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QR Code Based Food Ordering System

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Abstract: A restaurant's ability to take orders for food is essential. This is something that waiters do for customers when they dine at restaurants. Typical restaurant ordering procedures may lead to a number of problems. Server and client misunderstandings during order taking are the root cause of all problems. A short wait for the server to come and take the order is also required of the customer. The current setup is somewhat antiquated, using paper and printed menus to keep track of customer orders. Consequently, a real-time ordering system developed to manage the ordering process for restaurants is the Food Ordering System using QR Code technology. Therefore, the QR Code meal ordering system is a remedy for that problem. Smartphones serve as the foundation of the system since they are now indispensable in modern culture. The restaurant will include a QR code on the menu that customers must scan. Using this method, the buyer may also be sure they got what they requested. Additionally, the restaurant staff has access to the order list and may review the menu.

Index Terms - QR Code, Food, Restaurant

I. INTRODUCTION

Digital transformation is becoming the norm for almost every industry, including the restaurant industry. It continued to communicate with customers and was designated as an essential firm, but it still lost a lot of money. Worldwide, most restaurants still employ the old-fashioned paper based ordering method. Here, paper is used for everything from checking the menu to placing an order to receiving the bill. After taking the customer's order, the server communicates it to the cooks.

This approach has a number of problems. Waiters making a mess of customers' orders is the most common mistake. On rare occasions, a server could leave out an item that a customer specifically asked for and forget to let the cook know about the change. The chefs must be relied upon by the wait staff to signal when the food is ready.

The COVID-19 pandemic has been devastating to the restaurant business. Customers mostly care about cleanliness and security while thinking about eating out. People avoid going out in public because they are afraid they could get the virus, so they shop online instead. Customers' experiences with restaurants have changed with the introduction of contactless meal ordering. Customers may safely pay using their cell phones or other mobile devices, easily scan menus, and personalize orders using web-based platforms and QR codes.

Consumers are able to find restaurants using digital platforms, which provide a simple interface. The elimination of physical menus is a major benefit of contactless food ordering systems. Using QR codes, which have a major influence on the restaurant industry, is the first step in the process. The food industry is only one of several that has been automated by digital technologies. Thanks to advancements in wireless technology, these systems are now very user-friendly for end users. Mobile technology has made it easier to transmit information and has incorporated into feature management. Enabling safer and more efficient meal ordering using a QR code is the main goal of this initiative. Scannable QR codes allow customers to quickly peruse the menu and make orders without touching anything. A quick and easy way for restaurants to keep track of customer orders and payments is by using a QR code. Keeping paper records may be a pain, but data can be easily retrieved and changed.

Technology for ordering meals has become a fiercely competitive market for restaurants. With our secure and streamlined payment system, clients can easily complete their orders. Businesses in the restaurant industry have an opportunity to set a new standard for customer safety by creating a more comfortable dining environment. A safe and quick way for restaurants to serve their consumers is via contactless meal ordering. Restaurants may improve their operational efficiency and provide customers with an improved dining experience using this technology. A restaurant's income and the amount of business it receives have been hit hard by this. Government COVID-19 laws necessitate that restaurants reduce their capacity and working hours. Menus printed on laminated paper are used by many restaurants. Since they are handled by a large number of people, printed menus are among the surfaces that are touched the most in any restaurant. Constant cleaning is required, and these kinds of food are bad for the planet. A digital menu is an essential part of contactless dining, and the created technology will help businesses use one to reduce the impact of such consequences.

II. LITERATURE REVIEW

In their article titled "QR Based Food Ordering System", Shraddha Pagare, Kashish Kirdat, and Vaidehi Bagul present their findings. The diploma in IT from MET Bhujbal Knowledge City in Nashik, Maharashtra, formed the basis for its release. • Our study's adoption of the QR-Based System is a major finding. • Customers are able to place their orders and get their food quickly using this method. • Without delay, they may go to the eatery and obtain what they requested. • In comparison to a manual method, this automated process requires much less time. • It eliminates the slow and error-prone aspects of a manual process while providing a quick and productive environment. • Minimal training is required to navigate the system due to its easy graphical user interface. • These digital menus provide information on a wide variety of restaurant items, allowing customers to make fast decisions while selecting their meals of choice. • Customers may save time while placing their meal orders with a smart menu that remembers their preferences and makes recommendations based on their past purchases. • An easier and more streamlined way for customers to personalize the menu selection process is the author's goal. • The author explains why it's important to create a digital display user interface that takes individual preferences into account. • In order to entice customers before they make an order, digital displays provide images of meals together with food items. • Incorporating a cooking method into these intelligent digital menus gives clients a glimpse into the culinary process before they place their order.

Development and implementation of a wireless LAN and RFID-based electronic dining system. Conventional methods in the restaurant sector, such as manual order taking, time delays, and inadequate menu customization, are going to be tackled by the author. • Using radio frequency identification (RFID) technology, customers are assigned unique identifiers when they make a reservation for a table, which allows for easier tracking of table placements and availability. • Minimizing waiting time and reducing human effort are two goals of this method. • In order to increase productivity, decrease error rates, and improve accuracy, the author explains why this technology is so important. • Customers' tastes and preferences may be learned by this automated eating system. • In order to enhance and improve the eating experience, we record customer feedback and previous order data. • Safe and transparent online transactions are made possible by various payment gateways and systems. • Customers have the option to safely transact without the need for cash by using RFID technology. • According to the author, this technology makes it easy for restaurants to automate the process of taking table reservations. • Customers may rate and evaluate the eatery online using this system. • The author explains why it's important to employ Smart Menu digital displays for an intuitive and engaging interface, with the goal of luring customers with the latest system-integrated features. • This system accessed all the information from a central database and acted as the primary dynamic database utility. • Restaurants benefit from increased efficiency and precision with less room for human error thanks to this application. • With this innovation, automated meal ordering systems no longer have to rely on cumbersome manual processes, and users just need to purchase one set of gadgets.

An Automated Food Ordering System, "Automated Food Ordering System" (IJERD, 2015), by Patel Krishna, Patel Palak, Raj Nirali, and Patel Lalit. Automating the meal ordering process in restaurants and improving the dining experience for customers is the goal of the research discussed in this article.

An essay on the design and implementation of a restaurant meal ordering system with centralized database maintenance of order information is presented in this piece. Changes to the menu can be easily monitored by the restaurant owner.

III. METHODOLOGY

The proposed QR-based food ordering system seeks to build upon the strengths of existing solutions while addressing their limitations, ultimately providing an enhanced and more inclusive dining experience for customers and greater efficiency for restaurant owners. At the forefront of the proposed system is a user-friendly interface that prioritizes accessibility and ease of use for all patrons. Recognizing the digital divide as a barrier to adoption, the system is designed to accommodate a diverse range of users, including those with limited technological proficiency or access to smartphones. • This may involve offering alternative ordering methods, such as providing paper menus alongside QR code scanning options, or offering assistance from staff members trained to assist customers in navigating the digital ordering process. • In addition to improving accessibility, the proposed system places a strong emphasis on reliability and robustness. • Measures are implemented to mitigate the risk of technical glitches and system failures, ensuring a seamless and uninterrupted ordering experience for customers. • This may involve investing in redundant server infrastructure, implementing failover mechanisms, and conducting regular maintenance and testing to identify and address potential issues proactively. • Furthermore, the proposed system aims to strike a balance between technological innovation and human interaction, recognizing the importance of personalized service in the dining experience. • While QR codes facilitate contactless ordering and payment, the system maintains opportunities for customers to engage with restaurant staff and receive personalized recommendations or assistance as needed. • This may involve integrating chat or messaging features into the digital interface, allowing customers to communicate directly with staff members in real time. • Moreover, the proposed system prioritizes data privacy and security, implementing robust encryption protocols and stringent access controls to safeguard sensitive information. • Transparent policies and procedures are put in place to ensure compliance with relevant regulations and standards, providing customers with confidence and peace of mind when using the system to transmit personal or financial data.

In terms of implementation, the proposed system takes a phased approach, starting with pilot deployments in select locations before scaling up to larger deployments. This allows for iterative refinement based on user feedback and real-world usage data, ensuring that the system meets the evolving needs and expectations of both customers and restaurant owners. Overall, the proposed QR-based food ordering system represents a comprehensive and inclusive approach to modernizing the dining experience. By prioritizing accessibility, reliability, personalization, and security, the system aims to deliver tangible benefits for all stakeholders, ultimately enhancing the overall dining experience and driving business growth for restaurant.

IV. PROPOSED SYSTEM

In order to streamline the ordering and service procedures, the QR Based System offers a comprehensive digital solution for online food ordering throughout the whole campus. Restaurant owners and managers may take use of a number of features that allow them to monitor sales and performance and adjust their service based on client feedback.

• The program utilizes Al services to provide personalized menus based on user preferences, making it easier to make meal orders.

• The AI may also provide customers with a weekly menu that includes a wide variety of alternatives to enjoy during the week, in addition to personalized recommendations.

• In order to streamline development, the system uses Bootstrap for frontend development.

• Bootstrap is a strong framework that allows developers to create visually appealing user interfaces for both iOS and Android from a single code base.

• The back-end technology stack that has been chosen includes SQL and JavaScript.

• This integration reduces server burden by ensuring fast communication and efficient data retrieval.

• As a software developer, you must prioritize security.

• AJWT token is generated and stored on the user's device after authentication.

• For a safe and seamless app reopening experience, this token allows for asynchronous user authentication.

• Data security is ensured since the JWT token can only be deciphered by the server.

• It is a trustworthy and easy-to-use platform for campus-wide food ordering thanks to its complete technology stack, emphasis on security, and integration of AI services.

• The motion of many entities, as seen here.

V. SYSTEM ARCHITECTURE

The primary focus of system architecture is the system itself, and it does this by outlining a simple framework. The major goal of this approach is to provide a suitable solution to the problem stated in the document by outlining the whole project architecture and providing details about the structural functions. The program's framework diagram is shown in Figure 1. A high-level perspective of the system's operation is given by this framework diagram. A better understanding of the system's operation was given by the framework diagram. Scan the QR code on the room table with your mobile device. That's the first step for consumers. Once the scan is finished, they may go straight to the menu page. Second, after perusing the menu, customers may choose their preferred dish and go to the checkout page to complete their purchase. They will be informed that their order has been received once it has been dispatched to the kitchen. We will complete the client's order in the kitchen. Lastly, the food will be brought to the client's table by the staff.

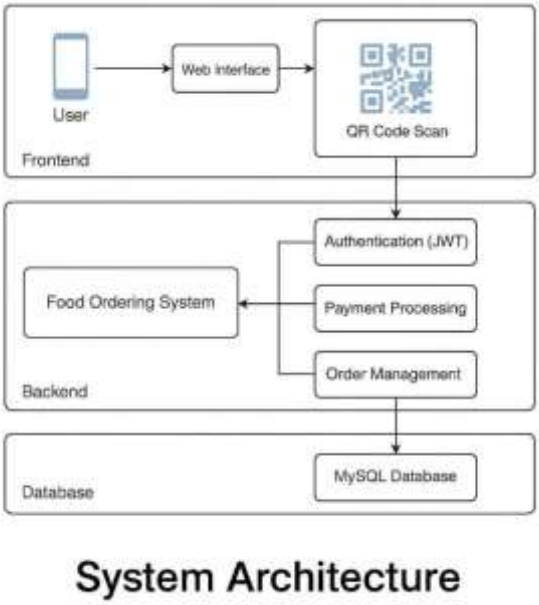


Fig. 1: System Architecture [1]

VI. ACTIVITY DIAGRAM

The UML Activity Diagram is a graphical representation of a dynamic workflow that shows the order and state of operations inside a system or business process. Important components are nodes, which stand for actions or decisions, and transitions, which show how information moves between these nodes. The action starts and ends at the starting and end nodes, respectively. Decision nodes provide branching depending on conditions, while control flows connect activities, outlining the sequence of execution. To make things more clear, forks and joins control parallel processes, and swim lanes separate actions among several entities. Eleven Activity Diagrams are a great way to show how a system's controls work and what steps are required to complete a use case. We use activity diagrams to show both simultaneous and sequential activities. In an activity diagram, we visually depict a process. The focus of an activity diagram is on the flow and the order of occurrences. The causes and effects of an event may be better understood with the help of an activity diagram.

There are primarily three types of diagrams used in UML models: structure, interaction, and behavior. As a kind of behavioral diagram, an activity diagram shows how a system operates. An activity diagram shows the many decision routes that occur throughout an activity's execution by drawing the control flow from a beginning point to an endpoint. Both parallel and sequential processing may be shown in an activity diagram. Their primary use is to depict the system's dynamic components in business and process modeling. Flowcharts and activity diagrams are quite similar. We use activity diagrams to show both simultaneous and sequential activities. In an activity diagram, we visually depict a process. The flow and sequence of events are highlighted in an activity diagram. Nodes represent actions or options, and transitions show how information moves between these nodes; they are the basic building blocks. The action starts and ends at the starting and end nodes, respectively. Decision nodes provide branching de pending on conditions, while control flows connect activities, outlining the sequence of execution. We need to figure out whether it's about flowcharts or activity diagrams.

Fig. 2: Activity Diagram

VII. OUTPUT SCREENS

Fig. 3: Represents The QR Code

After stepping foot in the restaurant, customers may view the menu by scanning the QR code.

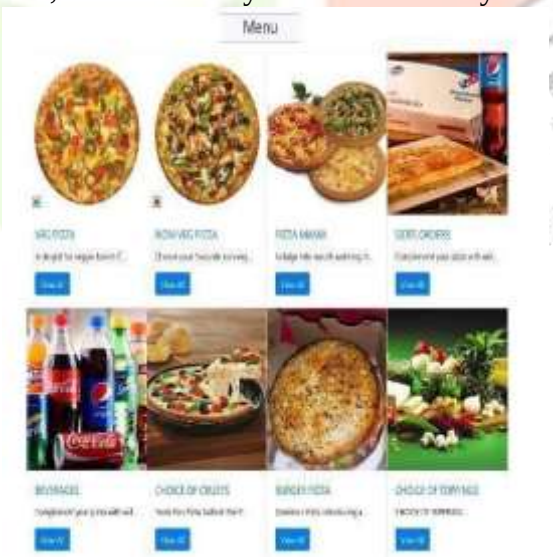


Fig. 4: Represents Initial User Interface After Scanning

The Quick Response Code The output screen displays the fundamental first user interface, presenting menu information with the login and sign-up options for the consumer.

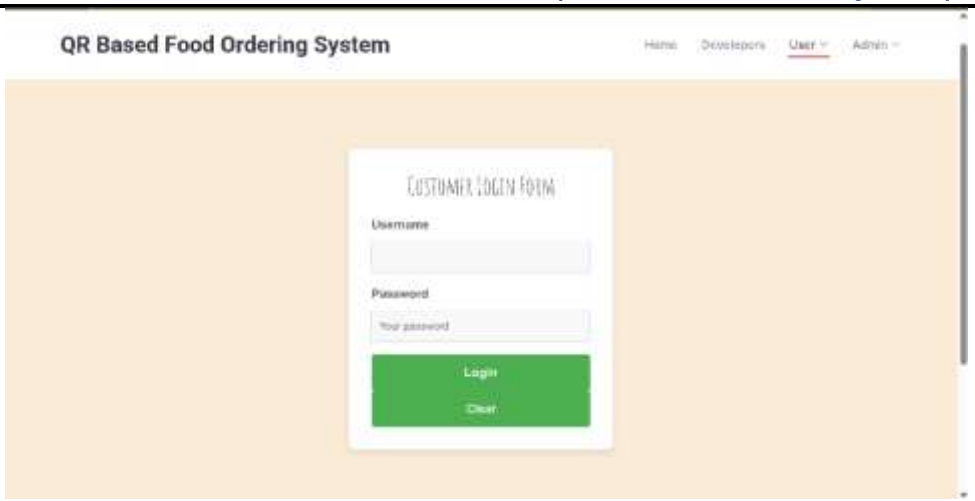


Fig. 5: Represents User Login Dialogue Box

The output screen displays the user login for customer access to the restaurant menu card.

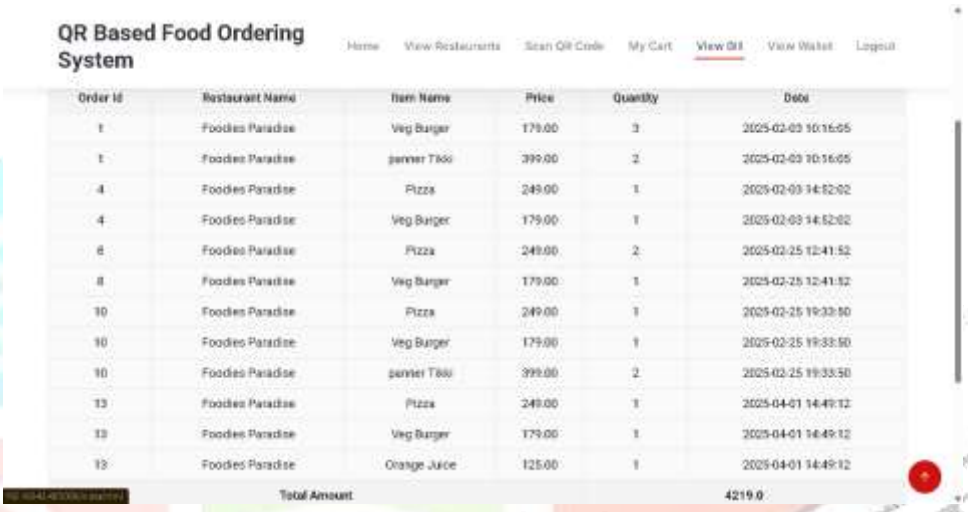
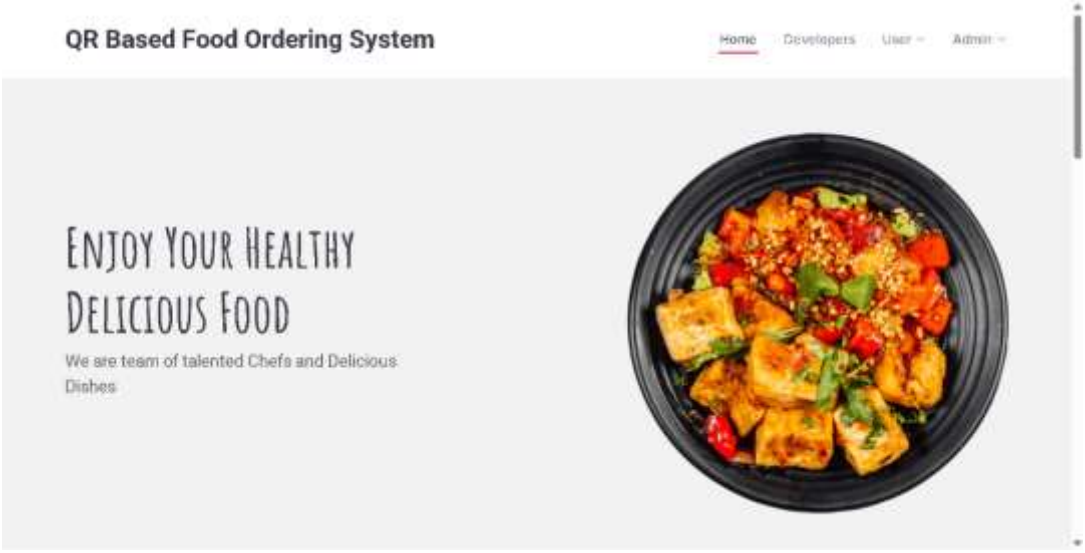


Fig. 6: Represents The Order Page

The output screen displays the orders placed by clients, and the order page continuously updates upon the placement of a new order.

VIII. RESULTS

QR Based Food Ordering System



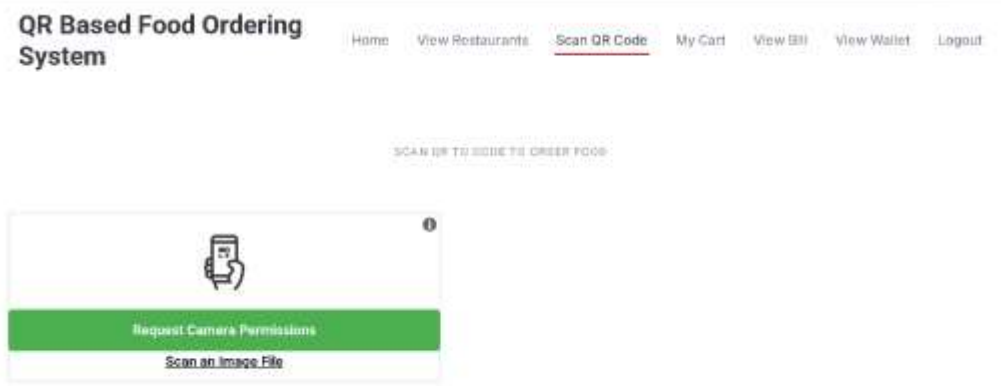


Fig. 7: Results Visualization

IX. CONCLUSION

With its emphasis on data analytics to boost efficiency and enable informed decision-making, the proposed solution represents a significant step forward in restaurant operations. By combining process automation with QR code ordering, this innovative solution intends to revolutionize the restaurant industry. Human error and the tedious process of menu changes are two of the inherent difficulties with traditional ordering systems that this novel approach successfully addresses. The proposed approach is based on its remarkable data analytics catalyst capability. Data analytics goes beyond surface-level benefits; it is a critical component that improves restaurant management with cutting-edge insights and pinpoint strategic precision. Results from extensive usability testing with restaurant owners show that the proposed method improves operational efficiency and the analytical capacity for important decision-making.

X. FUTURE ENHANCEMENTS

Customers are able to easily find what they're looking for in the food selection, make adjustments to their orders, and complete their purchases because to the user-friendly design.

- Improved overall customer happiness is a result of a well-organized interface.
- Scanning a QR code allows users to view the menu and make a payment.
- An easy and effective way to communicate with customers is provided by the interface.
- With the added convenience of real-time order tracking and notifications, dining out has never been easier.
- From delivery to pickup, customers may track their orders in real-time.
- We can keep tabs on any modifications to the order and participate all the way through thanks to these notifications.
- Consumers will have a better dining experience as a result of improvements such an enhanced smartphone interface, real-time order tracking, and notifications. • Driven by insights from users and incorporating the latest updates.

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