

QR CODE BASED SMART DINING SYSTEM

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Abstract— In a restaurant's traditional way of ordering meals, customers first browse through the menu of the restaurant and then wait for a waiter to come and take orders. This procedure can be slow during busy hours and can reduce customer satisfaction. It is therefore susceptible to errors made by humans. Automated systems can be used to automate procedures by eliminating errors made by humans, reducing paper waste, and making ordering processes more time- and cost-effective. There have been numerous attempts to automate the ordering process in restaurants in recent years. The method we propose in this paper is that accessing the QR code for the ordering of the food in the restaurant. With smartphones, the customer can scan the QR code which is set on the table, and open the current menu to order the food. Upon ordering, the notification will be delivered to the kitchen and the cashier along with the table number. The current menu and offers will be updated on this menu. The Robot can deliver food. This method ensures time and customer satisfaction with Restaurant. Also, the implementation cost is less.

Keywords— Smart Dining, QR code based Automation System, Robots

1. INTRODUCTION

The advancement in technology has greatly influenced the business transactions. The adoption of digital technology has led to automation in the hospitality industry. Businesses in the hospitality industry such as restaurants can be improved with the help of digital systems. The competition in the restaurant business has increased with the advancements in food ordering techniques. This project aims to automate the food ordering and billing process in the restaurant as well as to improve the dining experience of customers. Here we discuss the design & implementation of the Smart Dining ordering system in real-time with customer's feedback for restaurants. The system on the user's table will have all the details of his account as well as the menu. The order details from the customer's table are updated and subsequently

sent to the kitchen. The restaurant owner can manage the menu modifications easily. QR scan code provide fast access to any type of digital media, with no text bound interface getting in the way. Faster input can mean better service. Touch screens and QR scan codes are practical in automation which has become even simpler with the advancement in technology.

The traditional method that is used commonly in hotels is by taking the customer's orders and writing it down on a piece of paper and then giving the order in the kitchen section. The food ordering system is proposed with the use of a miniature device placed on each table which is used to make an order at the restaurant. The system uses a QR scan code that is placed on each customer's table to scan through their smartphone, to make orders. The order is made by selecting the items displayed on the mobile touch screen. The order will be sent from the customer section using Wi-Fi communication, and automatically will be displayed on a screen in the kitchen. The bill will be displayed with the table number at the manager/billing section. The food is delivered by a robot. The project will reduce the time spent on making the orders and paying the bills, whereby the cost and manpower also can be reduced.

In the paper 'Touch-based Digital Ordering System on Android'[1], the main component here is an LCD based on the android application set in the table. The customer can order food from the restaurant menu on this LCD, which can correct the drawbacks of the typical paper-pen-based food ordering system. The LCD is used as a hardware part in the paper 'Survey on Intelligent Food Menu Ordering System Model'[2]. But the dining experience has been enhanced by not just hardware but also features like messaging, using the software. The project paper 'Smart Ordering System via Bluetooth'[3], is proposed with the Bluetooth technology as the communication medium and Peripheral Interface Controller (PIC) as the hardware which implements a faster ordering system. It consists of a keypad at the customer's table as a remote control and monitor at the

kitchen or counter to display the ordering information systematically. The paper 'Automation in Restaurants: Ordering to Robots in Restaurant via Smart Ordering System'[4] is focusing on the smart ordering system to be introduced in restaurants along with serving robots. This paper aims to make the restaurants and hotels automated and facilitate the public by robotic technology along with the smart ordering system. The paper 'A customizable wireless food ordering system with realtime customer feedback'[5], provides a wireless food ordering technique along with customer's feedback for the restaurant. The CWOS-RTF enables restaurant owners to set up the system in the wireless environment and update menu presentations easily.

The organization of the paper is as follows: Section 2 describes the system overview of the proposed model this includes system design, system architecture, and flow chat. Section 3 discusses the required tools, they are JavaScript, PHP, MySQL, and Android studio. And also describes the basic parts that are used in robots. Final section 4 concludes the paper.

2. OVERVIEW

2.1. SYSTEM DESIGN

The smart dining system has four stages; According to these steps the customer goes through,

a)Stage 1:This step is completed when the customer scanning the QR code with his/her smartphone.

b) stage 2: The second stage is completed by scanning the QR code and making the customer access the food menu on his smartphone and ordering the customer's food.

c) stage 3: At this point, the "smart robot" delivers the food according to the customer's order.

d)stage 4: At the final stage, the manager/admin generates the bill and the customer pays the bill.

2.2.SYSTEM ARCHITECTURE

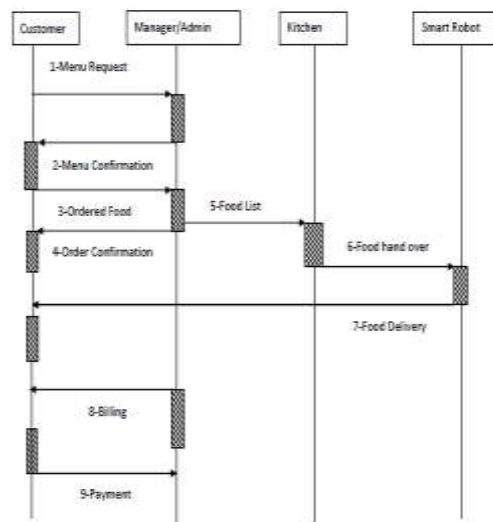


Fig.1.Architecture of smart dining system

The system architecture is based on the many steps that take place after the customer arrives at the smart dining. It consists of 9 steps, including customer interaction and the rest of the restaurant's operations. Architecture mainly has 4 sections, "customer", "manager / admin", "kitchen" and "smart robot". The below 9 steps are based on these 4 Sections.

1. Menu request

The first step is to scan the QR code from the table in the Smart dining with the customer using his smartphone. This step is accomplished by scanning the QR code and requesting access to the menu that is available in the restaurant to the manager/admin section.

2.Menu Confirmation

This phase can be considered as a continuation of the first step. This step is to make the manager/admin, menu accessible to the customer in response to the customer's request. As a result, the menu becomes visible to the customer and moves on to the next step.

3. Ordered food

This step is to order the customer's food according to his needs from the menu that was open before him. This order goes to the Manager/Admin section.

4. Order confirmation

This phase can be regarded as a continuation of the third stage. At this stage the confirmation response is what the customer ordered from the menu.

5. Food list

The customer has no direct connection to the kitchen, but the manager has. At this stage, the list of the ordered food is transferred from the manager/admin section to the kitchen section.

6. Food Hand over

This is a small step. At this stage the cooked food from the kitchen is handed over to the "Smart Robot" section according to the customer's order. Smart Robot is a fascinating feature of Smart Dining System.

7. Food delivery

At this point, the Smart Robot and the customer interact. This step is completed by delivering the food from the kitchen to the ordered customer.

8. Billing

This is the second last stage. At this stage, the manager/admin generates a bill according to the customer's food and gives it to the customer.

9. Payment

This is the final stage of the architecture. This step can be considered as the response of the eighth stage. At this point the customer is paying the bill.

2.3. FLOW CHART

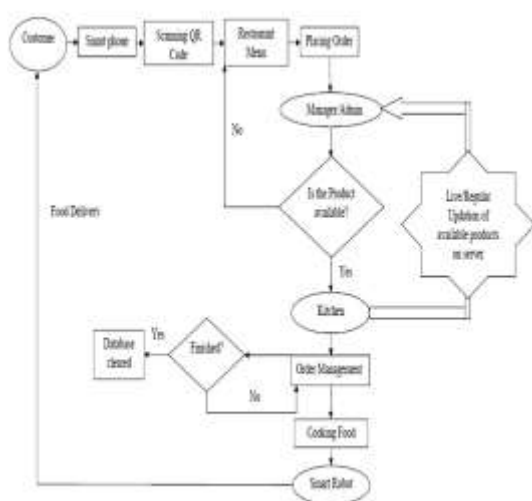


Fig.2.Flow chart

Firstly, the customer has to scan the QR-code pasted on the table using their smartphones. On the other hand, their smartphone shows what the menu of the day is all about. The customer can order the current menu on the display. When the customer is ordering food, the information goes into reception in the form of a message. If the product is not available, it goes back to the restaurant menu. Here the customer is interacted by the managing section. Also information about unavailable food products in the kitchen is updated to reception management at all times. Instead, if the product is available, it goes to the reception and the kitchen as a message. Next is food preparation. The order management section is to Manage and Store the Food Data. If the ordering is finished clear the data. If not finished it backs to order management. If all ok, then start to prepare food and then deliver it to the customer using a smart robot.

3. REQUIRED TOOLS

The system is developed using the following tools:

3.1.JAVASCRIPT

JavaScript is a dynamic, high-level, untyped, and interpreted programming language which is used alongside HTML and CSS. JavaScript is easy to learn, easy to edit, and prototyping language easy to debug object-oriented scripting language which allows you to create highly responsive interfaces that improve the user experience and supply dynamic functionality, without having to attend for the server to react and show another page.

3.2.PHP

PHP is a server-side scripting language. that is wont to develop Static websites or Dynamic websites or Web applications. PHP stands for Hypertext Pre-processor, which earlier stood for private Home Pages. The PHP scripts can only be interpreted on a server that has PHP installed.

3.3.MySQL

Database Service is a fully managed database service to deploy cloud-native applications using the world's most popular open-source database. It is managed,100% developed, and supported by the MySQL Team.

3.4.ANDROID STUDIO

Android Studio is the official IDE from Google for developing android applications for android devices. It consists of all the API required to create an app. It has emulators on which you can test the developed app. Before the introduction of Android studio, android applications were mostly developed using Eclipse IDE.

3.5.ADMIN/MANAGER PANEL



Fig.3. Admin login



Fig.4. Admin Page Interface

The Admin/manager should be login with a login id and password for access to both customer and kitchen panel. The manager panel acts as an admin of a system and has the ability of manipulating the database from this panel which is implemented by PHP scripting. The PHP scripting is responsible for adding/updating/deleting data entries in the MySQL database.

3.6. CUSTOMER PANEL



Fig.5. QR code Interface



Fig.6. Menu

The customer should be scan the QR code placed in the table with their smartphone to order the food. The food ordered is displaced on both manager panel and kitchen panel.

3.7.KITCHEN PANEL



Fig.7.Kitchen Panel

In the kitchen panel, the food ordered by customers is displayed, which includes table number and quantity of food they want. And also provide a key for kitchen staff to update in kitchen panel.

3.8. ROBOT SECTION



Fig.8. Arduino Nano[6]

Arduino nano is widely utilized in robotics, embedded systems, and other equipment, where automation is an important part of the system. The Arduino Nano can be powered via the Mini-B USB connection, 6-20V unregulated external power supply, and also provide 5V regulated external power supply. The power source is automatically selected for the highest voltage source. The Nano Arduino is a small, complete, and breadboard based on the ATmega328. Compare to Arduino Uno Arduino nano is better. Also, it used to produce a clock of precise frequency using constant voltage.



Fig.9. Motor Driver L293D [7]

The Motor Driver may be a module for motors that permits you to regulate the working speed and direction of two motors simultaneously. This Motor Driver is meant and developed supported L293D IC. L293D is a 16 Pin Motor Driver IC. This is designed to provide bidirectional drive currents at voltages from 5V to 36V

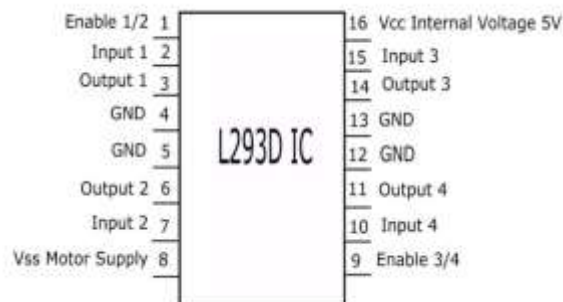


Fig.10. L293D IC[8]

The L293D is a 16 pin IC, with eight pins, on each side, to controlling two DC motor simultaneously. There are 4 INPUT pins, 4 OUTPUT pins, and a couple of ENABLE pin for every motor.

Pin 1: When Enable1/2 is HIGH, the Left part of the IC will work, i.e motor connected with pin 3, and pin 6 will rotate.

Pin 2: Input 1, when this pin is HIGH the present will flow through output 1.

Pin 3: Output 1, this pin is connected with one terminal of the motor.

Pin 4/5: GND pins

Pin 6: Output 2, this pin is connected with one terminal of the motor.

Pin 7: Input 2, when this pin is HIGH the present will flow through output 2.

Pin 8: VSS, this pin is employed to offer power supply to connected motors from 5V to 36V maximum depends on Motor connected.

Pin 9: When Enable 3/4 is HIGH, the Right part of IC will work, i.e motor connected with pin 11 and pin 14 will rotate.

Pin 10: Input 4, when this pin is HIGH the present will flow through output 4.

Pin 11: Output 4, this pin is connected with one terminal of the motor.

Pin 12/13: GND pins

Pin 14: Output 3, this pin is connected with one terminal of the motor.

4. CONCLUSIONS

The objectives of our project “QR code-based Smart Dining System” is to increase the customer's dining experience by fastening the existing restaurant services and to simplify the ordering and bill payment systems to minimize the workload of the restaurant and hotel owners. With smartphones, the customer can scan the QR code which is set on the table, and open the current menu to order the food. Upon ordering, the notification will be delivered to the kitchen and the cashier along with the table number. The current menu and offers will be updated on this menu. The Robot can deliver food. The presence of each component has been reasoned out and placed very carefully, thus contributing to the best and efficient working of the device. This system will help in reducing the waiting time of customers in the restaurant. It will also reduce the manual service given by waiters and serving staff, and also eliminating the human-made mistakes.

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