Personalized Restaurant Food Ordering System: Enhancing Customer Assistance for Intelligence Support

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**Abstract.** In this era of digitalization, restaurant management encounter difficulties in drafting the best way to grow revenue flowing from table reservation, food ordering, and customer engagement. Most people have previously had to wait and wait for long periods of time only to find that the booking was not managed well, resulting in customer dissatisfaction. To tackle these issues, the authors enhance the web-based platform for customer assistance to allow seamless and user-friendly table reservations and food ordering. Backend integration is carried out using Laravel, React and Vue.js consideration to build frontend interfaces, which would be personalized with MySQL for secure and efficient data management. It uses WebSocket for real time refreshments so when a table becomes available, or an order is received, it provides instant notifications. The system integrates artificial intelligence (AI) support features such as a chatbot for automatic customer support as well as a food recommendation system customized to user preferences to improve user experience. Security is a must-do aspect which ensures secure payments through the payment gateways and encryption mechanism to protect all transactions from being fake. Furthermore, sentiment analysis is also used for analyzing customer feedback to improve restaurant services based on real time insights. This research combines modern web technologies with a scalable, efficient, and intelligent restaurant management solution by using AI driven enhancements. Apart from streamlining operations, this enables the system to reduce waiting times, optimizes the utilization tables and personalizes the services. The technical components of the system are enlightened, as is how it is designed, developed and implemented with the challenges addressed, plus its potential benefits for the restaurant industry.

# INTRODUCTION

Today, most people have smartphones that allow them to quickly access online services that help them in their daily routines. For example, you can order food from your phone at any time and in any place. Thus, people can easily check restaurant menus and place their orders online or through an app. Online ordering saves both time and reduces the chance of misunderstanding between the customer and the restaurant staff. Traditional ways of booking a restaurant and ordering food are often slow, lead to confusion and do not offer much personalization. Several solutions now available do not have features that make the user experience personal or integrate table reservations with food orders and deliveries. It is usually challenging for customers to see if a table is currently available or check the progress of their orders. At the same time, restaurants have trouble handling bookings and orders which may result in poor service.

By creating a full Restaurant Table Reservation and Ordering System, this research improves the way customers use services and how the restaurant operates. The system makes it possible for customers to book tables according to their seating, time and party preferences. It also allows customers to order food that suits their dietary requirements and past orders, no matter if they dine in or take out. As well as being convenient, the system allows customers to stay informed about their table and order status at any moment. Following payment, the system gets feedback from customers to check their satisfaction and help make the service even better. The system is developed using Laravel, Vue.js, and MySQL technologies. Moreover, this study investigates how artificial intelligence and machine learning are used to create personalized food suggestions and a chatbot that helps customers. This study focuses on creating a single platform for making reservations and ordering food which makes things easier and more satisfying for users. Second, the authors use AI technology and chatbots to enhance how one interacts with the customers. Third, the system helps to reduce errors in communication and enhance the management of the restaurant. The research provides a new way to manage restaurants by mixing practical tools with intelligent technologies.

Although FoodPanda, GrabFood and myQRMenu allow food order separately, they do not have a combined system that uses AI, which books a table and tracks the order in real time. The research offers a system that combines these functions in one place, designed for restaurants. It is different from other systems because it features a chatbot for reservations and orders, an analysis of customer feedback and a lightweight system that offers recommendations based on what users have liked before. The aim of these features is to make customers happier and to help restaurants work more efficiently, especially when the restaurant is small or medium in size and cannot afford expensive systems.

# LITERATURE REVIEW

Due to technological improvement and the COVID-19 pandemic, food ordering has evolved from traditional in-person ordering to an online system. It enhances convenience and makes the food ordering process faster. For instance, platforms like Food Panda and Grab Food provide the features to let the users browse menus, place orders, and track deliveries. Moreover, Kok et al. [1] shows that the digital financial literacy with food ordering system can reduce human error because of huge amount of manual work. For example, waiters need to lead customers to their table, give the physical menu and place order for them. After that, customers need to queue at the counter for payment. By using digital food ordering system, customers can access the menu through their smartphone. Hence, the food ordering system can handle many orders simultaneously. It makes the process efficient and saves time. Besides, this system provides table reservation features. This allows customer can make a reservation before arriving at the restaurant. After the payment process, customers can also give comments and ratings to the restaurant. So that the restaurant can take decisions to improve their services. High customer satisfaction is important to the restaurant.

There are many food ordering systems using QR code menu. Customers can scan the QR code on the restaurant table and it will show the menu on their smartphone. Ozturkan and Kitapci [2] explain why QR code menu become the famous solution for food ordering system. QR code menu can bring a lot of benefits. For example, it can save paper and help the environment. This is because printing menu needs the use of ink and energy which have environmental consequences. Menus need to be always updated to show the price changes, promotion and availability. It will increase paper consumption and disposal. However, QR code menu can be always updated online easily. Thus, the QR code menu helps restaurant save cost and resources.

Laravel is perhaps one of the most popular PHP frameworks when it comes to developing web applications today. MVC architecture allows developers to make more structured applications. Ho et al. [3] explained how design patterns can be effectively applied within object-oriented frameworks to support Laravel’s structured MVC methods in the system. MVC is a reliable approach that could separate the data layer, presentation layer and interact with users. Laravel provides features, like a framework, which makes complex application development easier as per noted by Khan and Khanam [4]. Laravel brings a lot of benefits to website development. For instance, Laravel has its useful features like routing, authentication, caching, and database management that can assist in the development process. Besides, Laravel also provides its own ORM (Object-Relational Mapping) [5] system named Eloquent. It reduces the complexity of queries and associated relations of the database. Moreover, Laravel has integration with emerging web development frameworks, including Vue JS and application programming interface (API). It enables developers to design and implement both the complex back-end applications and good user interfaces. API also can be developed into applications running on laptop, smartphone or tablet. In addition, Laravel also provide security features [6] such as encryption and user authentication. This feature is essential to ensure the security of the customer’s information.

A digital clinic management system emerged from [7] to facilitate administrative streamlining capabilities and efficiency advancement. The automated workflow together with data handling system provides a model for enhancing efficiency through implementations in restaurant admin panels and backend functions. Besides, the system [8] introduced an adaptable digital assistant which modifies its operation based on daily user practices. The developers prioritize system usability together with user convenience in addition to user engagement which demonstrates their understanding of user experience enhancement principles like features incorporated into this research including real-time table booking and user-friendly food ordering systems.

Current years have indicated rising interest in artificial intelligence (AI) applications across restaurant businesses. Restaurants deploy AI technologies to improve their operations which include customer service features and inventory management systems and personalized dining customization steps. The implementation of AI systems such as chatbot [9] in restaurant management creates stronger operational effectiveness together with customer satisfaction results as shown by Alawami et al. [10]. AI technology will revolutionize the entire customer service operation of restaurants. Research on customer data such as customer preference, food order history, and feedback enable AI systems to deliver individualized products together with efficient order management for improved general service standards. Research by Oğan [11] demonstrates how AI analyses customer experiences by performing data mining while also employing thematic content analysis. Cho et al. [12] demonstrated how responsive web technologies extend their applications from healthcare settings into restaurant industry needs involving customized services and expanded efficiency. Mobile mechanisms used by Goh et al. [13] together with external weather data demonstrate how they can boost user personalization methods which can be applied to food preference modeling.

Restaurants will advance their operations by incorporating robotics technology together with predictive analysis methods and customized solutions in the coming years. Restaurants seeking competitive success need to follow industry trends which reply directly to their business objectives. The forthcoming AI-driven innovations affecting the restaurant sector are examined in a Journal of Business Research article by Millán and de la Torre [14]. The implementation of AI technologies within restaurant operational management creates substantial prospects to enhance operational performance while improving customer happiness levels. Accurate assessment of associated difficulties becomes essential to guarantee the implementation's success. YhoFoodie, known as Yhosana Foodie Sdn. Bhd, is an intelligent F&B Service platform that provides an efficient improvement plan for merchants to enhance customer experience and streamline business operations [15]. A set of standardized wisdom cloud restaurant products from restaurant buffet service to overall operation data management. Self-service order can meet the customer choice meal, the next checkout payment, call service and other requirements. The need to integrate their own POS system is needed to allow the system to be fully utilized by the restaurants. For example, an advanced version of the POS system that is provided by them is needed to allow users to use data management functions. Moreover, data visualization on sales volume, transaction amount and revenue are shown to assist owners understand more about the business.

MA Venture Marketing [16] have developed my QR Menu. To market, they introduced an online platform for ordering food, which is cheaper in the food ordering context. They promised that the system would work perfectly all right and replace the old physical menu with QR code menu. It helps to eliminate time wasting, which is a common occurrence in restaurants like receiving orders, deliveries and invoicing. The easy, straightforward, efficient, and courteous system that my QR Menu promised. You do not need to download any applications. Once customers scan the QR code on the dining tables, they can simply peruse the menu and choose what they would like before they place their own order and have the meal delivered instantly. Different services can be opted for by a restaurant that allows its consumers to order food and drinks from the restaurant. One of the dreadful reasons why some of the users are unsatisfied is poor backend accessibility by My QR Menu which means that some services may be limited.

Qashier Malaysia is an integrated solutions provider dedicated to being able to provide a better efficiency and better experience of restaurant operations through QR code ordering system. There is no need for customers to be present at the time of delivery because customers can fill the order from their smartphone [17], by scanning a QR code. Seamless integration with the payment process is one of the major features of the Qashier system. Customers are allowed to place orders and pay online in one streamlined process. Not only does it add to customer experience, it quickens the ordering process and thereby increases the table turnover. The Qashier solution is a flexible solution that was designed to operate in the traditional dine in, take away or delivery model. It also centralizes orders for restaurant owners, which makes it easier to manage with data real time which means there’s better inventory control, order fulfilment and operational insights. With their focus on allowing custom and user-friendly solutions, it became a favorite for globalizing businesses in Malaysia and aim to supply the efficient service to their customers and operators.

# RESEARCH METHODOLOGY

This system has three main users: customers, staff and administrators. The tasks and important features for every role are outlined here. Customers must register by creating an account to be able to use the system. After a successful login, customers can see the restaurant’s menu with all the available dishes. The system generates a list of recommended foods [18] for each user by analyzing their past orders and choices. Haque et al. [19] shows that the AI-based personalization in healthcare system can improve user satisfaction. Customers can also pick what they want to eat and place it in their shopping cart. Before placing the order, they can check the details of their cart. After the order is confirmed, the system shows the billing information with a list of itemized prices and service charges. After making a purchase, customers can see the status of their orders in real time such as "order confirmed," "processing," and "ready to serve." Besides, users can check their previous orders, showing what they bought, the amount, total cost and the dates. Reserving a table is available, so customers can choose the day and time they want, and the system will present the open tables. To make customer support better, an AI chatbot is part of the system. With a chatbot, users can get answers, reserve a table and place orders, all without any hassle.

Staff help customers by using the “Manage Order” function to create, modify or remove orders for them. Next, the orders status is updated so that customers know in real time. The table reservations can be changed subsequently. To ensure there are no order issues, staff monitor and update the inventory, so items that are out of stock are marked as unavailable, ensuring customers are satisfied. The overall system is handled by administrators. They could change, add or remove menu items and handle the QR codes linked to tables for smooth order monitoring. Whenever new tables are added or there are QR codes problems, administrators can fix or update them as required. As staff members cannot sign up on their own, administrators oversee creating, modifying or deleting accounts for them. In addition, the system gathers data on sales, stock amounts and the income made each day. By examining the feedback from customers, administrators can enhance the restaurant’s services and systems on a regular basis. This methodology uses design focused on users and merges AI (such as recommendation system and chatbot) with useful features for placing orders and running the system. Integration ensures the restaurants can operate smoothly and provide better experience for customers. The system supports personalization by suggesting foods using an AI recommendation engine that matches users’ choices with the attributes of the foods they have bought earlier. The algorithm is built to work well with the data usually found in independent restaurants. The trained AI model beforehand analyses customer feedback to label it as positive, neutral or negative. This way, the system can use user reviews to get useful information. The system ensures it follows data protection rules by encrypting all sensitive information that is stored or sent. People give their approval for data collection, especially when using AI for recommendations or chatbots. It is important to anonymize personal data and make sure AI decisions are clear, so users’ privacy and trust are safeguarded.

# RESULTS AND DISCUSSION

Figure 1 shows the menu page of the system. Top of the menu page will show the search bar to let customers search for food items. On the right of the search bar shows the filter icon to let customers select the filter option. Following that, the category options show below the search bar. Then, there will be the list of foods shown at the middle of the page. The food’s name, category, and rating are displayed. Customers can click on the food to view more detailed information such as food description and price. A love icon will allow customers to add their food to their favorite list. Finally, there will be the icons including home, table reservations, cart, AI chatbot, box icon represent the order status, and profile show on the bottom of the pages. Figure 2 shows the food detail page of the system. This page displays the food name, rating, description, and price. Below the food information will be the customization panel to let customers customize the food such as add round egg for the “Nasi Lemak”. Finally, customers can add the food to their cart by clicking the added to cart button. Figure 3 shows the cart page of the system. This page displays the cart details of the customers. Customers can remove the food from the cart by clicking the remove icon. Once customers confirm their order, they can click the place order button to submit the order.

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| A screenshot of a food menu  Description automatically generated |  |  |
| **Figure 1.** Menu Page | **Figure 2.** Food Detail Page | **Figure 3.** Cart Page |

Figure 4 shows the payment page of the system. This page displays the order summary including the food, sub total price, service charge amount, discount amount, and the total price of the order. Customers are allowed to select their payment methods such as paying with visa card or cash at the counter. Customers can also save their card details for future payments. Once customers confirm their order and payment method, they can click the pay button to complete the payment. Figure 5 shows the order status page of the system. Customer able to view their order status after they make the payment. This page will display the order status, order created time, and order summary information. The same real-time tracking and filtering approaches described in [20] for digital inventory systems prove the feasibility of implementing these solutions for food order tracking. Figure 6 shows the profile page of the system. This page displays information about the customers including name, email address, contact number and password. Customers can edit their profiles as they change their password. Besides, customers also can view their order history by clicking the order history button. There will be a log out button to let customers log out their account.

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| **Figure 4.** Payment Page | **Figure 5.** Order Status Page | **Figure 6.** Profile Page |

Figure 7 shows the order history page of the system. This page displays the order history details such as order Id, total price, order status, and date. To view more details [21] like the food information, customers can click the order Id. Figure 8 shows the AI Chatbot page of the system. This page displays the conversation panel to let customers chat with the AI Chatbot. This AI Chatbot can answer customer questions, help to make table bookings, and place orders. Figure 9 shows the reservation page of the system. This page displays the available booking time for the customers. Customers can choose the booking date, time, and number of guests to make the reservations. Customers can only select the available time for booking a table.

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| **Figure 7.** Order History Page | **Figure 8.** AI Chatbot Page | **Figure 9.** Reservation Page |

Figure 10 represents the dashboard page. This page will display the data collected and analyzed data. There will be a view sentiment analysis button at the bottom of the dashboard page. Figure 11 represents the admin account detail page. Admin can edit their account information such as contact number and password.

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| **Figure 10.** Dashboard Page | **Figure 11.** Admin Account Detail Page |

Figure 12 represents management of the employee account page. This page displays the employee account list. Admin able to add new employees, update accounts and delete accounts. Figure 13 represents the manage food detail page. This page displays the food list. Admin able to add new food, update food information, and delete food.

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| **Figure 12.** Manage Employee Account Page | **Figure 13.** Manage Food Detail Page |

# CONCLUSION

This Restaurant Table Booking and Food Ordering System aims to improve the dining experience by combining table reservations with food ordering. The system utilizes technologies like Laravel, Vue.js and MySQL to provide an efficient user interface and backend supervision. AI and machine learning helps to improve personalization, giving it a feature such as AI Chatbot assistance, recipe recommendation and customer feedback sentiment analysis. Such advanced features, coupled with the fact they resolve the common industry inefficiencies in traditional booking and ordering systems, help enhance customer satisfaction and restaurant operations. The development process experienced several challenges. The first challenge was on data handling and structuring, in which AI based recommendations need additional refinement regarding accuracy and efficiency. In addition, the design related to the problems of providing a user-friendly interface for both restaurants and customers will be further addressed in the next phase.

# References

1. F.Y. Lee, M.A. Bin Mohd Shukran, and C.K. Wong, “Responsive Web Design for Mobile Device Screen Optimization,” AMM **548–549**, 1460–1464 (2014). https://doi.org/10.4028/www.scientific.net/amm.548-549.1460
2. S. Ozturkcan, and O. Kitapci, “A sustainable solution for the hospitality industry: The QR code menus,” Journal of Information Technology Teaching Cases **15**(1), 2–7 (2025). https://doi.org/10.1177/20438869231181599
3. S.B. Ho, I. Chai, and C.H. Tan, “An Empirical Investigation of Methods, for Teaching Design Patterns Within Object-Oriented Frameworks,” Int. J. Info. Tech. Dec. Mak. **06**(04), 701–722 (2007). https://doi.org/10.1142/S021962200700271X
4. S. Khan, and A.T. Khanam, “Study on MVC Framework for Web Development in PHP,” International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), 414–419 (2023). https://doi.org/10.32628/cseit2390450
5. F. Majerik, and M. Borkovcova, “Design of Data Access Architecture Using ORM Framework,” in *2023 34th Conference of Open Innovations Association (FRUCT)*, (IEEE, Riga, Latvia, 2023), pp. 93–99. https://doi.org/10.23919/FRUCT60429.2023.10328151
6. F.Y. Lee, and T.J. Chan, “Establishing Credibility in AI Chatbots: The Importance of Customization, Communication Competency and User Satisfaction,” (Atlantis Press, 2024), pp. 88–106. https://doi.org/10.2991/978-2-38476-196-8\_9
7. S.P. Kumaresan, L.F. Yee, N. Palanichamy, and E. Annan, “Improving Human Pose Estimation with Integrated Dual Self-Attention Mechanism in High-Resolution Network,” JTDE **12**(3), 7–28 (2024). https://doi.org/10.18080/jtde.v12n3.984
8. W.-X. Ong, S.-B. Ho, and C.-H. Tan, “Enhancing Migraine Management System through Weather Forecasting for a Better Daily Life,” JIWE **2**(2), 201–217 (2023). https://doi.org/10.33093/jiwe.2023.2.2.15
9. C.K. Wong, M.A. Bin Mohd Shukran, and F.Y. Lee, “Approaches in Pattern Recognition and Classification Based on Coin Images,” AMM **548–549**, 1148–1151 (2014). https://doi.org/10.4028/www.scientific.net/amm.548-549.1148
10. A. Alawami, M. Alawami, A. Obaid, M. Alrushaydan, M.L. Boudjedra, B.E. Boudjedra, M. Alharbi, H. Alzoori, S. Abosaif, G. Bshir, H. Alawami, and M. Abufawr, “A Systematic Review of AI-Driven Innovations in the Hospitality Sector: Implications on Restaurant Management,” American Journal of Industrial and Business Management (AJIBM) **15**(01), 30–40 (2025). https://doi.org/10.4236/ajibm.2025.151003
11. E. Oğan, “Artificial intelligence in restaurant businesses: a systematic review on service robots,” Worldwide Hospitality and Tourism Themes (WHATT) **16**(2), 150–162 (2024). https://doi.org/10.1108/WHATT-03-2024-0058
12. S.-C. Ng, T.-S. Lee, C.-K. Wong, and F.-Y. Lee, “C1: An Automated Online Education Management System Based On An Object-Oriented Approach,” Journal of Web Engineering **13**(1-2), 87–96 (2014). https://www.webofscience.com/wos/woscc/full-record/WOS:000333067200005
13. S.C. Ng, C.K. Wong, T.S. Lee, and F.Y. Lee, “Design of an Agent-based Academic Information System for Effective Education Management,” Information Technology J. 10(9), 1784–1788 (2011). https://doi.org/10.3923/itj.2011.1784.1788
14. M.G. Dancausa Millán, and M.G. Millán Vázquez De La Torre, “An Economic Perspective on the Implementation of Artificial Intelligence in the Restaurant Sector,” Administrative Sciences **14**(9), 214 (2024). https://doi.org/10.3390/admsci14090214
15. R.E. Yap, S.C. Haw, and S. Al-Juboori, “A Comprehensive Review on Machine Learning-Based Job Recommendation Systems,” IJORAS **7**(2), 36–55 (2025). https://doi.org/10.33093/ijoras.2025.7.2.5
16. C.-C. Wong, L.-Y. Chong, S.-C. Chong, and C.-Y. Law, “QR Food Ordering System with Data Analytics,” JIWE **2**(2), 249–272 (2023). https://doi.org/10.33093/jiwe.2023.2.2.18
17. I. Ibriwesh, S.-B. Ho, I. Chai, and C.-H. Tan, “A Controlled Experiment on Comparison of Data Perspectives for Software Requirements Documentation,” Arab J Sci Eng **42**(8), 3175–3189 (2017). https://doi.org/10.1007/s13369-017-2425-2
18. J.N. Bondevik, K.E. Bennin, Ö. Babur, and C. Ersch, “A systematic review on food recommender systems,” Expert Systems with Applications **238**, 122166 (2024). https://doi.org/10.1016/j.eswa.2023.122166
19. R. Haque, S.-B. Ho, I. Chai, and A. Abdullah, “Parameter and Hyperparameter Optimisation of Deep Neural Network Model for Personalised Predictions of Asthma,” Journal of Advances in Information Technology (JAIT) **13**(5), (2022). https://doi.org/10.12720/jait.13.5.512-517
20. S.C. Ng, C.K. Wong, T.S. Lee, and F.Y. Lee, “Design of an Agent-based Academic Information System for Effective Education Management,” Information Technology J. **10**(9), 1784–1788 (2011). https://doi.org/10.3923/itj.2011.1784.1788
21. S.B. Ho, S.L. Chean, I. Chai, and C.H. Tan, “Engineering Meaningful Computing Education: Programming Learning Experience Model,” in *2019 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*, (IEEE, Macao, Macao, 2019), pp. 925–929. https://doi.org/10.1109/IEEM44572.2019.8978920