss.

### **Future Possibilities**

The proposed project is designed with flexibility in mind, allowing for future demands and user-driven enhancements.

### **Comprehensive Food Item and Category Management:**

The system could include more detailed management tools for food items and categories, allowing restaurants to quickly update their menus and manage inventory.

### **Customer Relationship Management (CRM) Integration:**

By integrating CRM features, the system could offer personalized marketing campaigns and customer analytics, enhancing customer engagement and loyalty.

### **Enhanced Order Management:**

Improvements in order management, such as better tracking, real-time updates, and automated order confirmation, would contribute to a more seamless user experience.

## **CONCLUSION:**

The development of an online food ordering system introduces a streamlined process that allows customers to place orders directly without the need for traditional waitstaff. This approach addresses the common issue of delays and miscommunication in busy restaurants, enhancing the overall dining experience.

Through the application, end-users can register online, browse the digital menu (E-menu), and select their desired food items. Once the order is placed, it is transmitted directly to the kitchen, where chefs can immediately begin preparing the meal. This direct communication between customers and kitchen staff eliminates the need for intermediaries, reducing the likelihood of errors and delays.

The system significantly reduces reliance on waitstaff, which can be especially beneficial during peak hours when restaurants are typically crowded. In such situations, waiters can become overwhelmed with orders, leading to slower service and decreased customer satisfaction. By allowing customers to order through an online platform, the system ensures a more efficient and accurate order-taking process.

Additionally, this technology offers a more flexible and accessible way for customers to interact with restaurants. It can also enable restaurants to manage high volumes of orders more effectively, thus improving customer satisfaction and operational efficiency. Overall, the online food ordering system represents a modern solution to traditional challenges in the restaurant industry. By embracing this technology, restaurants can offer a smoother, more convenient dining experience while reducing operational bottlenecks and improving service quality. This approach can lead to increased customer loyalty and a better bottom line for the business.

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