Chatbot Meal Ordering System

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**Abstract.** Conventional meal ordering methods, such as paper-and-pen systems, place a heavy burden on waitstaff and often cause service delays during peak hours due to manpower shortages. On top of that, it is common for these digital platforms to have issues that make them hard for some customers, low-tech users and language barrier users to master. For this reason, the meal ordering system that includes a chatbot will be developed in the project. Bringing together chatbot technology and speech recognition, customers can easily speak out what they want to order for their meal. Because of this approach, using the system for ordering is simpler, more efficient and can be done more easily by everyone. Basically, by using this system, ordering meals becomes smoother and available to all, especially those who have certain physical or tech-related obstacles. This system is better than others that only use typed text conversation or fixed interfaces, as it uses voice recognition and artificial intelligence to benefit everyone and improve efficiency. Unlike other apps, this app does not put the elderly or those who do not use technology much at a disadvantage by showing complicated lists and charts. It is worth noting that the smartphone can be used when on the road, since the assistance is available both by voice and through chats.

# INTRODUCTION

The Chatbot Meal Ordering System is a modern, voice-driven food ordering solution designed to overcome the limitations of both traditional and existing digital systems in restaurants. A great deal of restaurants is using old methods, including writing down orders with pen and paper which leads to problems during busy times. This outdated approach usually causes many people to wait in line for a long time and delayed support, especially when there are not enough employees. On the other hand, though some restaurants have added touchscreen kiosks and mobile apps, these sometimes turn out to be hard to use for some people. Certain challenges exist for elderly people, those who do not have much education and people who do not speak English when using such technology and this can lead to problems and distress during their visit. These works is handled by using speech recognition and chatbots that help make the process more inclusive and accessible to people. Placing an order is possible for customers by just giving a simple voice command, without reading extensive menus or using complicated systems. People using this system are led through the process, including paying for goods and it is easy to understand for those who use such technologies for the first time. As a result, customers barely interact with waiters, there is less chance of an error and restaurants can work more efficiently. The main goal of the system is to make customers happy, encourage digital use among all groups and raise the productivity of the food and beverage industry. As opposed to simple digital food ordering, this system uses a voice-activated chatbot to help users make their choices and finish the whole order. People who have trouble reading or who are disabled can use the web as a result. Voice recognition is being used with chatbots, meeting the user’s needs in the best way. This app is different from other apps since it provides quick help in many languages and accommodates every user which fits a wide range of restaurants.

# literature review

The integration of chatbots in the food service industry has led to a substantial transformation in how customer interactions, order processing, and menu navigation are managed. A prominent example is the bilingual dialogue ordering system (Bil-DOS) developed by [1], which caters to non-native speakers by supporting Mandarin and English simultaneously, thus enhancing the accessibility of digital ordering platforms for international customers (

Further expanding chatbot capabilities, [2] designed a knowledge-based chatbot for humanoid robots aimed at facilitating Q&A scenarios in restaurant environments. Their work shows how structured domain knowledge can empower robots to provide more intelligent, context-aware responses in food service settings.

Design and user experience are equally critical. [3] explored how anthropomorphism in chatbot design—adding human-like features—impacts customer satisfaction and loyalty. Their study revealed that personalized and emotionally engaging interfaces significantly enhance user interaction, especially in food commerce.

Natural language processing (NLP) also plays a vital role in improving restaurant chatbot systems. [4] presented an NLP-powered chatbot that adapts responses to customer emotions and preferences, significantly boosting satisfaction and perceived service quality.

In educational contexts, [5] presented a review discussing how chatbots support learning and human-computer interaction through dialogue simulations (Design and Development of Chatbot: A Review). Although focused on pedagogy, the principles extend well into food ordering, especially where customization and recommendation engines are involved.

[6] implemented a chatbot-based ordering system at a university cafeteria, highlighting real-world usability. This study demonstrated how chatbots can simplify menu selection, reduce human workload, and optimize queue management in institutional food services.

[7], in a study conducted at Sookmyung Women’s University, investigated the attitude and utilization intention toward restaurant-menu curation chatbots. Their findings indicated that customer experience quality directly affects behavioral intentions, especially among tech-savvy demographics in urban regions.

Meanwhile, the work by [8] introduced a speech-to-text chatbot interface leveraging Google APIs, which enhances accessibility for visually impaired or hands-busy users—an essential consideration in inclusive food service systems.

[9] introduced an improved memory model for chatbots using semantic-based short-term memory mechanisms. Their Thai case study points to the increasing demand for context-aware and locally adapted chatbot solutions.

Chatbot integration with e-commerce also reveals insights into generational differences. [10] assessed Gen Z engagement with chatbots and found that immediate, responsive communication boosts brand trust and order frequency.

The Review of Online Food Delivery Platforms by [11] at the University of Otago discusses sustainability concerns in the era of chatbot-led food ordering. Their paper connects technological adoption with broader themes like food waste reduction and efficient logistics, showing the secondary benefits of digital integration.

[12] surveyed the use of AI chatbots in customer and public administration services. Their findings suggest that even simple chatbot models can reduce workload and response time dramatically, a crucial insight for food delivery platforms managing high order volumes.

A study by [13] examined compliance behavior when interacting with AI-based customer service bots. Their findings imply that users are more likely to follow recommendations or promotions when delivered through conversational agents, potentially boosting upselling in food apps.

In another study, researchers implemented a pizza ordering chatbot using Amazon Lex, showcasing how commercial NLP platforms can streamline chatbot deployment. This system allowed customers to place orders conversationally and integrated with backend services for real-time processing [14].

[15] explored the transformative impact of artificial intelligence on the online food delivery sector in India, especially during the post-pandemic surge in digital consumption. They highlight AI’s role in enhancing personalization, improving operational efficiency, and addressing the dynamic preferences of consumers.

In conclusion, the current literature supports the use of AI chatbot systems like the Chatbot Meal Ordering System across operational efficiency, user accessibility, secure payment, and intelligent personalization. By aligning AI capabilities with user-centered design, the system aims to deliver a modern, intuitive, and inclusive ordering experience.

# RESEARCH METHOD

The research method adopted for the development of the system in this study is based on a structured and systematic approach, leveraging the Software Development Life Cycle (SDLC) as its foundation. The reason for choosing the Waterfall Model was its linear form which makes it simple to follow every step and ensures the project has set requirements along the way. The model is ideal as we know the system requirements from the beginning, and they can be dealt with one phase after another.

Everything began by determining which areas were going to be affected, what the goals were and if they were achievable from technical, management and money aspects. By focusing on owners, workers and customers, the study took care of actual needs. At this stage, remarks from stakeholders revealed that the existing food ordering systems fail to give customers enough flexibility. All of these insights were gathered in an SRS document that directed the rest of the project’s development.

A plan for the main components of the system was designed at this part of development. As a result, the chatbot interface, the order and data management schemas and the user flow were all well-developed. They allow us to see and adjust how users would handle their activities on the site. At this step, the front-end site was made with HTML, CSS and JavaScript for compatibility on desktops as well as Android devices and PHP was applied to control and process the chatbot’s workings on the back end. The testing phase was conducted at unit, system, and user levels to ensure quality and functionality. Feedback from test users was collected to refine the chatbot and interface. In the deployment phase, the prototype was installed in selected restaurants for live testing, allowing further improvements based on real user interactions. Lastly, the maintenance phase involved continuous monitoring, user support, and updates to ensure long-term functionality and adaptability of the system.

This methodical, step-by-step research approach ensured that the system was built to be user-centric, technically sound, and operationally effective from development to deployment.

As mentioned earlier, the paper’s ultimate objective is to examine user’s experience of using the food order system, therefore a survey was conducted by providing an online questionnaire to users via Google Form after they experienced using the existing food order systems. The questions were self-designed and validated by a group of experts. Besides the collection of users’ general information, data of the users’ opinions on the food order systems’ overall performance and functionality, its reliability of notifications, and users’ satisfaction were collected too. Consent of participation in the study was obtained from users prior to the survey.

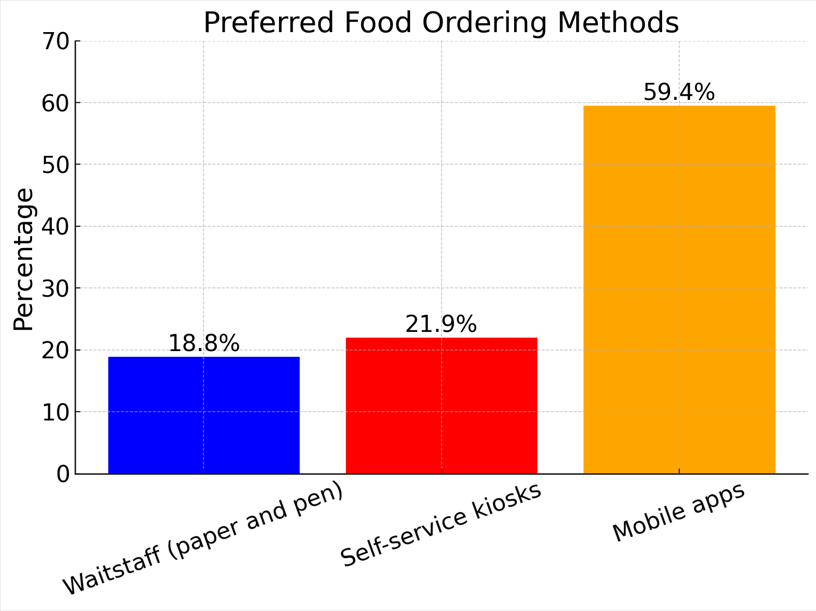
# RESULTS AND DISCUSSION

In this study, we successfully gathered feedback from 32 respondents. Participants engaged in evaluating various aspects of the system, sharing their experiences and preferences. The survey aimed to capture valuable insights to further enhance the functionality, usability, and overall user satisfaction with the food order system. A total of 22 males and 10 females participated in the survey. They were all Malaysian university students. These included 30 Chinese and 2 Malays. Since the data was collected via Google Form, the results were analysed in Google Form itself and will be used for the following discussion.

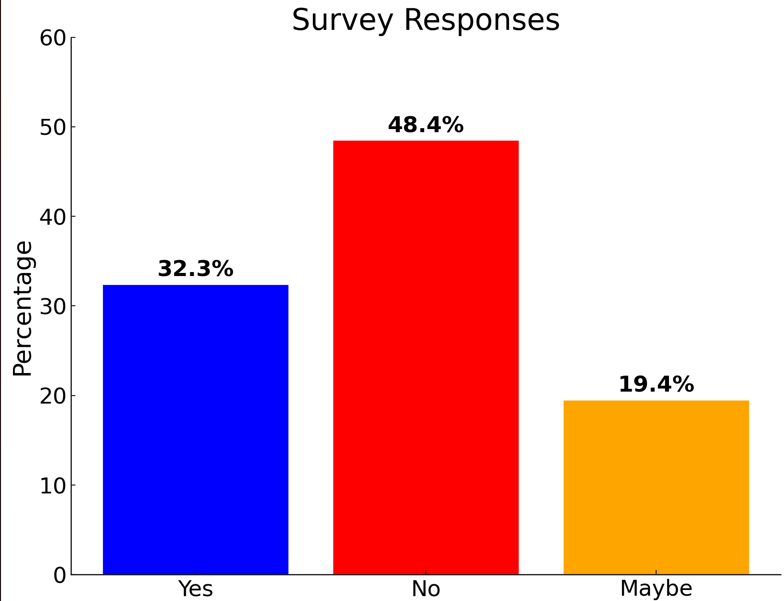
Figure 1 shows the respondents' preferred methods for placing food orders. The majority, 59.4%, expressed a preference for using mobile applications, indicating a clear shift toward digital platforms driven by their accessibility and convenience. This trend demonstrates that customers are increasingly embracing technology for its ease of use. The second most preferred option, selected by 21.9% of respondents, is self-service kiosks, reflecting a moderate level of adoption that may be limited by factors such as device availability or interface complexity. Meanwhile, only 18.8% of participants preferred the traditional paper-and-pen method, highlighting its inefficiency and higher likelihood of errors, especially during busy hours. These findings emphasize the need for enhanced digital solutions in the system of this study, which combines technological convenience with operational efficiency to better serve a wide range of users.

Figure 2 highlights respondents' experiences with existing digital food ordering systems. A notable 48.4% reported encountering no difficulties, suggesting that many users are already comfortable with current digital platforms. However, 32.3% indicated they face challenges, such as complicated interfaces or technical barriers, while 19.4% were uncertain or lacked sufficient experience to form an opinion. These findings reveal that although many users adapt well, there remains a significant portion who struggle or feel unsure. This indicates a clear need for further improvement in digital ordering systems. Thus, by incorporating features like voice recognition and a more user-friendly interface in the system of this study, it can overcome these issues, making the ordering experience more inclusive, accessible, and efficient for all users.

In Figure 3, the chart highlights the specific features respondents desire in a more user-friendly food ordering system. The majority emphasized the importance of a simple interface (68.8%) and voice recognition (53.1%), indicating a strong preference for systems that are both easy to navigate and allow for convenient voice-based interaction, rather than dealing with complex menu structures. Additionally, 34.4% of respondents expressed the need for multiple language support, while 25% mentioned they wanted payment guidance to help them complete transactions smoothly. These results clearly suggest that users value simplicity and voice-enabled functionality the most. Therefore, these features should be central to the design of the system in this project to enhance accessibility and significantly improve the overall user experience.

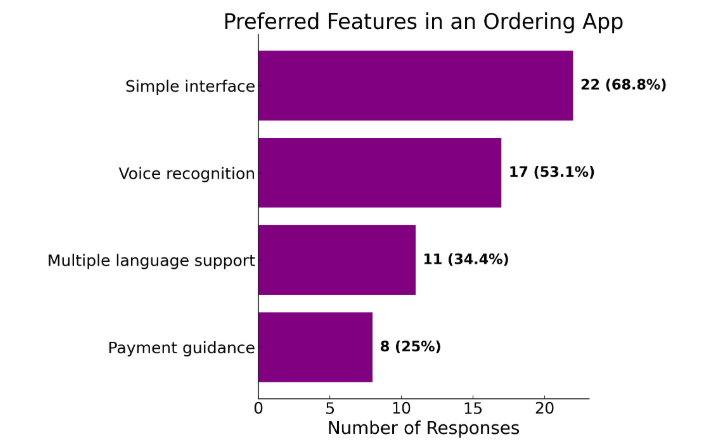


**FIGURE 1.** Method to order foods

  
**FIGURE 2.** Difficulties faced with existing digital ordering system

## Prototype

Figure 4 shows a sample of the systems prototype of the Chatbox Page, which serves as an interactive interface where users can engage with the chatbot for food ordering and menu inquiries. The design emulates conversation to create an easy-to-use interface for users. The chatbot icon and food photo combines at the interface level to create a functional system branding. The chat interface maintains a defined dialogue system through which the chatbot meets users for service assistance. Different color differentiation stands out for user requests which improve readability of the screen. The bot responds dynamically with displays of daily specials that feature visual menu items for users to choose between options. Users can easily communicate through a text input box equipped with a send button which rests at the page bottom. A visually appealing consistent design emerges through the systematic application of green color throughout the interface. The page offers an efficient food ordering experience which manages to improve user engagement through its user-friendly interface.



**FIGURE 3.** Feature make food ordering system more user friendly

A screenshot of a phone

Description automatically generated

**FIGURE** **4.** Chatbox page

# CONCLUSION

As a conclusion, the project produced a prototype that allows people to order food by addressing the two important issues in today’s food ordering systems: excessive complexity and difficulties for different users. Adding voice recognition, chatbox features and a simple design enables the system to offer a current solution that improves food ordering. With the help of these tools, users can transition from old manual tasks to modern digital ones, since they make things easier for everyone.

The creators made it a priority for the user interface to be straightforward which helps both the familiar and those who are not very familiar with technology. The system is designed in a way that older, disabled and non-technical people can use it more conveniently. The system managed to reduce wait times for customers, increase accuracy in order processing and add to users’ satisfaction. Users underlined that smooth navigation, several languages available and reliable, easy payment systems are essential. All these requirements were put into the version of the prototype presented to UX designers.

Besides, the architecture allows for expanding and strengthening the system in the future. Designing it in modules helps add options for users’ diets, choices in languages and more payment systems. Because of this adaptability, the industry’s procedures can grow as the food and hospitality industry changes, but the main values of accessibility and efficiency are still kept. With people needing fast and personalized services such systems will become more important for digital transformation in this sector.

Among systems of the same type mentioned in the literature, the Food Order System is unique because it is user-friendly, uses voice commands and offers real-time support, so it is more useful for those who find other systems challenging. What makes this system better and simpler is that it is a combination of elements that was not previously used together. It suggests a key step towards making food service technology part of the digital age.

All in all, the system managed to meet its objectives by making things easier for restaurants and for people placing orders. It encourages the use of advanced technology in the food industry, as well as improving things for everyone. Further improvements in the future may be adding AI-powered recommendations, fast data analysis and smart tracking of stock which will make things more personalized and effectively run. With this project, it is possible to see how advanced voice-enabled solutions are changing food service and it marks a significant move forward in developing smart restaurant technologies for users.

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