

FoodPartner: Your Online Digital Assistance

Submitted in partial fulfillment of the requirements

For the degree of

Bachelor of Engineering in Information Technology

by

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CERTIFICATE

This is to certify that, the Project-II titled

“FoodPartner: Your Online Digital Assistance”

is a bonafide work done by

Riteshkumar Singh

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*and is submitted in the partial fulfillment of the requirement for the
degree of*

Bachelor of Engineering
in
Information Technology
to the
University of Mumbai



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Project Report Approval for B.E.

This is to certify that the project entitled "*FoodPartner: Your Online Digital Assistance*" is a bonafide work done by *Riteshkumar Singh, Rupal Sonje and Soham Salkar* under the supervision of *Prof. Dr. Ashish Jadhav*. This project has been approved for the award of *Bachelor's Degree in Information Technology, University of Mumbai*.

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Declaration

I declare that this written submission represents my ideas in my own words and where other's ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

The modern-day customer has new priorities when it comes to dine-out and the top of them is safety. Most of the restaurant's meal orders rely on the interaction with waiters to place orders into the kitchen. Due to the pandemic situation, there happens to be discomfort interacting with waiters and other staff members of the restaurant. To solve such problems this system is developed. This system covers the whole order process of a restaurant including the interaction between the customer, the waiter, the kitchen, and the cashier through a web application. Additionally, restaurant owners will be able to enhance sales by using this system to analyze data gathered. This system will attempt to replace the traditional manual ordering process. A better user experience that includes food recommendations can indirectly boost customer loyalty to the restaurant. It is a complete product for managing restaurant services with minimal human interaction while providing maximum contactless service

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Chapter 1

Introduction

1.1 FoodPartner

Almost every industry is embracing the road to digital transformation and the restaurant sector is no exception. Despite it being classified as an essential business and continuing to reach out to its customers in one way or the other, it incurred heavy losses. The traditional paper based ordering method is being used in most of the restaurants worldwide. In this system the whole process of checking the menu, ordering food to bill receipt is done using paper. Here, the waiter takes the order from the customer and forwards it to the kitchen. There are a lot of problems associated with this system. The most common stumble is that waiters may make mistakes with customers' orders. At times, a waiter may forget to add a specific item ordered by the customers and make changes and forget to give the updated order to the kitchen. It is extremely important for the waiters to rely on the chefs to inform them whether the food is ready or not. The restaurant business has been adversely affected because of the covid pandemic. Hygiene and safety is the prime concern of consumers when they think of moving out to dine. People are afraid of catching the virus in public places and thus, order everything online. This has immensely affected the footfall that a restaurant receives and eventually their sales. Due to the covid norms imposed by the government, the restaurants have to reduce their opening hours and capacity. Many restaurants are using printed laminated paper menus. Since printed menus

are one of the most touch surfaces in any restaurant as they go through different hands. They require constant sanitation and also such menus are harmful to the environment.

The designed system will help the restaurants to overcome such consequences by means of having a digital menu which is an essential part of contactless dining. This system aims to automate the entire traditional paper-based menu ordering to a digital and smart ordering system using the QR code. The digital ordering system enables the user to register and log in followed by ordering food and viewing the status of their order. Digital menus can be equipped with recommended and top-selling dishes based on past orders and restaurant suggestions. They can easily add items to their order and pay online. Order details are also forwarded to their registered WhatsApp number. They can also access their previous orders in the restaurant. The manager can view all the orders and the table number from where the order is placed with the customer's details. Any new incoming order will be notified to the chef where he can accept the order and start with his preparation. The manager can also view the payment status. Manager can also see the real-time data of sales and orders. The sales data is graphically visualized to give better insight to the restaurant owner. Also during rush hours the load on the waiters and the chefs will be reduced, and restaurants will perform better than usual and also the human error that occurs when performing tasks manually is also minimized and the presence of queues in the system to accept orders and assign tasks to chefs can reduce congestion in the kitchen. This can be used for better service and planning. This system thereby reduces the manpower and eases the systematic operation of the restaurant.

1.2 Problem Statement

It was recognized that the management system of a restaurant is still being manually operated by waiters and managers and is not automated yet. Due to the covid situation, interacting with restaurant personnel has created discomfort. It is found that transmission of viruses is higher when people interact in a closed environment. Also, most staff and customers wear face masks which muffle conversation, the chance of miscommunication, misordering, or misinterpretation when receiving orders is greater. It is also a problem that customers have to wait until the waiter responds to them. There are constraints on updating available dishes due to printed menu cards. Customers need to ask the waiter if a particular dish is available or not. Customer has to toil for

improvising the dish according to his taste in a crowded quarter. Poor customer service on holidays and weekends when the number of customers increases. This project aims to provide a full-featured system that includes order and payment integration, rather than a menu-only solution.

1.3 Project Scope

A major objective of this project is to design an order system for small and medium sized food establishments, which can improve the overall dining experience for customers by simplifying their daily operations.

Currently, the system will operate on two platforms: mobile and desktop. The mobile platform will be developed to let users view the menu cards of restaurants and be able to make orders via mobile. A computer-based platform will enable staff to update and make changes to the information on their food menus. Also, reports can be generated by staff as they desire, such as monthly sales reports. Staff can use this program to issue billing statements to consumers so they can make payment after dine-in.

In the end, the project will increase the restaurant's production, efficiency, and profitability. Using this system, all manual work will be eliminated by replacing the traditional order system with a computer system. By automating the process, the physical delivery of food order tickets into the kitchen, replacing the food's price tag, and calculating the billing price will be omitted.

1.4 Relevance and Motivation of project

The motivation for the project comes from the fact that, although there are multiple types of management systems available, they do not follow contactless dining practices, which is a necessity today. Restaurant dining is unsafe unless we follow contactless practices. In light of the current social conditions, having in-contact dining practices becomes a concern and a threat. To provide a healthier and safer digital restaurant environment in the upcoming days of a better

world, our project is taking measures. Developed under a highly efficient digital platform with a visually understandable user interface and application that captures accurate data and generates efficient reports for restaurant management, the solutions combine all the modules necessary to manage a restaurant under one roof.

1.5 Organization of the report

The report is divided into 7 chapters. All the chapters have been continuously numbered for easy identification.

- Chapter 1 gives a brief introduction about the project, circumstances leading to the project i.e., problem statement and the existing system. It also provides a detailed description of the aim and objective of the project.
- Chapter 2 discusses the review of literature where the paper related to the project is examined.
- In chapter 3, planning and formulation of the project is stated, where software development life cycle is derived and time line is discussed.
- In chapter 4, proposed systems and proposed methodology are discussed in detail where technologies used are listed.
- Chapter 5 discusses the design of the system which includes a data flow diagram, use case diagram and system diagram .
- In chapter 6, experimental results are elucidated where each module is discussed in detail.
- In chapter 7, the project is being concluded.

Chapter 2

Review of literature

As technology advanced, a variety of new systems were developed to automate the ordering process. A familiar system which was implemented in various restaurants was a Bluetooth based ordering system where the peripheral interface controller consists of a keypad which acts as a remote control and is placed on the customers table connected to a monitor placed in the kitchen using a Bluetooth module [6]. The Microcontroller will transmit the data via Bluetooth transmitter which will be processed and displayed on the monitor [11]. This system was improved by replacing the PIC board with a touch screen panel and transmitting the data through a Wifi module [7]. Speech recognition technology was also added to place the order using speech commands [15]. Since touch screen devices are currently in vogue, it did not take long for tablet-based menus to make an appearance on the market. Each table will be equipped with a touch screen tablet with an android application installed [10]. A smart menu will be available, and customers can order food by selecting the dish they want and placing the order [9]. A chef's interface will display the placed order, and the order will be marked as completed once it has been prepared [4]. It is possible for the manager to view orders and make changes to the menu at any time [1]. Customers can make their payments in cash or by swiping a credit or debit card after the order process [12]. In addition to checking and verifying the current status of orders, the admin can also check if the payments have been received [8]. The system allows customers to provide real-time feedback at the end of the meal [5]. The recommendation system was also added which focuses on customer reviews and location to provide personalized

recommendations to customers [14].Based on previous orders, the Recommendation algorithm suggests dishes to the customers so that they can build his or her order and easily view the most popular dishes [13]. An android application was made available on the Play Store in order to reduce device costs [2]. In order to further improve the system, offers on food and bill payment have been added [3] .

Chapter 3

Planning and Formulation

3.1 Software Development lifecycle

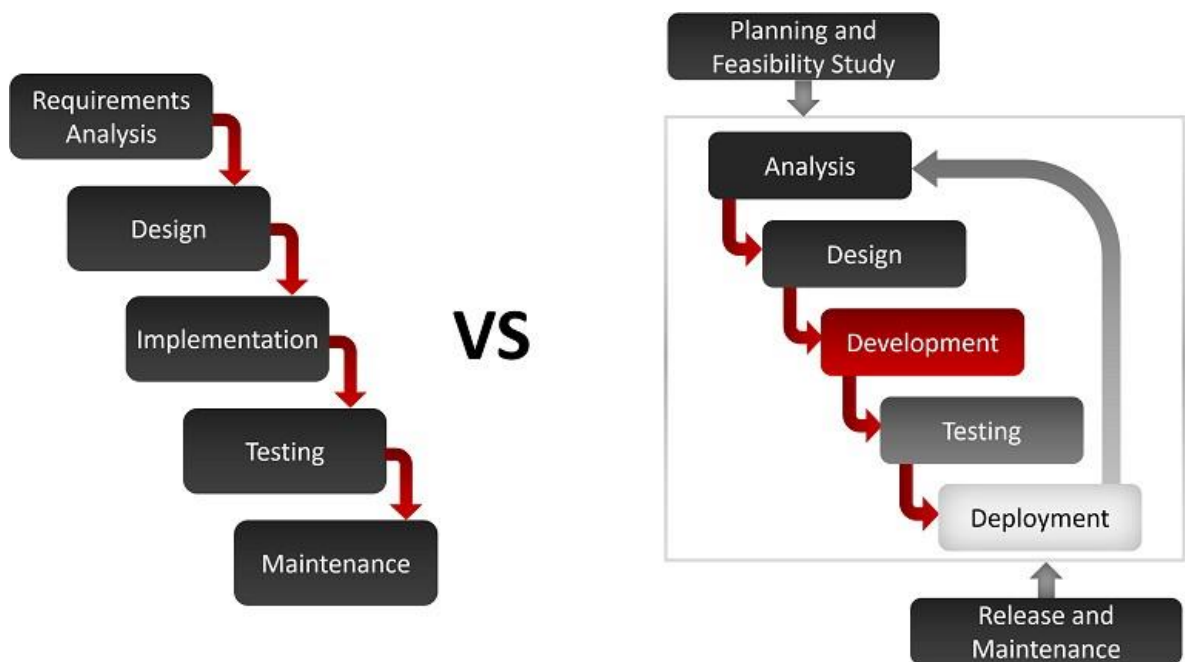


Figure 3.1: Software development lifecycle

In order to effectively design and develop a cost-effective model the Agile Methodology was practiced. Agile is a technique for software development that incrementally uses short iterations of 1 to 4 weeks to create a program to match the development process with evolving business needs. Instead of a 6 to 18-month single-pass development where all requirements and risks are predicted in advance, Agile adopts a frequent feedback process where a workable product is delivered after 1 to 4 weeks of iteration.

3.2 Timeline

Table 3.1: Gantt chart

Sr no	Task Name	May 21	June 21	July 21	Aug 21	Sept 21	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22
1	Domain Selection											
2	Topic Selection											
3	Problem Statement											
4	Requirement gathering and Analysis											
5	Flowchart and UML diagram											
6	Implementati on											
7	Testing and Integration											
8	Feedback											
9	Deployment											
10	Documentati on											

Chapter 4

Methodology

4.1 Proposed System

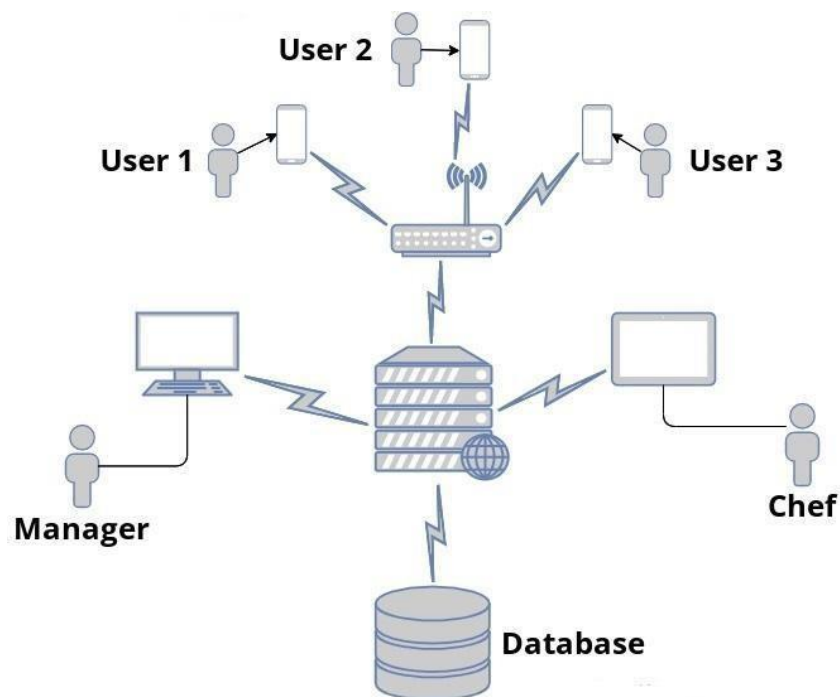


Figure 4.1: System Architecture

The proposed system automates all aspects of the dining experience. The restaurant follows a contact-less dining norm by reducing the human contact in terms of waiters at service to a great extent with the customers. The QR Code on each table redirects the user to the UI of the

system with the specific table number. The graphical interface allows registered users to order food and pay bills using their smartphones. The user can also view their past orders, their feedback and ratings, and favorite food items. A confirmation of the order is sent to the customer's registered Whatsapp number after the order is placed. Chefs are notified when new orders arrive. System access is restricted to each department. Data about sales can be analyzed for purposes such as tracking the most popular products, new customer counts, and revenue stats for daily or monthly periods. Restaurant managers can edit the menu items of their restaurant as required and can manage users as well. A daily and monthly report of sales data and user data can be generated and downloaded in CSV and PDF formats. Proposed system includes following modules:

1. Customer module
2. Manager module
3. Chef module

4.2 Detailed description of modules

1. Customer Module

The application provides all the modules the customer needs when they visit the restaurant, such as viewing the digital menu, placing an order, and paying online. Customer modules contains the following:

- **Scanning module:** This is the first module when a customer is starting with the process. When the customer arrives at the restaurant, he scans the QR code on the table which redirects him to the restaurant's website to continue. The QR code contains a unique table ID on top of a URL that will be stored for later process.
- **Login/ Registration module:** In this module, customers are required to log in to the website if they are already registered, using their unique username. New customers must complete the registration process before logging in. The customer must select the number of people with him and continue with the process after logging in.

- Menu display module: Customers can view the current menu of the restaurant using this module. In addition to the different categories of dishes, the top selling and recommended dishes are also displayed so they can see what is popular. The product image is included, along with the product name, price, and some description.
- Cart module: The customer's cart gets automatically updated as soon as an item is added, showing the subtotal as well as the order quantity. Customers can edit their cart at any time before they place an order. To prevent data loss, items in the cart are also stored in the session. When an order is placed, customers can add additional items and update their orders before making a payment.
- View previous orders module: This module allows customers to view past orders in detail, including total prices, payment IDs, and the date of each order.
- Payment module: In this module, as soon as a customer clicks on the 'PAY' button, he can view his final bill and proceed with payment. The payment module is integrated with the testmojo API, which provides a secure payment gateway. After completing the payment process, the customer can either order again or end his session followed by a feedback.
- Feedback Module: In this module, customers can evaluate each dish, comment on the ordering process, and suggest improvements to the restaurant's hospitality.
- Notification module: A notification will be sent by WhatsApp with order details upon placing an order. After successful completion of payment, customers will receive a notification with the amount received for an order ID. Payment receipts are also sent by testmojo API to their registered email address.

2. Manager modules

This includes all the features a manager needs to manage a restaurant. This includes analysis of orders, product management, order and sales management. Various modules included here are:

- Analysis module: This module provides a variety of data visualizations to the restaurant manager including bar graphs, line graphs, and pie graphs. The module also gives customer and product statistics as well as order information and daily and monthly revenue estimates.
- Product management module: Managers can perform CRUD operations on products, such as adding categories, adding new products based on categories, updating the current

products, and deleting them. Furthermore, they can manage the current date's menu, based on its availability.

- Sales module: Managers can get all the details of a product's sales with this module. It contains the details such as product details, customer ID, quantity ordered, order ID and date of order. Incoming orders are notified by beep sound to the manager and a record of the seen/unseen status of each order is maintained.
- Bill history module: This module allows the manager to view all billing information, including past orders, and delete them. It provides additional information such as total price, payment status, and payment ID for each order.
- Report module: This module helps the manager to download the report of sales, orders and customers in various formats like PDF and CSV.

3. Chef Modules

It includes modules which help the chef to view the incoming orders in a detailed manner and update the status of each order. Modules included here are:

- View orders module: It allows the chef to be notified with a beep sound of when an order is coming in. The chef can then view a detailed list of what is in each order along with the quantity.
- Update Status module: This module allows the chef to update each order's status to 'Accepted', 'In Progress', or 'Rejected'.

4.3 Proposed Methodology

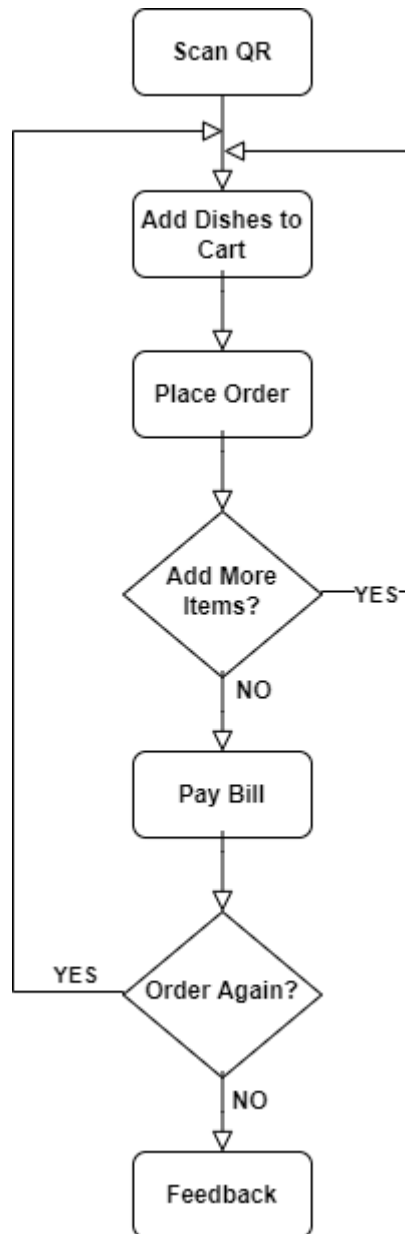


Figure 4.2: Data flow Diagram

- I. Scan the Qr code placed on the table from the mobile camera and open the link
- II. Login/Register and proceed ahead by selecting number of people
- III. Explore the menu and dishes according to choice
- IV. Confirm the order or update the dishes
- V. Check the status and wait until the order is arrived
- VI. Pay the bill for the order online or repeat from step 3
- VII. Give the feedback

4.3.1 Technologies used

1. HTML:

The acronym HTML stands for Hyper Text Markup Language, a coding language used to construct websites and web applications.

2. CSS

CSS (Cascading Style Sheets) describes the appearance of documents written in markup languages like HTML. Together with HTML and JavaScript, CSS is one of the key technologies that make up the World Wide Web.

3. JAVASCRIPT

The CanvasJS chart creator library enables users to create rich UI dashboards and charts that will work across all devices without compromising their web application's functionality.

The HighCharts library adds interactive charts to web applications by using a JavaScript based library. There are several types of charts available with Highcharts. The types of charts may include line charts, spline charts, area charts, bar charts, pie charts, etc.

4. AJAX

The acronym AJAX stands for Asynchronous JavaScript and XML. It consists of a variety of interrelated technologies like JavaScript, DOM, XML, HTML/XHTML, CSS, XMLHttpRequest etc.

5. PHP

The Hypertext Preprocessor (PHP, recursively acronym for PHP: Hypertext Preprocessor) is a widely used open-source general-purpose scripting language designed to be embedded within HTML.

6. MYSQLI DATABASE

The most popular Open Source SQL database management system, MySQL, is developed, distributed, and supported by Oracle Corporation. From powerful, data-driven B2B services to customer-facing web applications, MySQL is essential to many popular software stacks.

7. PAYMENT GATEWAY (INSTAMOJO API)

With Instamojo, any developer can easily integrate their payment gateway. The system integrates on any platform and on any website.

8. WHATSAPP INTEGRATION USING CHAT API

Business users can receive and respond to a limitless number of WhatsApp messages through this application programming interface (API).

9. BOOTSTRAP

Bootstrap is a free framework that includes HTML, CSS, and JavaScript bits of code that can be reused. This is also a front-end development framework that designers and developers can use to create fully responsive websites rapidly.

4.4 System Requirements

4.4.1 Hardware Interfaces

Our system will directly interact with the hardware devices like mobile phones, laptops, desktops, tablets, etc. There is no need for additional hardware devices.

4.4.2 Software Interfaces

- For Database services, the system shall use mysql latest version.
- System will run on all browsers like Google chrome, Mozilla Firefox, Safari, Microsoft Edge, etc.

4.4.3 Performance Requirements

The system should be interactive and the delays involved must be minimal. In every action the response from the system should be quick without any delays. In case of scrolling through the menu, there should be a delay of no more than 2 seconds before the next page of menu items is displayed otherwise our customer's dining experience is affected. The order should be placed in pending orders and be visible to the chef in less than 1 second to start the preparation. Updates must be made with little delay to avoid delivery delays. Also, when connecting to the database the delay to make a successful connection should be less for effective communication.

4.4.4 Safety Requirements

The application is environmentally friendly and does not cause any safety violations. The UI will have an adaptable font to not have constrain over the eyes.

4.4.5 Security Requirements

There is a need for a proper and encrypted login authentication for chef and manager as employee sensitive information, as well as inventory, should be protected from hacking. Data should be securely transmitted to Database without replacing data to avoid disturbances in orders and billing

Chapter 5

Design of System

5.1 System Design

The following diagram illustrates the design of the system, the modules and the corresponding functionalities as well as how they are connected to the database.

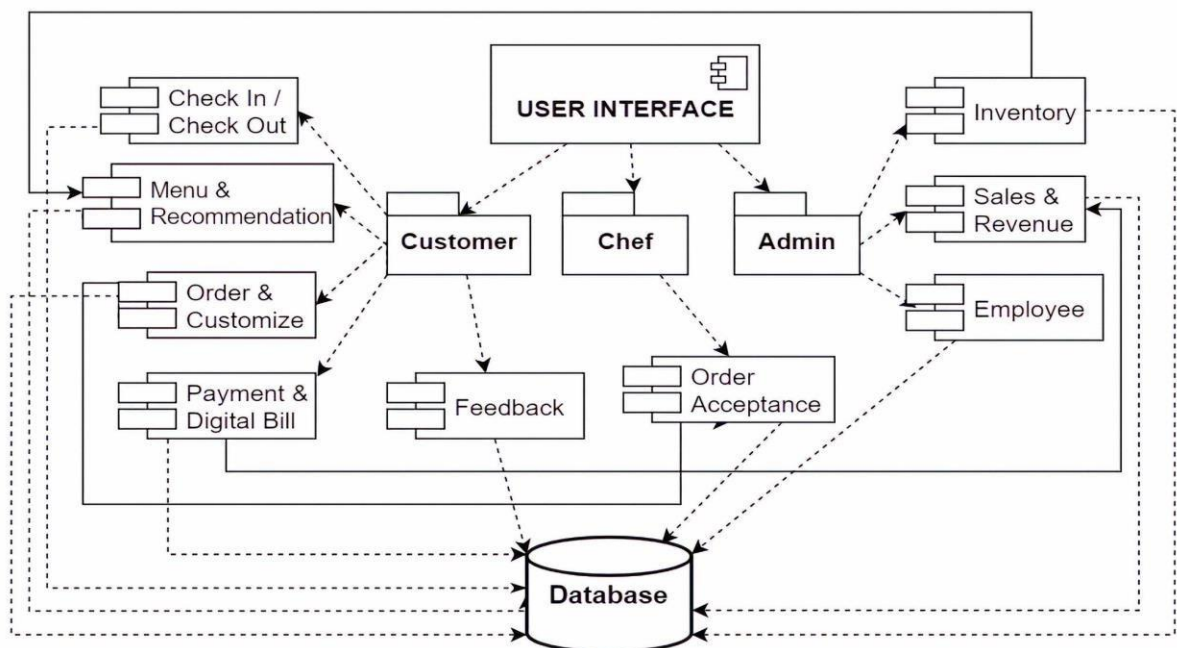


Figure 5.1: Composite structure Diagram

5.2 Use Case Diagram

A use case diagram is a way to summarize details of a system and the users within that system. It represents the interactions between various elements in a system graphically. Three actors are involved in the system, namely, the customer, the chef and the manager. These actors are related to each other with the respective attributes.

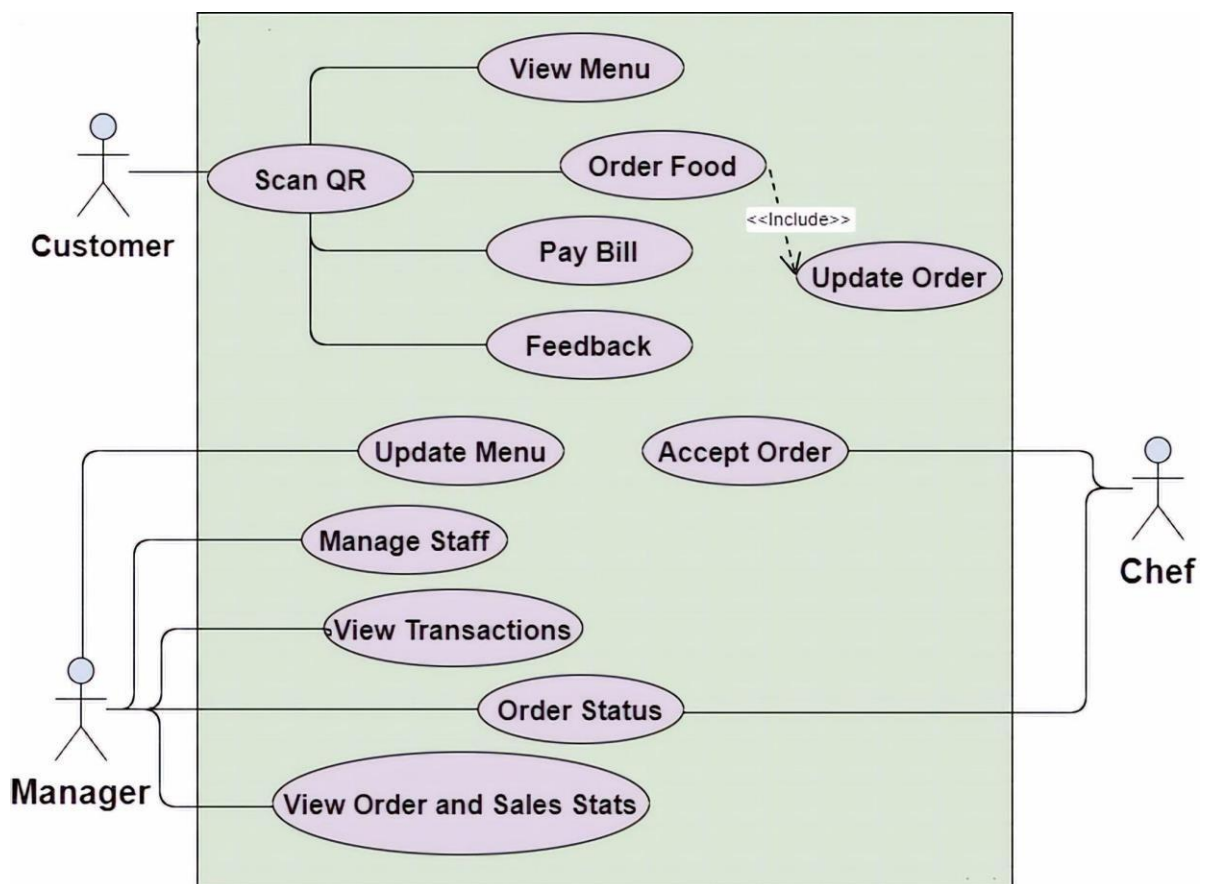


Figure 5.2: Use case Diagram

5.3 Sequence Diagram

These diagrams are used to represent the behavior of the system. This diagram shows how events cause transitions from object to object. Once the events are identified the sequence diagram can be created.

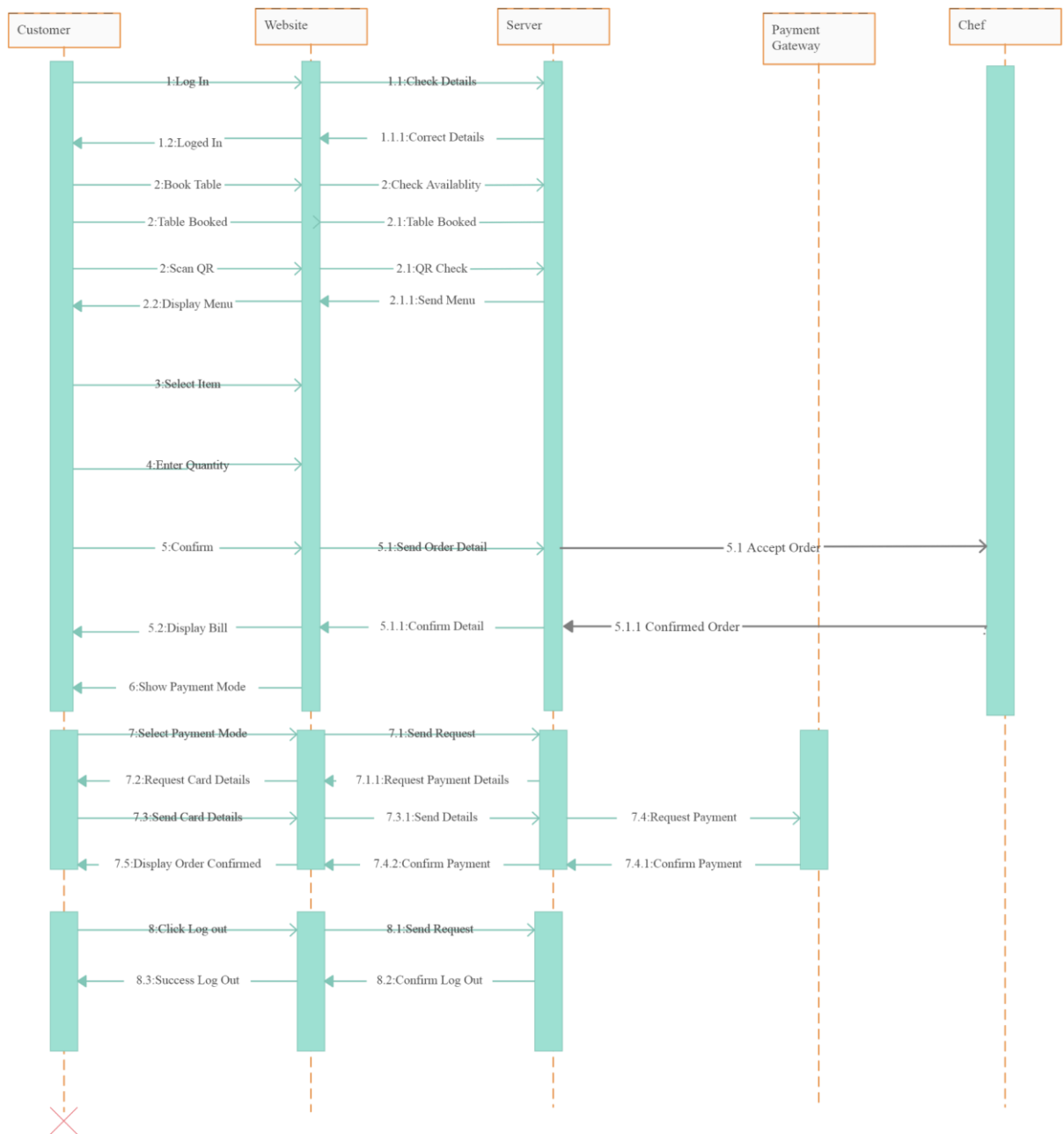


Figure 5.3: Sequence Diagram

Chapter 6

Experimental Results

6.1 Testing Results

6.1.1 Functional Testing

A functional test is conducted to ensure that the functionality specified in the software requirements actually works as intended from the end user's perspective. Testing software by letting end-users use it is the method proven to uncover the most bugs.

Table 6.1: Functional testing

Sr. No	Module	Test Case	Expected Outcome	Result
1	Login	Entering Correct credentials	Customer should be logged in and reverted back with the success message and redirected to menu page	Pass
2	Login	Entering Wrong Credentials	Customer should be alerted with the error message of wrong credentials	Pass
3	Login	Forget Password	Customer should be directed to form where he can enter his username and email address	Pass

			and can change the password	
4	Login	Clicking on Registration	Customer should be directed to registration page	Pass
5	Register	Entering Correct Details	Customer should receive success message and directed to login page	Pass
6	Register	Entering Incorrect Details	Customer should be alerted with the error message of incorrect details	Pass
7	Menu	Clicking on menu sections	Menu Details of that particular section should be displayed	Pass
8	Menu	Clicking on Detailed description	Detailed description of that menu item should be displayed	Pass
9	Menu	Selecting Count of customer	After logged in the customer should be directed to the form to enter number of person and table no and start the session	Pass
10	Menu	add to cart	After clicking on add the cart that menu item must be added in the cart	Pass
11	Cart	Menu added	Added menu should be visible in the cart section	Pass
12	Cart	Remove menu item	After clicking on remove item that particular menu item must be removed from the cart	Pass
13	Cart	Place Order	After clicking on place order that particular order must be placed and the customer must be alerted with success message	Pass
14	Cart	Error while placing order	If the order is not place error message should be displayed and redirected to the cart section to replace the order	Pass
15	Cart	Adding more items	Customer should be able to add more items after placing the order	Pass

16	Cart	Place Updated Order	Updated order should be placed	Pass
17	Payment	Clicked on pay bill	Customer should be directed to payment gateway where he can choose the payment mode from the available options, add credentials and pay bill	Pass
18	Payment	Transaction failed	Customer will be directed back to the payment page	Pass
19	Bill	Bill Invoice	After successful bill payment, bill invoice will be mailed to customers registered email	Pass
20	Menu	Reorder	After payment, customers will be asked to place another order. if ans is yes it will be directed to menu page, else to feedback form	Pass
21	Admin	Add Food Items	Admin should be able to add food items in the menu	Pass
22	Admin	Remove Food items	Admin should be able to delete food items in the menu	Pass
23	Admin	Update Food Items	Admin should be able to update food items in the menu	Pass
24	Admin	View Bill	Admin should be able to view status of bill payments	Pass
25	Admin	View Orders	Admin should be able to view present orders and their status	Pass
26	Chef	Accept Order	After receiving the order, the chef should be able to accept or reject order	Pass
27	Chef	Mark order as completed	After marking the order the order as completed, customer will be notified with prepared order status	Pass

6.1.2 Cross-browser testing

You should perform cross-browser testing on your website to ensure it works correctly in different browsers, whether you are using desktop or mobile. Since browsers update relatively frequently, your application might not work as intended in your target browser by the time you are ready to deploy it. Moreover, users may be running an outdated operating system while using a recent browser. Thus, automating cross browser testing ensures continuous compatibility between your web application and the specified versions of operating systems, browsers, and devices.

The following image shows the compatibility of the website with different browsers:

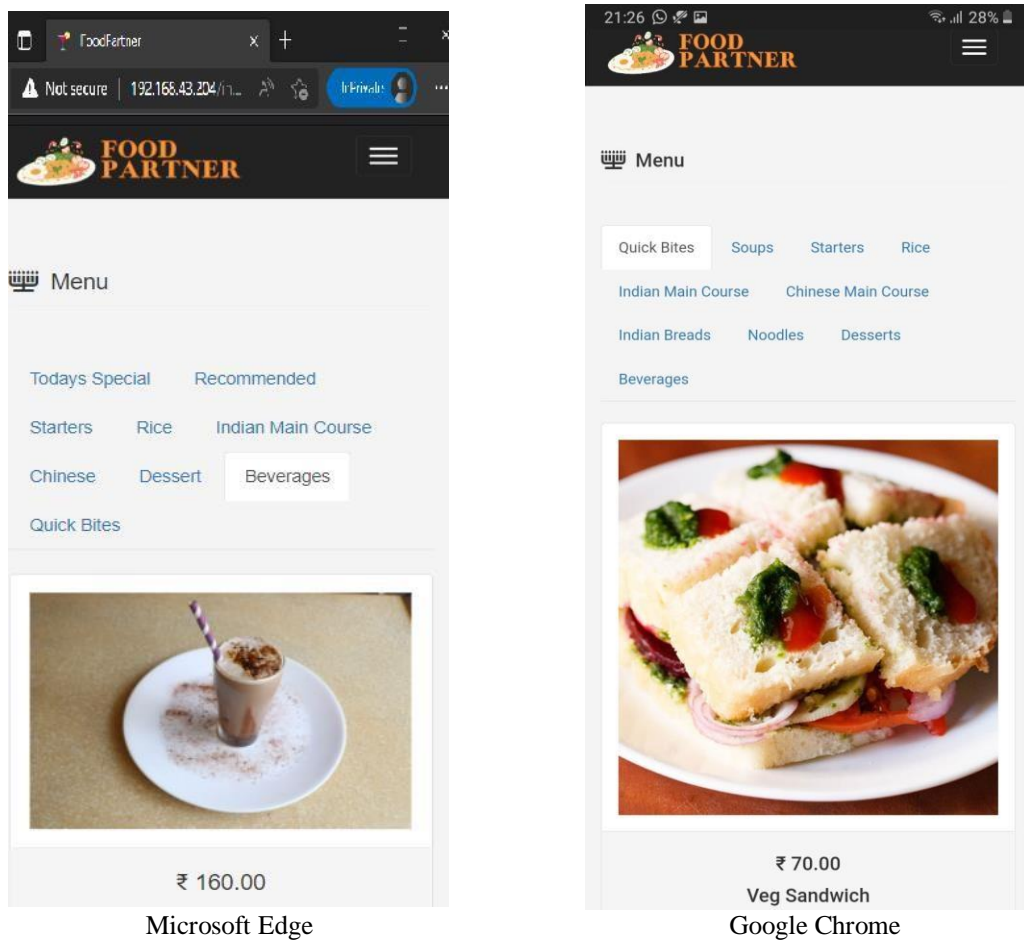


Figure 6.1: Testing system across different browsers

6.1.3 Performance testing

The purpose of performance testing is to ensure that your web application can withstand extended periods of usage or peak loads. Automating the process is crucial in proving that your application can perform in any situation, as manually achieving the necessary stress conditions or load level would not be feasible.

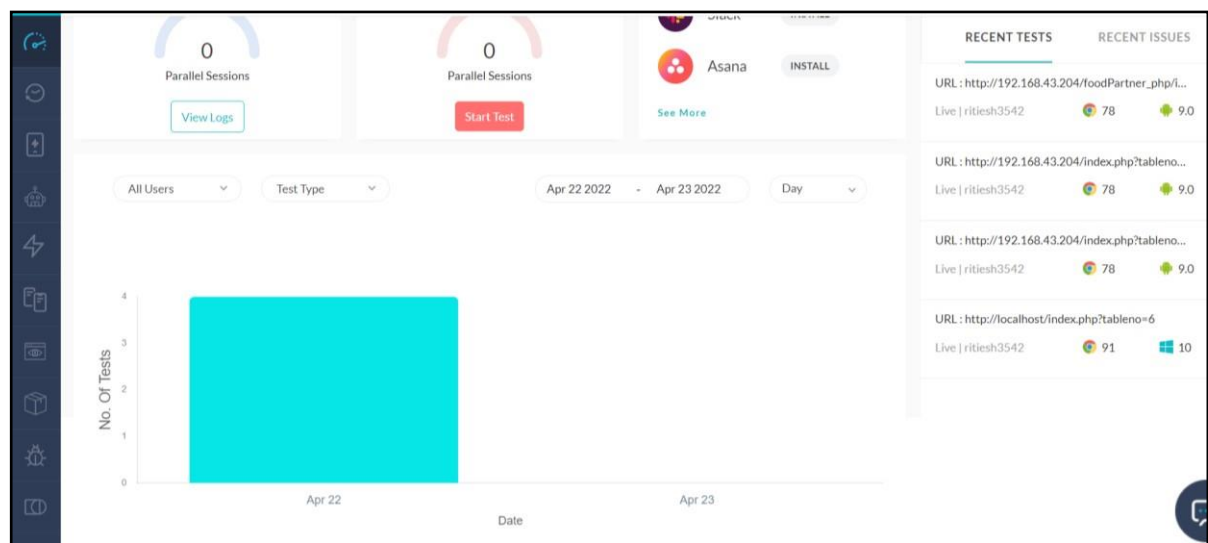


Figure 6.2: Lambda testing of system

6.2 Outcome and Results

This result shows the application flow as viewed from the user's point of view, starting from scanning the QR to login, viewing the menu, adding food items to cart, placing order, paying the bill, and concluding with an order feedback. Furthermore, analysis and visualization of orders at admin level is displayed in conjunction with chef side working

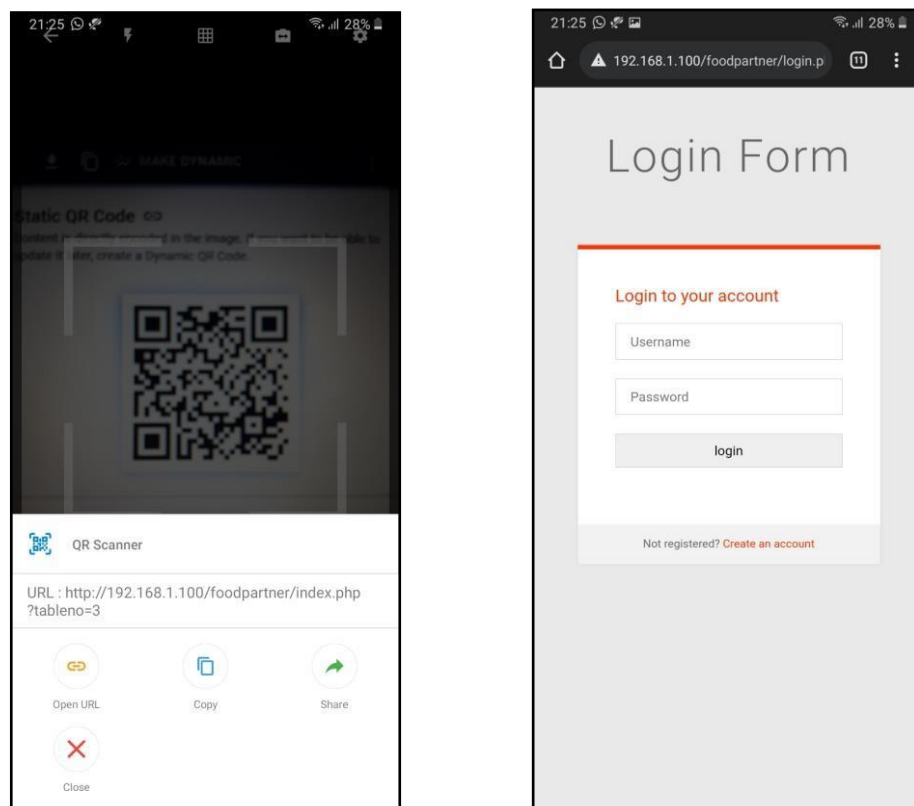


Figure 6.3: Scanning Qr and login page

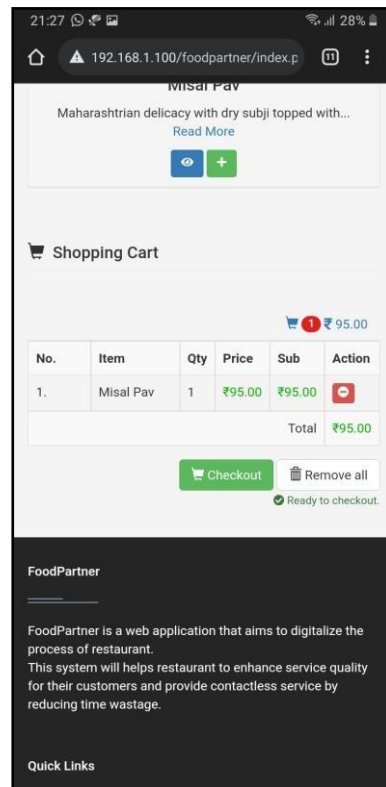
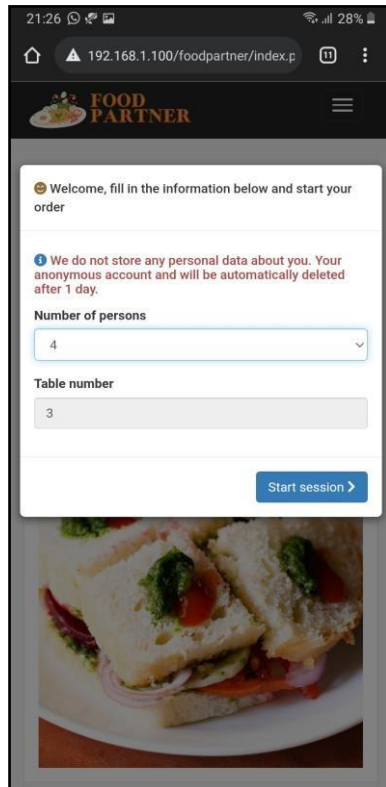


Figure 6.4: Index page and cart section

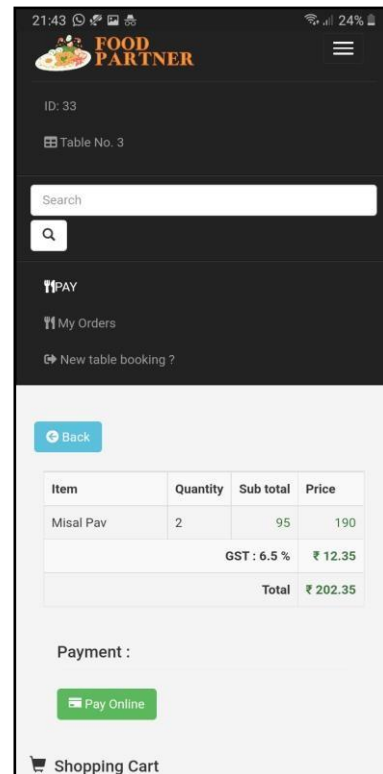
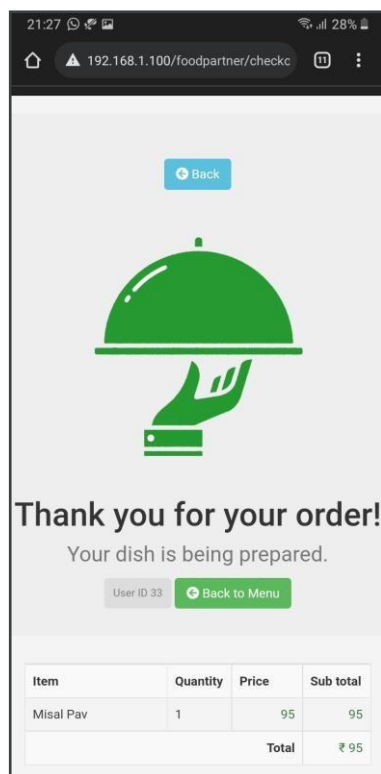


Figure 6.5: Order confirmation and payment page

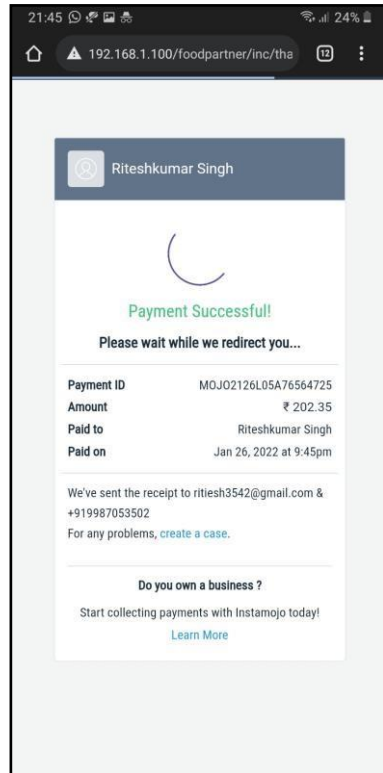


Figure 6.6: Successful payment and Feedback page

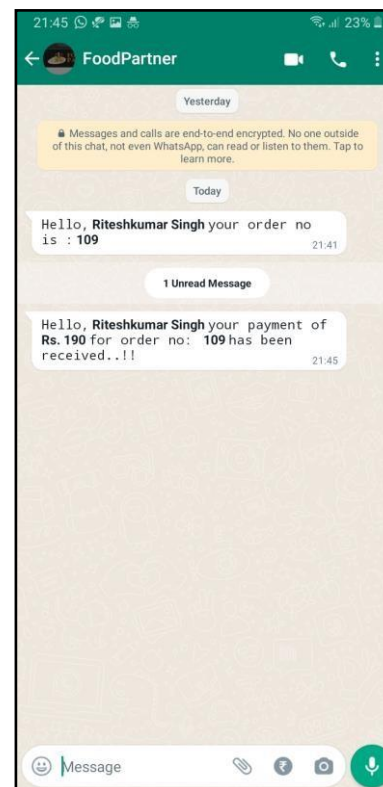
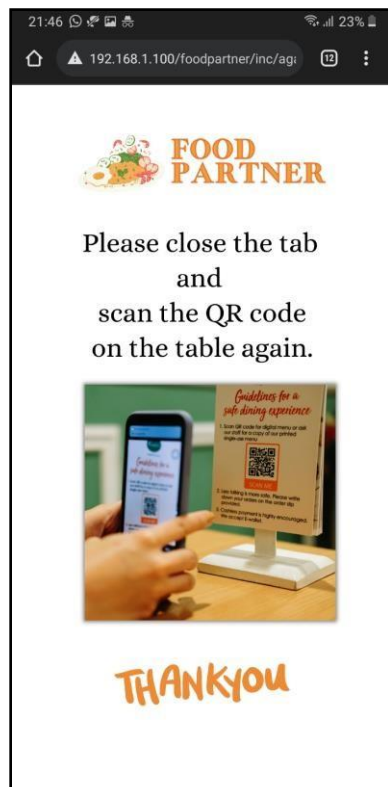


Figure 6.7: Closing current session and whatsapp notification

localhost/foodPartner_php/admin/dashboard.php?page=8

Chef Section

info: Bill history tab helps to see bill of the customer just by entering CustomerID into the search bar below.
Keep that in mind each row represent a unique table, deleting row might be losing the data/orders associated with it.

Seen	CustomerID	OrderID	Table No.	Order	Date(first ordered)	Action
	#37	#231	3	Tomato Soup x 1 Schezwan Noodles x 1 Veg Dumpling Soup x 2 Manchow Soup x 1 Veg Hakka Noodles x 1 Veg Crispy x 1 Hara Bhara Kebab x 1 Chocolate Milkshake x 1 Kiklat Milkshake x 1	2022-02-28 23:45:42	<button>Accept</button> <button>Reject</button>
	#39	#240	3	Misal Pav x 2 Chocolate Milkshake x 2 Paneer Biryani x 2 Fruit Salad with Ice Cream x 2	2022-02-28 20:51:34	<button>Accept</button> <button>Reject</button>
	#45	#239	4	Rose Faloode x 1 Fruit Salad with Ice Cream x 1 Red Velvet Dessert Eggless x 1 Chocolate Milkshake x 1 Kiklat Milkshake x 1 Veg Sandwich x 1 Potato Vada x 1 Veg Cutlet x 1 Misal Pav x 1	2022-02-28 20:49:12	<button>Completed</button>
	#45	#238	4	Veg Makhanwala x 1 Veg Kolhapuri x 1 Chana Masala x 1	2022-02-28 20:44:33	<button>Completed</button>

Figure 6.8: Chef Section

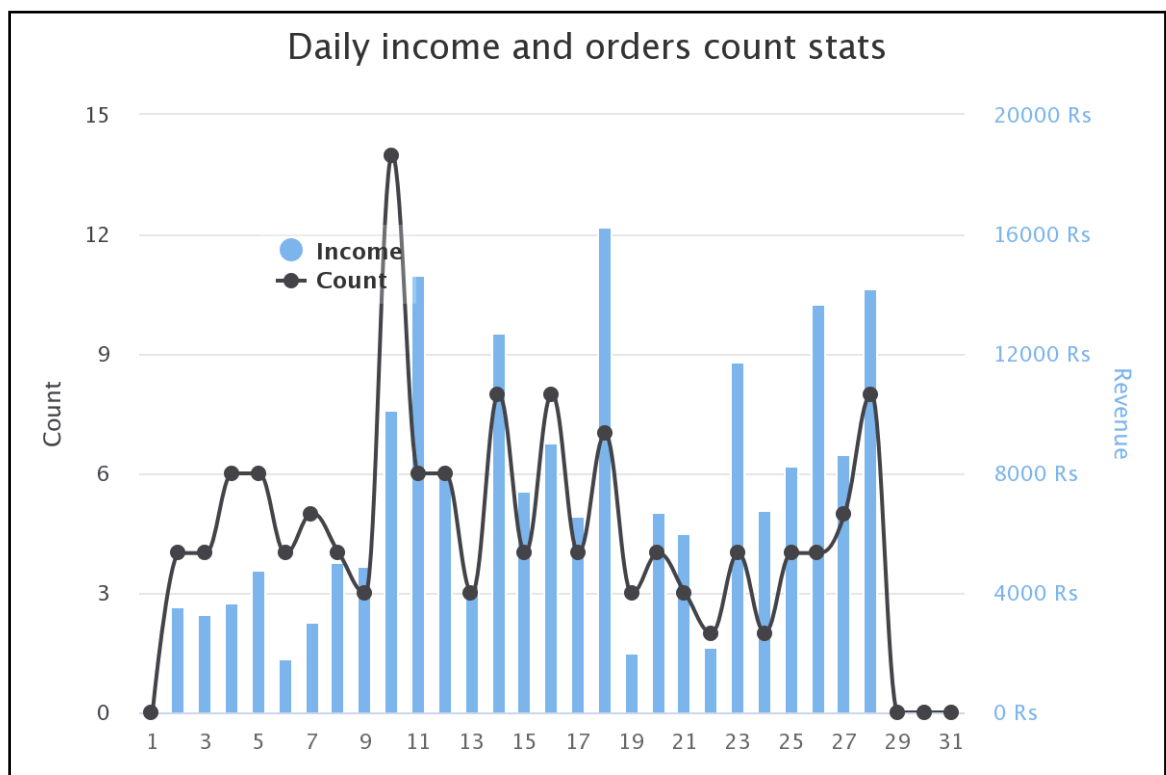


Figure 6.9: Daily revenue and order count

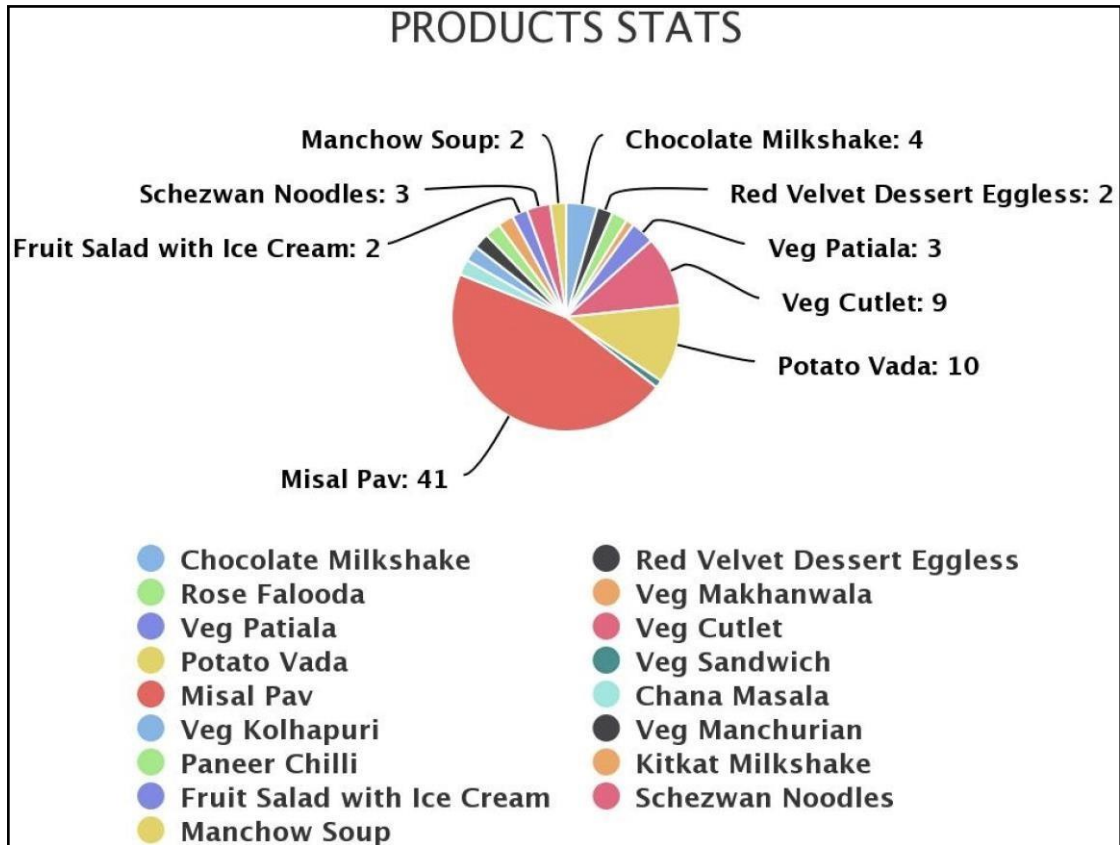


Figure 6.10: Product stats

Copy	Excel	PDF	Column visibility	Search:	
CustomerID	OrderID	Table No.	Payment Status	Action	
#33	#115	7	⌛ Pending	view Bill 🗑	
#33	#113	3	✓ MOJO2127305A01973666	view Bill 🗑	
#33	#112	3	✓ MOJO2127505A01973664	view Bill 🗑	
#33	#109	3	✓ MOJO2126L05A76564725	view Bill 🗑	
#39	#106	2	✓ MOJO2125905A11774310	view Bill 🗑	
#33	#105	4	✓ MOJO2125605A11774200	view Bill 🗑	
#33	#104	4	✓ MOJO2125G05A11774199	view Bill 🗑	

Figure 6.11: Bill history view

Chapter 7

Conclusion

The proposed system provides an easy, convenient, and low-cost method for ordering meals with a contactless dining experience. By encouraging no-contact interaction and personal hygiene, restaurants can lower their risk of transmitting viruses. As a result, diners who find that hygiene and safety standards are satisfactory are more likely to become repeat diners. Such repeat diners promote restaurants for their value to customers, ultimately improving the goodwill of the restaurant. Furthermore, contactless dining helps improve order accuracy, preventing miscommunication between staff and diners. This allows diners to focus on food, ambiance, and service. Machine learning can be applied to gather data to make food recommendations and boost restaurant revenue. In the restaurant business, data analysis is essential for increasing income and sales. During rush hours, the restaurant load would be balanced effectively, and customer service would be better than usual. By including reservation and take-away features, restaurants can improve even further. Thus, investing in a contactless dining solution will not only provide a safer dining experience in the short term but also position the restaurant to meet changing consumer behavior in the future.

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Publication

The implementation of the project which works on “Smart QR-based Restaurant Dine-in System with Sales Analysis” has been compiled into a conference paper and accepted in the following conference “ICACC 2022 3rd International Conference on Automation Computing and Communication”

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No project is ever complete without the guidance of those experts who have already traded this past before and hence become master of it and as a result, our leader. So we would like to take this opportunity to take all those individuals who have helped us in visualizing this project.

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Smart QR-based Restaurant Dine-in System with Sales Analysis

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Abstract. The modern-day customer has new priorities when it comes to dine-out and the top of them is safety. Most of the restaurant's meal orders rely on the interaction with waiters to place orders into the kitchen. Due to the pandemic situation, there happens to be discomfort interacting with waiters and other staff members of the restaurant. To solve such problems this system is developed. This system covers the whole order process of a restaurant including the interaction between the customer, the waiter, the kitchen, and the cashier through a web application. Additionally, restaurant owners will be able to enhance sales by using this system to analyze data gathered. This system will attempt to replace the traditional manual ordering process. A better user experience that includes food recommendations can indirectly boost customer loyalty to the restaurant. It is a complete product for managing restaurant services with minimal human interaction while providing maximum contactless service.

1 Introduction

Almost every industry is embracing the road to digital transformation and the restaurant sector is no exception. Despite it being classified as an essential business and continuing to reach out to its customers in one way or the other, it incurred heavy losses. The traditional paper based ordering method is being used in most of the restaurants worldwide. In this system the whole process of checking the menu, ordering food to bill receipt is done using paper. Here, the waiter takes the order from the customer and forwards it to the kitchen. There are a lot of problems associated with this system. The most common stumble is that waiters may make mistakes with customers' orders. At times, a waiter may forget to add a specific item ordered by the customers and make changes and forget to give the updated order to the kitchen. It is extremely important for the waiters to rely on the chefs to inform them whether the food is ready or not. The restaurant business has been adversely affected because of the covid pandemic. Hygiene and safety is the prime concern of consumers when they think of moving out to dine. People are afraid of catching the virus in public places and thus, order everything online. This has immensely affected the footfall that a restaurant receives and eventually their sales. Due to the covid norms imposed by the government, the restaurants have to reduce their opening hours and capacity. Many restaurants are using printed laminated paper menus. Since printed menus are one of the most touch surfaces in any restaurant as they go through different hands. They require constant sanitation and also such menus are harmful to the environment. The designed system will help the restaurants to overcome such consequences by means of having a digital menu which is an essential part of contactless dining. This

system aims to automate the entire traditional paper-based menu ordering to a digital and smart ordering system using the QR code. The digital ordering system enables the user to register and log in followed by ordering food and viewing the status of their order. Digital menus can be equipped with recommended and top-selling dishes based on past orders and restaurant suggestions. They can easily add items to their order and pay online. Order details are also forwarded to their registered WhatsApp number. They can also access their previous orders in the restaurant. The manager can view all the orders and the table number from where the order is placed with the customer's details. Any new incoming order will be notified to the chef where he can accept the order and start with his preparation. The manager can also view the payment status. Manager can also see the real-time data of sales and orders. The sales data is graphically visualized to give better insight to the restaurant owner. Also during rush hours the load on the waiters and the chefs will be reduced, and restaurants will perform better than usual and also the human error that occurs when performing tasks manually is also minimized and the presence of queues in the system to accept orders and assign tasks to chefs can reduce congestion in the kitchen. This can be used for better service and planning. This system thereby reduces the manpower and eases the systematic operation of the restaurant.

2 Motivation

The motivation for the project comes from the fact that, although there are multiple types of management systems available, they do not follow contact-less dining practices, which is a necessity today. Restaurant dining is unsafe unless we follow contactless practices. In light of the current social conditions, having in-contact dining practices

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becomes a concern and a threat. To provide a healthier and safer digital restaurant environment in the upcoming days of a better world, our project is taking measures. Developed under a highly efficient digital platform with a visually understandable user interface and application that captures accurate data and generates efficient reports for restaurant management, the solutions combine all the modules necessary to manage a restaurant under one roof.

3 Literature Survey

As technology advanced, a variety of new systems were developed to automate the ordering process. A familiar system which was implemented in various restaurants was a Bluetooth based ordering system where the peripheral interface controller consists of a keypad which acts as a remote control and is placed on the customers table connected to a monitor placed in the kitchen using a Bluetooth module [6]. The Microcontroller will transmit the data via Bluetooth transmitter which will be processed and displayed on the monitor [11]. This system was improved by replacing the PIC board with a touch screen panel and transmitting the data through a Wifi module [7]. Speech recognition technology were also added to place the order using speech commands [15]. Since touch screen devices are currently in vogue, it did not take long for tablet-based menus to make an appearance on the market. Each table will be equipped with a touch screen tablet with an android application installed [10]. A smart menu will be available, and customers can order food by selecting the dish they want and placing the order [9]. A chef's interface will display the placed order, and the order will be marked as completed once it has been prepared [4]. It is possible for the manager to view orders and make changes to the menu at any time [1]. Customers can make their payments in cash or by swiping a credit or debit card after the order process [12]. In addition to checking and verifying the current status of orders, the admin can also check if the payments have been received [8]. The system allows customers to provide real-time feedback at the end of the meal [5]. The recommendation system were also added which focuses on customer reviews and location to provide personalized recommendations to customers [14]. Based on previous orders, the Recommendation algorithm suggests dishes to the customers so that they can build his or her order and easily view the most popular dishes [13]. An android application was made available on the Play Store in order to reduce device costs [2]. In order to further improve the system, offers on food and bill payment have been added [3].

4 Problem Statement

It was recognized that the management system of a restaurant is still being manually operated by waiters and managers and is not automated yet. Due to the covid situation, interacting with restaurant personnel has created discomfort. It is found that transmission of viruses is higher when people interact in a closed environment. Also, most

staff and customers wear face masks which muffle conversation, the chance of miscommunication, misordering, or misinterpretation when receiving orders is greater. It is also a problem that customers have to wait until the waiter responds to them. There are constraints on updating available dishes due to printed menu cards. Customers need to ask the waiter if a particular dish is available or not. Customer has to toil for improvising the dish according to his taste in a crowded quarter. Poor customer service on holidays and weekends when the number of customers increases. This project aims to provide a full-featured system that includes order and payment integration, rather than a menu-only solution.

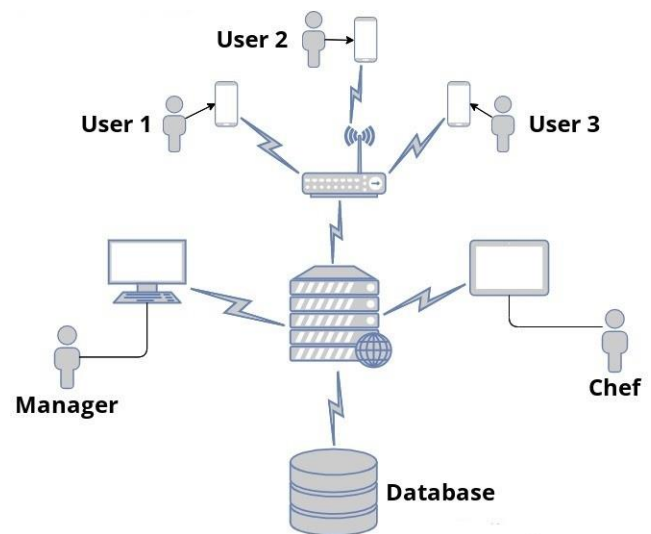


Figure 1. Proposed system architecture

5 Proposed system

The proposed system automates all aspects of the dining experience. The restaurant follows a contact-less dining norm by reducing the human contact in terms of waiters at service to a great extent with the customers. The QR Code on each table redirects the user to the UI of the system with the specific table number. The graphical interface allows registered users to order food and pay bills using their smartphones. The user can also view their past orders, their feedback and ratings, and favorite food items. A confirmation of the order is sent to the customer's registered Whatsapp number after the order is placed. Chefs are notified when new orders arrive. System access is restricted to each department. Data about sales can be analyzed for purposes such as tracking the most popular products, new customer counts, and revenue stats for daily or monthly periods. Restaurant managers can edit the menu items of their restaurant as required and can manage users as well. A daily and monthly report of sales data and user data can be generated and downloaded in CSV and PDF formats. Proposed system includes following modules:

1. Customer Modules

2. Manager Modules

3. Chef Modules

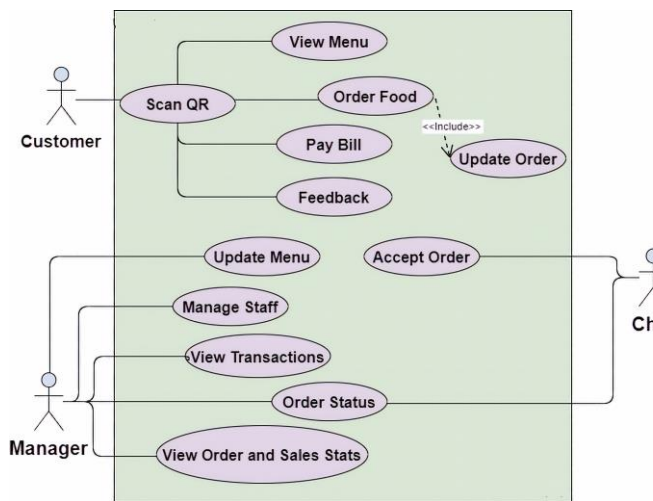


Figure 2. Use Case Diagram

6 Detailed Description of System

Customer modules

The application provides all the modules the customer needs when they visit the restaurant, such as viewing the digital menu, placing an order, and paying online.

Customer modules contains the following:

- **Scanning module:** This is the first module when a customer is starting with the process. When the customer arrives at the restaurant, he scans the QR code on the table which redirects him to the restaurant's website to continue. The QR code contains a unique table ID on top of a URL that will be stored for later process.
- **Login/ Registration module:** In this module, customers are required to log in to the website if they are already registered, using their unique username. New customers must complete the registration process before logging in. The customer must select the number of people with him and continue with the process after logging in.
- **Menu display module:** Customers can view the current menu of the restaurant using this module. In addition to the different categories of dishes, the top selling and recommended dishes are also displayed so they can see what is popular. The product image is included, along with the product name, price, and some description.
- **Cart module:** The customer's cart gets automatically updated as soon as an item is added, showing the subtotal as well as the order quantity. Customers can edit their cart at any time before they place an order. To prevent data loss, items in the cart are also stored in the session. When an order is placed, customers can add additional items and update their orders before making a payment.

- **View previous orders module:** This module allows customers to view past orders in detail, including total prices, payment IDs, and the date of each order.
- **Payment module:** In this module, as soon as a customer clicks on the 'PAY' button, he can view his final bill and proceed with payment. The payment module is integrated with the testmojo API, which provides a secure payment gateway. After completing the payment process, the customer can either order again or end his session followed by a feedback.
- **Feedback Module:** In this module, customers can evaluate each dish, comment on the ordering process, and suggest improvements to the restaurant's hospitality.
- **Notification module:** A notification will be sent by WhatsApp with order details upon placing an order. After successful completion of payment, customers will receive a notification with the amount received for an order ID. Payment receipts are also sent by testmojo API to their registered email address.

Manager modules

This includes all the features a manager needs to manage a restaurant. This includes analysis of orders, product management, order and sales management.

Various modules included here are:

- **Analysis module:** This module provides a variety of data visualizations to the restaurant manager including bar graphs, line graphs, and pie graphs. The module also gives customer and product statistics as well as order information and daily and monthly revenue estimates.
- **Product management module:** Managers can perform CRUD operations on products, such as adding categories, adding new products based on categories, updating the current products, and deleting them. Furthermore, they can manage the current date's menu, based on its availability.
- **Sales module:** Managers can get all the details of a product's sales with this module. It contains the details such as product details, customer ID, quantity ordered, order ID and date of order. Incoming orders are notified by beep sound to the manager and a record of the seen/unseen status of each order is maintained.
- **Bill history module:** This module allows the manager to view all billing information, including past orders, and delete them. It provides additional information such as total price, payment status, and payment ID for each order.
- **Report module:** This module helps the manager to download the report of sales, orders and customers in various formats like PDF and CSV.

Chef Modules

It includes modules which help the chef to view the incoming orders in a detailed manner and update the status of each order.

Modules included here are:

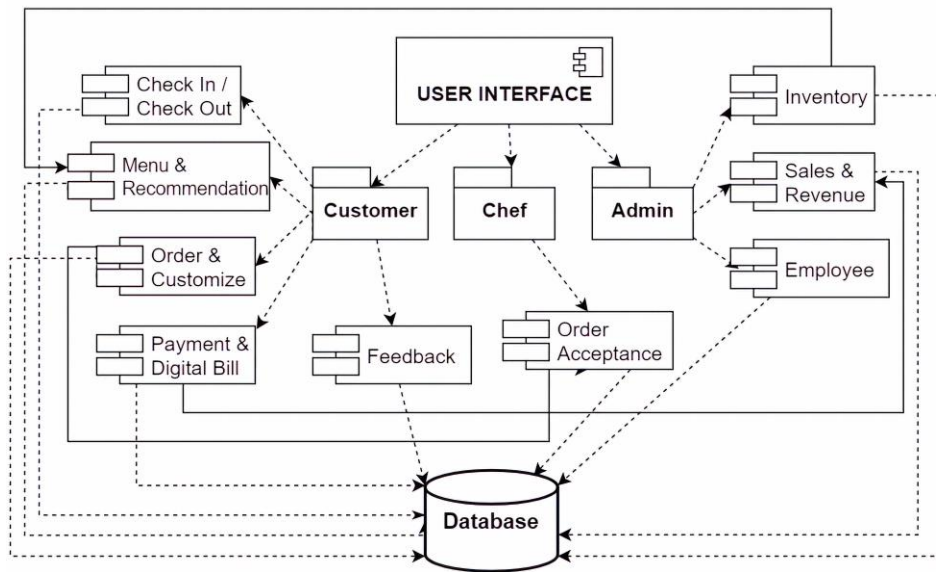


Figure 3. Detailed design of system

- **View orders module:** It allows the chef to be notified with a beep sound of when an order is coming in. The chef can then view a detailed list of what is in each order along with the quantity.
- **Update Status module:** This module allows the chef to update each order's status to 'Accepted', 'In Progress', or 'Rejected'.

7 Outcome and Results

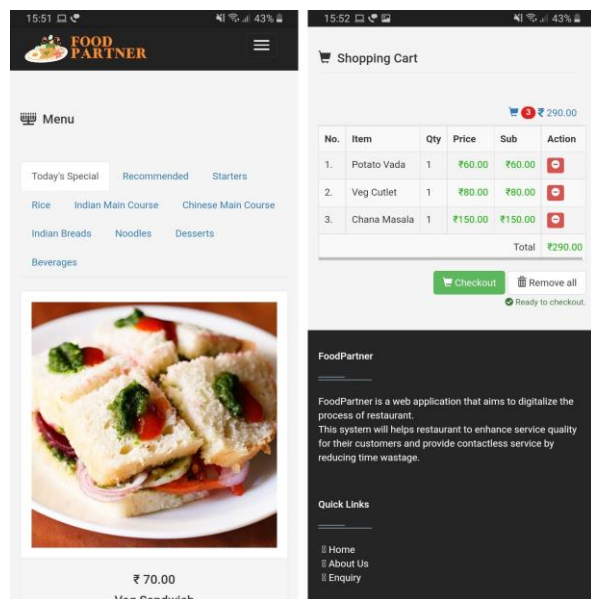


Figure 4. Smart Menu and cart view

he can see the menu, including today's special, recommended dishes, and various dishes sorted by category. On this page, the customer can view each dish details and put them in the cart.

The order is sent to the chef for confirmation, and the customer is notified after confirmation. The customer then reviews the final bill and makes payment. Upon completing the payment part, the customer receives a notification on their registered WhatsApp number, after which they can then submit their feedback.

In the Manager dashboard, the manager can see various analysis data, such as the number of customers present and revenues today. They are notified of any incoming orders, and they can view all sales data including past orders. They can also download these data as PDFs or CSVs. This dashboard is built using technologies like PHP and various data visualization libraries, including CanvaJs and High-Charts Js.

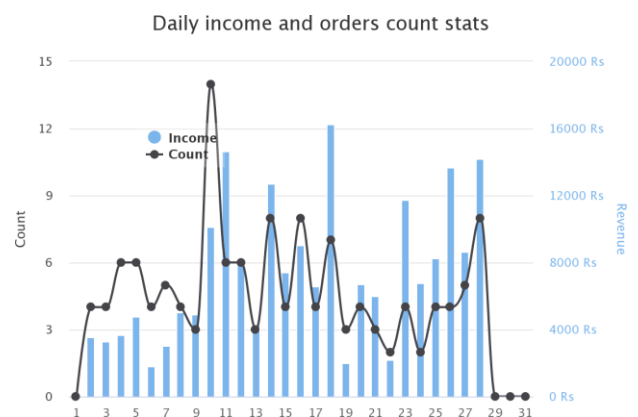


Figure 5. Daily Revenue and order count

The customer lands on the index page as shown in Fig. 4, after scanning the QR code placed on the table where

Manager dashboard includes various graph based on sales data like date-wise/monthly revenue is shown with a bar chart, the orders count is shown with a line graph, the new-customers ratio and top-selling products are shown with a pie chart, and the current date order details are shown with a bubble graph. This dashboard is built using technologies like PHP and various data visualization libraries, including CanvaJs and HighCharts Js.

An example of this is seen in Fig. 5, where the bar graph shows the revenue generated on a daily basis and the line graph shows the order count on that day. This information allows the manager to analyze revenue generation and the frequency of orders being placed in the restaurant.

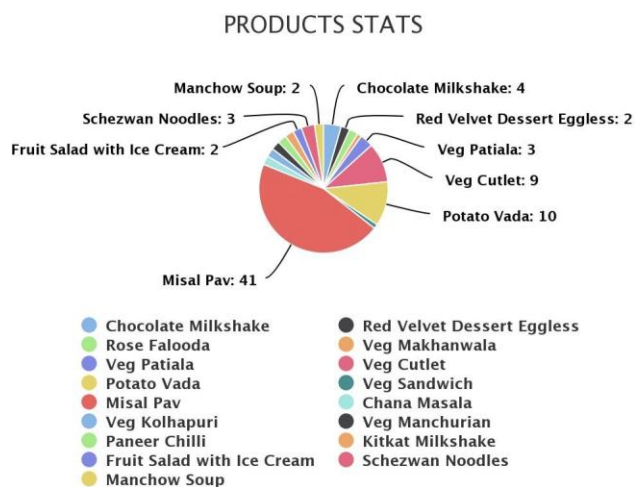


Figure 6. Product Stats

The pie chart in Fig. 6 shows the sales of dishes in the restaurant in real time. This information helps the restaurant manager to identify the most popular dishes for customers to order. Manager can also view this in full screen mode and even download it in form of report.

Manager can also see the count of new customer coming to restaurant on that specific day. Also the manager can view the order details of specific day.

Copy	Excel	PDF	Column visibility	Search:	
CustomerID	OrderID	Table No.	Payment Status	Action	
#33	#115	7	Pending	view Bill	
#33	#113	3	✓MOJO2127305A01973666	view Bill	
#33	#112	3	✓MOJO2127505A01973664	view Bill	
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#33	#104	4	✓MOJO2125G05A11774199	view Bill	

Figure 7. Bill History view

Fig. 7 represents the bill history where all the order details are present along with its payment status. Manager

can view each detail order, can also delete them if they want and can also download these data as reports in PDF and CSV format.

8 Conclusion

The proposed system provides an easy, convenient, and low-cost method for ordering meals with a contactless dining experience. By encouraging no-contact interaction and personal hygiene, restaurants can lower their risk of transmitting viruses. As a result, diners who find that hygiene and safety standards are satisfactory are more likely to become repeat diners. Such repeat diners promote restaurants for their value to customers, ultimately improving the goodwill of the restaurant. Furthermore, contactless dining helps improve order accuracy, preventing miscommunication between staff and diners. This allows diners to focus on food, ambiance, and service. Machine learning can be applied to gathered data to make food recommendations and boost restaurant revenue. In the restaurant business, data analysis is essential for increasing income and sales. During rush hours, the restaurant load would be balanced effectively, and customer service would be better than usual. By including reservation and take-away features, restaurants can improve even further. Thus, investing in a contactless dining solution will not only provide a safer dining experience in the short term but also position the restaurant to meet changing consumer behavior in the future.

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FoodPartner Report 01

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