International Journal on Science and Technology (IJSAT)
E-ISSN: 2229-7677 ● Website: www.ijsat.org ● Email: editor@ijsat.org

Food Ordering Web application

Mr. M. Bala Subiramani[1], Mr. S. Gunasekaran[2], Mr. P. Dinesh[3], Mr. D. Dhayanandh[4], Mr. M. Dhayanithi[5], Mr. K. Dinesh Kumar[6]

[1,2] Assistant professor, Department of Computer Science and Engineering,
V.S.B Engineering College, Karur, Tamil Nadu
[3,4,5,6] Department of Computer Science and Engineering,
V.S.B Engineering College, Karur, Tamil Nadu

Abstract:

platform that has a total strategy for customers to connect with restaurants for food ordering, reservations, and take-out. Customers today expect restaurants to have a digital presence, especially in the rapidly growing digital marketplace. The platform is being design to connect consumers of restaurants with restaurants by providing one place (mobile app and web app) to shop a variety of restaurants, view a classified menu, browse and see what is available in real-time, and place their orders for take-out or possibly dine-in. This application is not only improving convenience for the customer, but also improving the user experience for the restaurant(s) through an intuitive and/or user-friendly admin dashboard that will allow the restaurant to modify and manage their menu, pricing, and availability without expecting the user to have technical experience. The interface is mobile responsive and therefore the application is designed to provide users with the same experience on various devices regardless of who the user is. Coordinate future envisions/and plans for the application will have secure payment processing for the customer, real time order status notifications, other enhancements for basic customer-focused features to enhance the user experience and multilingual capability for each individual user to improve communication between the user and their restaurant staff. This new service intends to disrupt the food and beverage service by having restaurants connect to consumers through one application.

Keyword: Food Ordering, Dine-in Booking, Restaurant Platform, On-Line Ordering & Take Out, Multi-Restaurant App, Responsive Site, Real-time Menu Update, Restaurant Panel, Digital Food Ordering, Customer Convenience, Meal Booking, Restaurant Finding, All-in-one Ordering, Web Ordering, Scheduling Meals, Technology in Food Services.

1. Introduction:

In today's fast, mobile, and digitally connected pace of life, the hospitality and food service sector is experiencing its own transformation. As convenience and online accessibility become increasingly valued, customers expect restaurant services to be available with a few clicks online. The old-fashioned dine-in experience is now being augmented-and in some cases supplanted-by modern digital solutions that allow the user to browse menus, place an order, make reservations, and even pre-order the meal

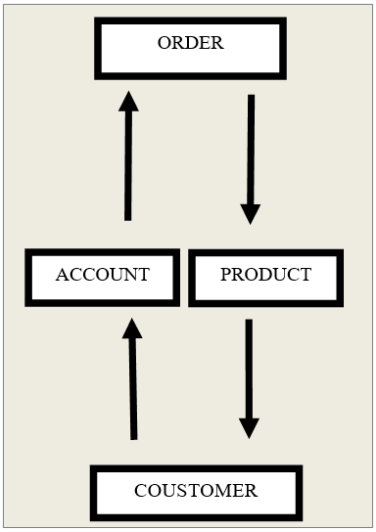
from a mobile device. The proposed food ordering system plans to model the modern needs of the restaurants and customers by creating a digital space that offers an integrated platform or dashboard of various restaurants, offering pickup and dine eating functionality. While conventional apps and platforms (like Swiggy, Zomato, or Uber Eats) are focused primarily on delivery to a home address, this proposed platform is creating opportunities for flexibility by scheduling dine-in options and managing cuisine offerings on menus in real-time. The customer will explore restaurants, filter menus by preference or cuisine type, check out a restaurant, and place an order for either a pickup or dine-in, from one holistic platform.

From the restaurant's viewpoint, this is also beneficial in managing its workload and decreasing reliance on multiple digital applications for its operations because all functions and features can be managed by an integrated admin or dashboard option. In addition to eliminating redundancy, the interface allows the restaurant owner to track specific orders, update the home's menu, and adjust or change the status of a menu item (for example as an unavailable option).

The platform proposed seeks to address this technological gap by providing users with the ability to browse the multitude of restaurants, check categorized menus, place pickup orders or make dine-in reservations ahead of time through a single responsive user interface, whether through a website or a mobile app. It offers the dual benefit of convenience for the user and efficiency for the restaurant owner. From the consumer's perspective, the system serves to make discovering restaurants, viewing menus that have been updated, and arranging dining all in one place more convenient. To the restaurant, it makes the use of several digital service entries unnecessary as it is not very difficult to use a single administrative dashboard, where they can update their menus, adjust prices of their menu items, look at the orders, and make dine-in reservations in real-time.

The platform is also understood as the increasing level of digital interaction within hospitality. The modern customers desire to receive a personalized, efficient and smooth experience and restaurants have to dive into the digital world to remain competitive. Through the creation of this cohesive solution, the consumers and the restaurateurs can harness the benefits of a digitally streamlined system capable of up to the mark. Besides the benefits to the consumer and restaurateurs, the scalable and cloud-based infrastructure implies that with time, it can add additional restaurants, additional user accounts and options like online payment system, real-time order tracking and AI-based personalised recommendations can be added.

Finally, the project goal is to develop a smart, engaging, and future ready digital platform that will make customers happier and restaurants will be able to streamline their work processes. Not merely the digitalisation of food ordering, it is enhancing the consumer experience in a restaurant, booking a table to fulfilling their order, which is a continuation of the digitalisation process in the food service industry.



2. Related works:

The emergence of digital solutions in the food and hospitality sector has led to the development of a number of large players such as Swiggy, Zomato, Uber Eats, DoorDash, and Grubhub, who have transformed the way individuals interact with restaurants. These players are largely multi-million dollar food delivery and takeout options, and have streamlined the food ordering process from nearby restaurants and provided delivery to the customer's location. However, while they have been successful with delivery options, similar players often neglect dine-in users and users that want to reserve a meal ahead of time. Similarly, reservation-based players such as OpenTable focus mainly on table reservation, but not food ordering. Alternatively, restaurant management systems like Toast provide back-end management solutions, but lack a front-facing customer ordering option. Each approach has contributed to fragmentation in the market for a true-system which combines online meal-ordering, dine-in-reservation and multi-restaurant management together.

Prior research and implementations have captured the rising demand for integrated digital solutions that bring together real-time ordering, discovery of restaurants, and management. Current solutions mostly lack a two-way communication model that allows for dynamic interactions between a restaurant and a customer. This system is designed to bridge that gap by developing a comprehensive unified platform capable of real-time updates, live order tracking, and a multi-restaurant environment that improves the user experience and restaurant operation. In examining the limitations of current systems, our project proposes a new method that integrates the benefit of both delivery-focused applications and reservations application into one unified total solution.

3. Methodology and Technologies Used:

The system is developed in a modular and dynamic manner in order to offer flexibility, adaptability and continuous improvement. The agile approach is conducive to this process of development because of the iterative cycles of development in which the user input is taken after each sprint so as to ensure that the end product is what the user anticipated. The proposed system indicates a client-server structure, which is composed of three broad modules: the user interface (frontend), the server and APIs (backend) and the

data storage and management (database). The front end will be developed using a modern JavaScript platform, such as ReactJS or Angular to deal with the web interface/execution; and a modern technology stack of mobile platforms, such as Flutter or React Native, will be used to take advantage of the native execution in both Android and IOS platforms.

The backend (server-side functionality) is based on node.js and Express, and is a simple, flexible, and powerful framework of order tracking, authentication, and API integration. As a database layer, MongoDB may be employed to store unstructured and flexible data, or postgreSQL may be employed to store relational consistency. Order tracking or menu item availability are just some examples of real-time data updates which can be made possible with such technologies as Firebase, or Socket.IO. The authentication system is based on Jerome Web Tokens (JWT), which provides a safe token-based user session. The application will be hosted and deployed on a cloud, e.g. AWS, Firebase Hosting or Heroku, which will provide scalability, security, and continuous integration. In general, the technology stack is chosen so as to offer a strong, high-performance, and scalable platform now and to greater extensibility in the future including rich analytics, or to be driven by AI to create personalized user experience.

The user interface and experience lie under the domain of the frontend. It is developed with the help of the current JavaScript frameworks such as ReactJS or Angular that are characterized by the dynamic rendering and responsive design. The frameworks help the system to present a smooth interactive interface in web browsers, and mobile devices. In the case of mobile applications, such technologies as Flutter or React Native are applied to make sure that only a single Android-iOS compatible codebase would be used. This is a beneficial development technique because there is a shorter development, and cost of maintaining the codebase. The frontend is based on the principle of responsive web design (RWD), according to which a consistent experience is achieved on the screen irrespective of the size and resolution of a particular device. More to this, accessibility, usability, and minimalistic design of user interface are considered to accommodate users with different levels of technical expertise.

The system backbone is the backend, and it manages logic, processing data and facilitating the interaction of users, restaurants and database. It is deployed on the basis of the Node.js and the Express.js framework, which gives an asynchronous and event-driven architecture. Express.js and Node.js are often able to support more than one request simultaneously, which is an essential feature of a successfully operating, real-time solution, e.g. a food ordering platform. The backend will handle functions of great importance such as user authentication, session management, order-tracking, dine-in scheduling, and application programming interface (API) integrations.

The database layer is designed to be flexible and resilient such that various forms of storage can be employed depending on the case of usage. As a NoSQL database, MongoDB is effective in storing additive, dynamic and nonstructured data such as restaurant menus and preferences of customers. PostgreSQL is relational database type and is more suitable to structured data such as transactions, user account data and order history. The hybrid solution can be scaled and enable the platform to process numerous data streams at the same time and still be able to maintain performance.

Another important feature of the system is real-time updates, which real-time synchronization between the frontend and backend data, i. e., a user will see things on a menu, order status, and table reservations

published and offered a user will not need to refresh them. This real-time data offers very high user experience.

To deploy and host, scalable, reliable, and continuous integration features will be provided with the help of such cloud-based services as Amazon Web Services (AWS), Firebase Hosting or Heroku. It is also easier to deploy the cloud where services are automatically scaled in times of peak usage or just because of accidents that may happen leading to loss of service. On the same note, the system will have external APIs to consolidate with payment gateway, third party analytics, and notification services.

Software engineering best practices were given special consideration during the development. The coding is created based on modularity, components, and re-usable elements during coding.

To sum up, the judicious application of a robust technology stack (ReactJS, Node.js, MongoDB/PostgreSQL, Firebase) with a disciplined approach to agility, will make the system considerate in terms of security, performance, and scalability. The current capabilities, which include online ordering and in-person table booking, are currently made possible with the help of this technology, and the future capabilities (including AI powered recommendations, real-time analytics, and multilingual support) are also in place. Therefore, it is a resilient and viable solution to the online ecosystem of the restaurant.

4. Proposed system architecture:

The system architecture is based on a three-layer platform: (1) the Presentation Layer (or front-end), (2) the Application Layer (or back-end), (3) the Data Layer (or database). The user interface is exposed for users and the navigation is user-friendly to users to navigate the restaurants, look at menus section by section and place a pick up order or make a reservation to dine out. More so, the interface is responsive to various screen sizes and can be used on a regular desktop, tables, and smartphones. Admin dashboard will be provided to the restaurant owners to allow them to manage menu items, adjust menu prices, confirming orders and real-time monitoring of reservations. The platform administrators will also possess super user rights to track the operations within the system and maintain the registration of registered users and restaurants.

All the business logic and system processes, such as authentication, order processing, and real-time synchronization are done in the backend. The frontend and the backend are safely connected with the help of APIs, with live updates being provided by Socket.IO or Firebase (e.g., available menu items and confirmations of orders). All the information required, including user profiles, restaurant details, orders and schedule is stored in the database (developed using either MongoDB or PostgreSQL). The hosting is provided (AWS, Firebase) to guarantee reliability, uptime, and scalability. The additional integrations (e.g., payment gateway, role-based access, and HTTPS) provide a safe, efficient ecosystem to all users.

5. Result analysis:

During the testing phase, the prototype was able to satisfy all the requirements identified in the design process. The prototype was able to showcase functionalities, such as user registration, search of

restaurants, real-time menu, ordering and dine-in booking. The functional testing also ensured that the application was in a position to handle multiple requests at the same time without compromising on stability and responsiveness. Responsiveness allowed uniform operations of all services, i.e. a laptop, tablet, or smartphone, and a common user experience. The owners of test restaurants were able to use the system using the admin dashboard to edit and adjust menu items and forecast the flow of orders and this proved that the system is simple and user-friendly even to those that are not technical.

Additional usability testing on the system proved the convenience and usability of the system. The participants appreciated having one platform where they could view a number of restaurants and place an order without switching between different applications. Dine-in scheduling was also received well especially in the capacity to minimize wait times especially during peak hours which were appreciated by the contributors. In the case of the restaurants, it helped them to handle the orders and determine when a customer would visit and hence improving the running of the restaurants. Regarding the results, the system outcome was proved to be the realization of the objective of the system the reduction of the strain of interaction between the restaurant and the customer, as well as a better customer satisfaction.

6. Discussion:

The analysis of the developed system shows the advantages of the system, and the means of how it could be enhanced later. The system has been mostly successful in terms of ordering and dine-in scheduling; however, the development of an integrated payment gateway would greatly enhance the customer experience, leading to greater trust in the system. An integrated table management in real time would allow restaurants to further automate their reservations while increasing table turnover. Testers also mentioned that the system should consider localization through multi-language support, as well as personalization options to be attractive to an international demographic. The possibilities of filtering or recommending restaurants by dietary ingredients, cuisine category, or location would plan to make the system even more user-focused. In a technical aspect, it is likely that to take the system to scale will require attention to the backend to ensure there are no issues due to the high end user traffic. Load balancing and cloud auto-scaling will be part of the near-future phases of this project ongoing development of an upgraded version of the system with better performance with increased usage. In conclusion, the system was successful as a stepping stone in the modernization of restaurants. With that said, there are areas for sure improvements can be made to contribute to custodial experience.

7. Conclusion:

The project successfully provides a holistic, user-centric platform that allows customers and restaurants to connect, offering food ordering, dine-in planning, and restaurant discovery on an integrated system. Among the significant industry demands that the solution services, include menu management, operational streamlining and flexible value to the user experience. The focus on pickup and dine in solutions will provide the platform with a special experience, in contrast to the standard delivery based applications. The system architecture is constructed keeping in mind the future scalability and data security and can be extended as well in case technology may change. In the future, it will provide ease of use and inclusiveness through the introduction of such a feature as payment with integration, algorithm

and learning recommendations, and chatbot. Overall, the project can be viewed as the basis of creating the quality of service in restaurants on the basis of the digital transformation process, increased efficiency, and the beneficial customer satisfaction in the context of user experience.

8. Future Enhancements:

Subsequent releases will be updated, in order to make the platform future-proof. The first and foremost concern is to integrate a secure online payment service like Razorpay, Stripe, or PayPal so that its customers could access a secure online payment system, which would enable them to conveniently and safely pay their order online to restaurants. Multi-language assistance will be introduced to give an opportunity to participants of various backgrounds and languages. The customers will also be able to monitor the progress of their orders by getting to monitor their order status where they can view the progress of their orders in real-time. Artificial Intelligence (AI) and Machine Learning (ML) option will also be incorporated that will enable the platform to suggest the most suitable restaurant and menu to the user depending on the preferences and history of ordering. Users will also manage to offer a ratings and reviews platform, which will enable users to give their feedback and helps other people in their decision making process. Additionally, restaurant owners will have access to an analytics dashboard, which will provide elements of customer behavior, sales patterns, and operational efficiencies. Additionally, integration with more advanced table management systems will enable users to eliminate manual entries, enhancing operational strategy and approaches to customer flow. Overall, the updates planned for future versions together will allow the current system to evolve into an intelligent, cohesive, and real-time efficient management platform for food service utilization.

Reference:

1. A.Sharma, R. Gupta, P. Singh, S. Reddy, and M. Verma, “Design of modular responsive restaurant web systems,” in Proc. IEEE Int. Conf. on Web Engineering, New Delhi, India, Mar. 2025, pp. 123–130.
2. K. Johnson et al., "Performance analysis of scalable food-ordering platforms," IEEE Transactions on Service Computing, vol. 18, no. 6, pp. 765-777, Jun. 2025.
3. Karthik, T. S. Sridhar, and R. Sriram, "Digital Food Ordering System Based on Spring Framework," International Journal of Recent Technology and Engineering (IJRTE), vol. 8, no. 6, pp. 4795-4798, Mar. 2020.
4. L. Jagadeesh and S. Noor Taj, "Contact Less Food Ordering," International Journal of Scientific Research in Science, Engineering and Technology, vol. 12, no. 3, pp. 1025-1030, Jun. 2025.
5. A. S. Jaiswal, C. R. Kulkarni, Y. Patil, S. Ponde, and R. B. Vaidya, "Smart Food Ordering System For Restaurants," International Journal of Innovative Science and Research Technology, vol. 8, no. 2, pp. 1707-1710, Feb. 2023.
6. S. Reddy, M. Verma, T. Choudhary, N. Patel, and V. Kumar, "Enhancing customer experience in online food ordering platforms using recommendation systems," IEEE Transactions on Human-Machine Systems, vol. 54, no. 2, pp. 245-254, Feb. 2025.

7. Dr.S.Prabakaran, Dr.P.Anbumani , Dr.S.Prabakaran, Ms.Narmatha M, Ms.Preetha K, Ms.Priyadharshini C, Helping Hands With Social Welfare.. Advances in Consumer Research. 2025;2(6): 2375-2382
8. M. Deshmukh, S. Rao, P. Iyer, A. K. Mishra, B. Nair, and K. Banerjee, "Cloud deployment strategies for restaurant management systems," in Proceedings of the IEEE Cloud Computing Conference, Bengaluru, India, pp. 77-84, Jul. 2024.
9. D. Thompson, E. Green, S. Kim, J. Liu, R. White, P. Miller, and G. Anderson, "User engagement models for online food applications," Proceedings of the IEEE International Conference on E-Commerce Technologies, London, U.K., pp. 212-219, Sep. 2023.
10. A. Singh et al., "Microservices architecture for scalable restaurant web applications," IEEE Software, vol. 42, no. 1, pp. 50-59, Jan.-Feb. 2025.
11. R. Gupta, A. Sharma, V. Nair, K. Iqbal, M. Hussain, T. Joseph, F. Khan, J. S. Gill, P. Roy, L. Mathew, S. Banerjee, P. Kaur, A. Desai, V. Pillai, S. Kapoor, R. Mehta, and M. Verma, "End-to-end architecture for food ordering and delivery management systems," in Proc. IEEE Int. Conf. on Information Systems Engineering, Hyderabad, India, pp. 301-310, Dec. 2024.
12. Anbumani P, Vasantharaja R, Gokul MP, Roopesh VS, Hareesh SD. Improving LLM and Generative Model Efficiency using Predictive Analysis. In 2024 International Conference on IoT, Communication and Automation Technology (ICICAT) 2024 Nov 23 (pp. 69-73). IEEE.
13. S Prabakaran, V Shangamithra, G Sowmiya, R Suruthi, Advanced smart inventory management system using IoT, International Journal of Creative Research Thoughts (IJCRT), vol 11, Issue 4, page 37-45