

# **QR BASED ORDERING IN RESTAURANTS**

## **Project Report**

**Submitted in partial fulfilment of the requirements for the award of**

**degree of  
Bachelor of Technology  
In**

**COMPUTER SCIENCE AND ENGINEERING**

**By**

**R.J.R.LAKSHMI 17K61A0590**

**S.YAMINI 17K61A0597**

**D.ROHIT 17K61A0522**

**L.R.M.ASRITHA 17K61A05E7**

**Under the esteemed guidance of**

**Dr. K. SUBHASH BHAGAVAN, Ph.D,**

**Associate Professor**



**sasi** INSTITUTE OF  
autonomous TECHNOLOGY &  
ENGINEERING

Accredited by **NAAC** with **"A"** Grade,  
Recognised by **UGC** under section 2(f) & 12(B)  
Approved by **AICTE** - New Delhi  
Permanently Affiliated to **JNTUK, SBTET,**  
Ranked as **"A"** Grade by Govt. of A.P.,

**Department of Computer Science and Engineering  
SASI INSTITUTE OF TECHNOLOGY & ENGINEERING**

(Approved by AICTE, New Delhi, Permanently Affiliated to JNTUK, Kakinada and  
SBTET - Hyderabad, Accredited by NAAC with 'A' Grade and NBA, Ranked as "A"  
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**Kadakatla, TADEPALLIGUDEM– 534 101**

**ACADEMIC YEAR 2020-2021**

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**PO1.Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

**PO2.Problem Analysis:** Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

**PO3.Design/ Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

**PO4. Conduct investigations of complex problems** using research based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

**PO5.Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

**PO6.The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

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**PO8.Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

**PO9. Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

**PO10.Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

**PO11.Life-long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

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**PSO2.Cloud Services:** To deploy virtualized and cloud based services in the organization.

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**PEO3:** Graduates will have the technical, communication skills and character that will prepare them for technical and leadership roles.

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**CO2.** Collect and Generate ideas through literature surveys on current research areas which help to analyze and present to impart knowledge in different fields.

**CO3.** Impart knowledge on software & hardware to meet industry perspective needs and standards.

**CO4.** Create interest to carry out research on innovative ideas as a lifelong learning.

**CO5.** Ability to work with a team, and enrich presentation and communication skills.

**CO6.** Create a platform that makes students employable.

# **EXPECTED OUTCOMES**

## **PROGRAM OUTCOMES (POs)**

PO1: Engineering Knowledge

PO2: Problem Analysis

PO3: Design/Development of Solutions

PO4: Conduct investigation of complex problems

PO5: Modern Tool Usage

PO6: The Engineer and Society

PO7: Environment and Sustainability

PO8: Ethics

PO9: Individual Team Work

PO10: Communication

PO 11: Life-long Learning

PO12: Project Management and Finance

## **CERTIFICATE**

*This is to certify that the project work entitled “**QR BASED ORDERING IN RESTAURANTS**” is being submitted by **R.J.R.Lakshmi (17K61A0590)**, **S.Yamini (17K61A0597)**, **D.Rohit (17K61A0522)**, **L.R.M.Asritha (17K61A05E7)** in partial fulfilment for the award of the degree of **BACHELOR OF TECHNOLOGY**, in Computer Science and Engineering to Jawaharlal Nehru Technological University, Kakinada during the academic year 2020 to 2021 is a record of bonafide work carried out by them under my/our guidance and supervision. The results presented in this thesis have been verified and are found to be satisfactory. The results embodied in this thesis have not been submitted to any other University or Institute for the award of any other degree or diploma.*

**Project Supervisor**

**Dr. K. Subhash Bhagavan**

**Associate Professor**

**Dept. of CSE**

**Head of Department**

**Dr. M. V. S. S. Nagendranath**

**Associate Professor & HOD**

**Dept. of CSE**

**External Examiner**

## **DECLARATION BY THE CANDIDATES**

We **R.J.R.Lakshmi (17K61A0590)**, **S.Yamini (17K61A0597)**, **D.Rohit (17K61A0522)**, **L.R.M.Asritha (17K61A05E7)**, hereby declare the project report entitled “**QR BASED ORDERING IN RESTAURANTS**” under esteemed supervision of **Dr.K.Subhash Bhagavan**, is submitted in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in Computer Science & Engineering. This is a record of work carried out by us and the results embodied in this project have not been reproduced or copied from any source. The results embodied in this project report have not been submitted to any other University or Institute for the award of any other degree or diploma.

R. J. R. Lakshmi (17K61A0590)

S. Yamini (17K61A0597)

D. Rohit (17K61A0522)

L. R. M. Asritha (17K61A05E7)



## **ABSTRACT**

When customers enter the restaurant, customers often must wait for the waiter when it comes to ordering food. In the conventional method, if the restaurant is too crowded, they will be exhausted, anxious about the service. This system perfects the solution, “QR Based Ordering In Restaurants” provides cost & time efficiency benefits easy for management and the customer. Each table contains the QR Code stand where customers need to scan the QR Code using their mobile phones and they can view the menu. On the manager's side we have created a web application which is connected to the router to manage the whole functionalities of the restaurant. The system works on an intranet environment which provides additional security. With our restaurant ordering system, it helps us adapt to the digital era and restaurant activities more effectively and efficiently.

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R. J. R. Lakshmi (17K61A0590)

S. Yamini (17K61A0597)

D. Rohit (17K61A0522)

L. R. M. Asritha (17K61A05E7)

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# Chapter 1

## INTRODUCTION

### PREAMBLE

#### Domain: Web Application

Millions of businesses use the Internet as a way to save money. It allows them to share information about their target market and create fast, secure transactions. However, effective engagement is only possible when the entity can capture and store all the required information and has the means to process this information and present the results to the user.

Web applications are often coded in browser-support languages such as JavaScript and HTML as these languages rely on the browser to make the program work. Some of the applications are powerful, requiring server-side processing. Some are completely free without the required processing on the server.

A web application requires a web server to manage requests from a client, an application server to perform requested tasks, and, in some cases, a database to store data.

Web applications usually have short development cycles and can be done in small development groups. Most Web applications are written in JavaScript, HTML5, or Cascading Style Sheets (CSS). Client side programs use these languages, which help build the front-end of applications. The server-side program is designed to create scripts for use by the Web application. Languages such as Python, Java, and Ruby are commonly used in server-side applications

#### Here's what the standard web application flow looks like:

The **user** launches the application on the **web server** via the **Internet**, either through a web browser or the application interface

1. The **web server** redirects this request to the appropriate **web application server**

3. The **Web application server** performs the requested task - such as requesting a **database** or processing data - and then generates the requested data results
4. The **web application server** sends results to the **webserver** with the requested information or processed information
5. The **Web server** responds to the client with the requested information that appears on the user interface

**The web app has many benefits, including:**

- You do not need to install it on a hard drive, so it does not cause space constraints.
- It requires little support and care from the business and reduces the technical requirements from the user's computer.
- The web application reduces the **end-user** and business costs.
- Web applications are always up to date because updates are used in the middle.
- You can access web applications anywhere with a web browser.

## **1.1 PROBLEM STATEMENT**

Nowadays, all programs are controlled by a computer. And all business transactions, payment systems, inventory systems are managed by information and communication technology (ICT). The rapid growth of knowledge and information and communication technology (ICT) has had a significant impact on business transactions. With the increasing use of communication technology, the emergence of wireless technology and android devices has created quite a movement in business sales. The rapid growth of wireless telecommunications and the leading network industries are gaining more and more customers every day. Providing instant services to customers within a short period as well as reducing human effort is the goal of all computer programs. Restaurants should provide quality services and maintain relationships with their customers to survive this competition. Any order of food at the restaurant was a completely booked process when you waited. you take the order from customers you have to write the order on paper and put it on the computer. The order is then delivered to the kitchen, bringing food and making a bill. Although the current system is simple it takes a lot of time as the waiter keeps going to and from customers. It also requires investment in the purchase and storage of paper and consumes a lot of paper. Great power is also needed and is inclined toward man's mistakes and a lot of time.

One of the biggest challenges for many businesses based on customer orders, product preparation, and customer delivery is the time for order delivery registration. Reducing this time will lead to customer satisfaction and as a result will improve the business. Currently, this cycle in our country operates traditionally in restaurants. This means that after the customer has settled the table, the waiter submits a list of products and returns a few minutes later to receive the order. If the customer is not specified, the waiter must return after the deadline to receive the order (some restaurants place customer orders themselves which is annoying). After receiving the order and forwarding it to the food staff, the customer must wait accordingly for the time required to prepare the order. Order preparation time is very important in terms of management because it is directly related to customer satisfaction. After the order is ready, the waiter takes it to the customer's table. After the meal, the customer turns to the wallet to pay off the debt and ends the business cycle.

Also, there are difficulties in providing appropriate and updated food information. For example, if the supplier does not supply "Prawns" recently. The staff has to remember and inform consumers that all food that contains "Prawns" is not available. But most of the time, the staff may forget this unexpected information due to the heavy workload. Hence, it may reduce the rate of satisfaction to the consumers after they have to make a decision but in the end, the restaurant does not serve them accordingly.

## **1.2 OBJECTIVE OF THE PROJECT**

### **1.2.1 Provide convenience for both customers and owners**

The system will provide an experience of convenience to the restaurant employees while they are on duty as well as the consumer who dine-in at the restaurant. This system allows the staff to serve customers with the minimal delay compared to the paper based order system, because what the staff need to do is just record down the food that the customer wishes to order then the staff place an order via the computer, the food order will be sent to the kitchen computer simultaneously. After the order has been successfully placed one copy of the food order with its details will be printed out for customer review.

It significantly shortens the time needed to take an order, assuming that the kitchen area is on the ground floor but currently the staff is taking orders on the second floor. If the restaurant is using a paper based system, the staff has to deliver the food order to the ground floor and walk all the way back to the second floor, it takes a lot of time and time consuming. Therefore, by using this system it can eliminate this minor section of the order taking process. Besides, it can let consumers enjoy their meals within a short period of time and thus it can increase the satisfaction and turnover rate of the consumers.

### **1.2.2 Prevention of food serves not in sequence**

This objective will be achieved because whenever waiters place an order into the system, the system will schedule the food order details in a queue then the chef will prepare the food according to the food order queue. In a paper based system, the employee will deliver the food order ticket into the kitchen and the chef will cook whatever foods that are recorded on the paper, due to the order details are recorded on each and different pieces of paper it is very troublesome and possible to leads the chef to cook food without following the order sequence. Hence, when the employee serves food to consumers without sequence it will cause consumers to be unhappy and dissatisfied and it will affect the image and reputation of the restaurant. Therefore, the system can help prevent this kind of incident from happening.

### **1.2.3 Simplify the ordering and bill payment systems**

In this system, the customer must scan the QR code printed on the table using his Smartphone's camera or a QR Code Reader. As he scans the code he will be redirected to the restaurant's webpage, where he will see the menu available in the restaurant with their prices. The customer must click on the order button of the menu that he wishes to order. After this, the order will be placed and it will be displayed on the screen in the kitchen with the table numbers. So that the ordering for customers is simplified and then he can also pay the bill immediately or after the order is received through the same portal so that the customer need not wait at the queue in the restaurant in rush hours.

#### **1.2.4 To reduce food wastage and increase average order value for restaurants.**

Through this method the customers order in an efficient manner and it leads to increase in customers and for the efficient service the average order value can be higher. From the insights and orders, what is popularly ordered and what is not can be known so that the restaurant can lower the production for unpopular one and thus lead to a lower food wastage.

### **1.3 METHODOLOGY**

The system used in some restaurants that allow customers to order with QR code using smartphones is limited to electronic menu viewing and registration of orders. But in the proposed model of this article based on the same QR code technology, many services are available to customers in addition to the previous options. In the proposed model, in addition to menu view and order, the system calculates prices and sends the bill to the customer's smartphone and a link to the bank portal for the customer to pay the bill electronically. However, the time between order and delivery is very important in terms of management. This program can provide exciting entertainment for customers at this time. Using this app is also great for remote ordering. The percentage of errors in food delivery at home can be zero if the database includes customers ordering food at home or work. This method can be used in conjunction with the traditional method of ordering food and delivering without arguing with each other. There must be hardware and software to implement this model; the infrastructure is as follows:

#### **Software infrastructure:**

- Specially designed system
- Database of the restaurant menu along with food ingredients, picture, and price
- Internal network or the internet to access a bank portal and bill payment

#### **Hardware infrastructure:**

- A smartphone equipped with QR code scanner software
- QR label specified for each table.

A special QR label is attached to each table. After settling in, the customer is connected to a special-order system at this table directly by his smartphone and uses QR code reading software. In this system, the customer can see all available products as well as price and product descriptions. The customer selects the food they want and enters their phone number and clicks below the order registration. After receiving the full order with the order table number from the central system, the person in charge of the system prepares the order and the waiter delivers the customer's food to the customer.

#### **1.4 SIGNIFICANCE OF THE WORK**

The QR code menu enables customers to view the digital food menu and order without physically touching any paper menu. Simply, scanning a QR code makes ordering faster. With the payment of the QR code, the need to exchange a credit card or bank or cash is eliminated which makes the payment less effective especially during COVID-19 when people are accustomed to communicating with people and non-contact has become commonplace.

Customers automatically browse the menu and place their orders individually so there is no chance of an error in the order. The order is controlled by the customer so there is no worry about the suspicion game because the customer chooses how they want to be eaten or delivered to them.

The Smart Restaurant system is compared to traditional methods such as the Pen & Paper method and PDA-based system. This will eliminate the manual process of ordering food and reduce the number of restaurant workers to save labour costs significantly. In the future, an order system can be developed and become a system to detect speech order. The user can simply say what they want and the computer will automatically order.

Our project "QR based ordering in restaurants" aims to enhance the customer dining experience by strengthening existing dining services and simplifying the ordering and billing of payment systems to reduce the workload of restaurant and hotel owners. With Smartphones, a customer can scan a QR code placed on a table, and then open the current menu to order food. After ordering, a notification will be sent to the kitchen and cashier along with the table number. The current menu and offers will be updated in this menu.

The presence of each component was considered and placed with great care, thus contributing to the efficient and effective operation of the fence. This program will help reduce customer waiting time at the restaurant. It will also reduce the manual service provided to waiters and staff, and eliminate human error.

## **1.5 ORGANISATION OF THE REPORT**

This report is divided into seven chapters.

Chapter 1- This chapter contains the introduction, problem statement, aim of the project, methodology, significance of the work, and conclusion.

Chapter 2- This chapter contains a literature review and comparison of various techniques.

Chapter 3-This chapter contains tools, Software requirements and Hardware requirements.

Chapter 4-This chapter contains architecture, use case, class, behavior, implementation and data flow diagrams.

Chapter 5-This chapter contains proposed methodology and proposed methodology modules.

Chapter 6-This chapter contains software testing, types of testing, test cases and conclusion.

Chapter 7-This chapter contains result comparison and applications.

## **1.6 CONCLUSION**

In this chapter, we discussed the introduction, problem statement, objective of the project, methodology, and significance of the work. The proposed system provides a low-cost, efficient, convenient, and easy to use the system for ordering food in hotels and restaurants. Nowadays people are very familiar with touch screen interfaces because of greater advancements in the field of technology. It will be easy for the users to navigate through the web pages by simply touching the display screen. The chances of errors

happening are reduced and updating of the menu and its prices can be done easily. It will be more comfortable and easier for the customers to place orders of their wishes. This system is user-friendly and also ensures a good quality of service and customer satisfaction.



## **Chapter 2**

### **LITERATURE REVIEW**

#### **PREAMBLE**

The previous chapter gives a brief introduction to the project and the scope of work. We have discussed problem statements, objectives of the project, methodology, significance of the work carried out in the project. We have also provided the organization of the whole report in chapter 1. This chapter gives a brief introduction to the literature review done related to the topic of our work. This chapter provides a brief review of various existing approaches discussed in the earlier research works. We have discussed the various research papers and journals with their merits, demerits, and proposed methods in this chapter.

#### **2.1 RELATED TOPIC OF LITERATURE REVIEW**

The traditional way of ordering menu cards is paper-based. Waiters normally use paper & pen to write the order of customers. The records are stored on paper. As they have used paper-based menu cards, if they want to make any changes to that menu card, they need to print and get the updated menu card as the earlier one was of no use. It needs re-printing of all the menu cards. The customer doesn't get honest service then he needs to call the waiter several times till he responds, and this leads to dissatisfaction for the customer. As you have not entertained correctly, this creates confusion between the customer and the waiter as he notes down the order and could serve the customer with the wrong dish or another customer's dish.

In this paper [1] The proposed method is to develop and implement a fully automated restaurant menu. Each table is fitted with a touch screen. The touch screen will act as a menu card that lists all restaurant items as well as the quantity of food and it displays the bill. The user can choose the Multi-Language option, enhance the interaction, and guide the customer. Then the order from the touch screen menu list is displayed which is put by the customer and the total amount is automatically determined

from the contact screen list. The RF transceiver links the kitchen to the counter of the cashier. The buzzer will signal when the customer sends a new order to the kitchen. Then the order shown on the LCD along with the number of the customer table and the quantity of the food items is taken by the microcontroller at the receiver section. Then by checking the QR code and then payment message sent to the manager, then the customer pays the bill.

In this paper [2] the proposed system is to develop an android application using an android studio that allows the person to choose the table and after that, the menu is displayed on the mobile screen along with the price of every food item in the menu. Customers can also provide the quantity required through the application itself. The database is recorded in the dataset based on the table number selected by the customer. When the customer sends an order, then the order will first reach the machine at the counter. Then the order will be displayed and simultaneously transmitted for display at the monitor in the kitchen. And the same is passed for billing at the customer tablet. Thus, the system presents an automated food ordering with real-time customer feedback.

In this paper [3] The proposed system presents an automated food ordering system with real-time customer feedback. In this system customers first order the food by using an android based touchpad. Then the order is further carried to the kitchen for fulfilling the order and then the bill is generated on the customer's touchpad. This system is improving the performance of the restaurant's staff. It provides the quality of service and customer satisfaction. The overall conclusion is that this is a fantastic food ordering system for the restaurant sector, made by combining Android and Wireless technology.

In this paper [4] the PIR sensor detects the person's infrared radiation after the customer goes to the table. Then the supply will turn on and then the LCD will show a welcome message on the LCD. To order the food items keypad is there. The food items which were ordered by the person will be displayed on the LCD system. After ordering the food items then that message will be sent to the chef with the help of a Bluetooth connection. The order will be fast and there is no need to waste time in the restaurants. After the food is delivered the quality of the food is tested by using an mq3 sensor then it will show the quality of the food if the food is bad we can return it and if it is good means

the customer can eat the food and after completion of eating food, it will display the bill of the food items.

In this paper [5] The main objective is to automate the process of ordering food thus eliminating the need for any waiter to take the orders. The customer who enters the restaurant needs to install the restaurant's app on their phone which can be downloaded by scanning a QR code in the restaurant. The user needs to sign up or sign in to the app by connecting to the restaurant Wi-Fi. The entire menu will be available on the app of the user from which the user can select the dishes they want. Once the order is placed, then that order will be displayed on a screen inside the kitchen. The kitchen staff who decided to attend to this order will select the order. After the assignment of the order to a particular staff, the customer will get a confirmation update about the chef's name and order status along with the option to view their order getting prepared through the kitchen cameras. Once the order has been prepared, based on the restaurant's policy, the customers can either have it picked up from the serving window (if it's a self-service restaurant) or a waiter can serve it.

In this paper [6] the aim is to develop a user-friendly matrix keypad-based menu card that will be placed on each and every table at the customer side. Then the customer will need to select the menu items by pressing on the items displayed on LCD. Then the order is received by the kitchen section by using the conveyor belt and then the ordered items will be supplied to the customer. After the whole order is placed, the bill is displayed on the LCD screen which was placed on the customer's table.

In this paper [7] The food ordering system is proposed with the use of a touch screen device placed on each table which is used to make an order at the restaurant. This system uses an LCD display module which is placed on each customer's table for them to make orders. Order is made by the customer by selecting the items displayed on LCD. The order will be sent to the kitchen section using Bluetooth communication, and then it will be displayed on a screen in the kitchen. The bill will be displayed with the table number in the billing section.

In this paper [8] The customer will scan the QR Code which is placed on the table. Then the customer will be redirected to the ordering site and may choose the order

from the menu. The menu indicates the quantity of the customer's order and the customer must click the "add to cart" option to complete the order. The app will show if the order is successfully added to the cart. If the notification of the successful ordering does not pop up, then the order is not added to the cart. When the customer accesses their cart, it will show the summary of their order. When a customer is ready to submit an order, he then clicks "Submit Additional Order". The system will ask for confirmation since customers are not allowed to cancel their orders once submitted. These orders will be received by kitchen staff. Upon sending customer orders, the kitchen staff can be notified by the system as to the table number, order quality, and descriptions. Once the orders are completed, the kitchen staff will notify the waiter through the app. Then the customer may use the app in viewing his bill for payment. The cashier can print an Official Receipt if the customer wants a copy.

In this paper [9] After the arrival of a customer in a restaurant then the customer selects the information and menu from the tablet then this order is sent to the system over a wireless network. Then the restaurant manager or owner and the kitchen staff will receive the ordered lists from the customer tablet or system. Then the restaurant owner can update the order status into the system and the customer can also view the order status and he has authority to cancel the order. The application will be installed and kept open on the tablet on the tables. Customer who is outside the restaurant will book a table in the restaurant or give orders from his smartphone. The customers may not be able to turn off the application and do any other work on the tablets. After having the food, customers can make payment and enter feedback regarding that restaurant system facility and services.

In this paper [10] an automated touch based digital smart system is proposed in this paper to manage the overall food ordering and serving process. The following section explains the development of a digital smart system using wireless technology for communication with a centralized database for record and an android application for placing orders with no more waiting for waiters. The aim is to save customers time by providing facilities like vacancy list at reception, digital food ordering.

In this paper [11] The proposed system permits customers to decide on their desired food via the menu shown on the screen of Tab. The choices created by the customer will be sent to a kitchen assistant. The digital menu can merely offer three operations i.e. menu, food ordered, ensure. If the menu is selected, it'll move to the food menu screen, customers will choose the sort of food they need to order, that's food(Veg. or Non-Veg.), dessert, drinks, etc. Once an item is clicked, the photos and outline of the food are shown. Customers will be ready to opt for everything they need and choose. The ensure screen can start up to repeat what they ordered. They'll be needed to press the confirmation button and the list of the food they ordered is sent to the kitchen.

In this paper [12] The proposed system the customer must scan the QR code printed on the table using his Smartphone's camera or a QR Code Reader. As he scans the code he will be redirected to the restaurant's webpage through their Wi-Fi network, where he will see the menu available in the restaurant with their prices. The customer must click on the buy button of the menu that he wishes to order. After this, the order will be placed and it will be displayed on the screen in the kitchen with the table numbers. The webpage will also consist of a feedback section where the customers can express their views about the food and the restaurant. The overall conclusion is that this is a fabulous system for the restaurant sector, made by combining the QR code and Wireless technology.

In this paper [13] In the proposed model, additionally, to view the menu and order using QR code, the system calculates the costs and sends the bill to the customer's smartphone in conjunction with the associated link to the bank portal in order that the customer will pay the bill electronically. The processing method of ordering in restaurants will increase efficiency and reduce energy and time supported QR code without the requirement to the presence of a waiter at the table by eliminating some stages of traditional ordering.

In this paper [14] The proposed system discusses a mobile application that can work primarily with QR code and Geo-fencing technique. The concept is that each section of the menu is QR code enabled when a customer is in the restaurant and wants to know more about a particular dish or food item, then the customer can avail this

information by scanning the QR code of that section in the menu. The information from farm to table will be provided to customers in their mobile application while a successful scan of the QR code. This will facilitate customers to pick a specific food item as per their health and at the exact same time if the customer is registered then the user may additionally get notified on their menu selection based on their previous order/taste/interest. Geo-fencing will be served to the customer to get notification when they are around the restaurant area. This may facilitate customer engagement with the restaurant.

In this paper [15] The proposed method is that the customer will scan the QR code that is already on the table, and open this menu to order the food. Upon ordering, the notifications are delivered to the kitchen and additionally the cashier with the table number. This menu offers square measure aiming to be updated on this menu. The Robot can deliver food. This method ensures time and customer satisfaction with Restaurant. This technique can facilitate in reducing the waiting time of customers within the restaurant. It also reduces the manual service, and additionally eliminates the human-made mistakes.

In this paper [16] The Android food ordering system makes it easy for people to order food as they want, the prices are also shown over the screen as a menu card. This order is printed and given in a kitchen room where the prepared food is supplied as per the order by the waiter to the corresponding table. The hotel staff members can read the items from the bill. If the food is ready in the kitchen which can be indicated to the corresponding table. It makes an advantage in reducing working staff and it will be a time-effective process.

In this paper [17] This restaurant automation ordering system is an alternative option in present situations like covid which avoids contact with people and also helps in the maintenance of restaurants with low working staff which makes it more economical. The system is reducing the manual and human efforts, and also it provides more accurate results. This system provides billing with high precision and it is available at low maintenance cost which can be installed in low range and medium range restaurants too. And it proves that it is the most cost-effective and time-effective technology in restaurants.

In this paper[18] This project consists of a touch screen method and programmed by C language.For the restaurant information HTML pages are being used.For online payment Paypal Android Application is being used and meal is served by a robot This system provide feature to customers to order food touch screen LCD module which is placed in every table, and it is wirelessly connected to the cash counter and the kitchen via RF module.Robot will carry the meal and serve to the customers.This restaurant implements touch screen and robotic technology and paypal application for the online payment.The proposed restaurant intensely enhances the speed and reliability of order fulfillment.while taking the orders from the digital screen to avoid wastage of papers and reducing the printing of the menu card.With this the customer can order what he needs,and the customer can take his own time to order.

In this paper [19] The proposed system discusses the growing technology and hardware components being used to develop this project.In this Advanced IC's and new technology with highly advanced components are successfully implemented in this project.The customers can easily interact with the wireless technology which is been designed and tested.The system can also be implemented with Graphical LCD for displaying the menu as we have used android phone.This system is delicate and complicated to handle because each table going to consist such a method for ordering.

In this paper [20] In the proposed model, they are using smartphones or tablets to provide an interface for customers to order the menu.In this model customers use a private login system to view,order and receive updates in real time and collect receipts right from the device which they had logged into. In this it allows customers to navigate the places and also it allows restaurant owners to manage orders from customers immediately whenever he or she logs in into the system.using smartphones shows the capabilities of wireless communication and smartphone phone technology in fulfilling and improving service delivery. This system is convenient, effective and easy so that it improves the performance of restaurant's staff.

**Table 2.1 Comparison of Literature Review**

<b>S.No</b>	<b>Author and Year</b>	<b>Proposed Methodology</b>	<b>Merits</b>	<b>Demerits</b>
1	M. Kousalya, E. Lakshi,R.K. Mukesh Kanna , G. Pravin , T. Prabhu, 2021.	The proposed method is each table is fitted with a touch screen. The touch screen will act as a menu card that lists all restaurant items as well as the quantity of food and it displays the bill. The buzzer will signal when the customer sends a new order to the kitchen. Then the order shown on the LCD along with the number of the customer table. Then by checking the QR code and then payment message sent to the manager, then the customer pays the bill.	Easy to use and user-friendly	The customer needs to pay the bill separately using QR code.
2	Nimesh Tembhekar , Pragati Singh, Ayush Mate , Kunjal Gurve , Prof.Mrunmaye e Rahate,	In this system the customer first orders the food from the touchpad looking at various combinations of food that is further carried to the kitchen for fulfilling the order. Then the same is	It will provide quality of service and customer satisfaction.	There is no facility of online payment.



	2020.	passed for the bill at the customer's tablet. Thus, the system presents an automated food ordering with real time customer feedback.		
3	Pragati Singh, Nimesh Tembhekar, Kunjal Gurve, Prof.Mrunmayee Rahate, 2020.	In this system customers first order the food by using an android based touchpad. Then the order is further carried to the kitchen for fulfilling the order and then the bill is generated on the customer's touchpad.	This system will help to reduce the cost of labor and errors.	Customer needs to install the android application.
4	D.Priyanka, P.Prathyusha, Ch.Tejaswini, D. Vishal Vardhan, Ch.Rajendra Prasad, 2020.	In this the PIR sensor detects the person's infrared radiation after the customer goes to the table. Then the supply will turn on and then the LCD will show a welcome message on the LCD. To order the food items keypad is there. The food items which were ordered by the person will be displayed on the LCD system. After ordering the	The customer can save their time and they can eat safe and hygienic food.	It requires an LCD screen to display the menu at each and every table.

		<p>food items then that message will be sent to the chef with the help of a Bluetooth connection. After completion of eating food, it will display the bill of the food items.</p>		
5	Utkarsh Ravekar, Shashank Singh,2019.	<p>The customer who enters the restaurant needs to install the restaurant's app on their phone which can be downloaded by scanning a QR code in the restaurant. The user needs to sign up or sign in to the app by connecting to the restaurant Wi-Fi. The entire menu will be available on the app of the user from which the user can select the dishes they want. Once the order is placed, then that order will be displayed on a screen inside the kitchen. Once the order has been prepared, based on the restaurant's policy, the customers can either have it picked up from the serving window (if</p>	<p>It provides real-time status updates about their orders to the customers .</p>	<p>Customer needs to install an android application and pay the bill manually.</p>

		it's a self-service restaurant) or a waiter can serve it.		
6	Shreya Umap, Shiwani Surode, Prajakta Kshirsagar , Manjusha Binekar, Prof. Nakul Nagpa, 2018.	Then the customer will need to select the menu items by pressing on the items displayed on LCD. Then the order is received by the kitchen section by using the conveyor belt and then the ordered items will be supplied to the customer. After completion of eating food the bill is displayed on the screen.	This system will help in reducing the waiting time of customers in the restaurants.	It needs a touch screen on every table and there is no facility of online payment.
7	Mrs. Anisha Cotta, Miss. Naik Trupti Devidas, Miss. Alvira Dias, Miss. Sawant Nidhi Kalidas, 2016.	This system uses an LCD display module which is placed on each customer's table for them to make orders. Order is made by the customer by selecting the items displayed on LCD. The order will be sent to the kitchen section using Bluetooth communication, and then it will be displayed on a screen in the kitchen. The bill will be displayed	It will reduce the time spent on making the orders, whereby the cost and man power also can be reduced.	It needs a touch screen to display the menu on every table.

		with the table number in the billing section.		
8	Grace Lorraine pIntal,Jan Daryll Payas, Louise Mae Fernandez,Blan ca Marie Domingo, 2020.	The customer will scan the QR Code which is placed on the table. Then the customer will be redirected to the ordering site and may choose the order from the menu. The menu indicates the quantity of the customer's order and the customer must click the "add to cart" option to complete the order. The app will show if the order is successfully added to the cart. When a customer is ready to submit an order, he then clicks "Submit Additional Order". These orders will be received by kitchen staff. Once the orders are completed, the kitchen staff will notify the waiter through the app. Then the customer may use the app in viewing his bill for payment.	It improve the service quality of a casual fine dining restaurant in terms of fast ordering.	There is no facility of online payment.

9	Priya Jadhav, Priyanka Teli, Snehal Korade, Varsha Chavan, 2015.	After the arrival of a customer in a restaurant then the customer selects the information and menu from the tablet then this order is sent to the system over a wireless network. Then the restaurant manager or owner and the kitchen staff will receive the ordered lists from the customer tablet or system. After having the food, customers can make payment .	It improves efficiency and accuracy for restaurants by saving time, reducing human efforts.	It requires touch screens on every table and to install android applications.
10	Kunal P. Gundle, Anuja A. Harshe, Kajol B. Kinage, Niraj L.Ghanawat, 2016	an automated touch based digital smart system is proposed in this paper to manage the overall food ordering and serving process. The following section explains the development of a digital smart system using wireless technology for communication with a centralized database for record and an android application for placing	This system provides efficiency and accuracy with cost effectiveness for restaurants.	There is no online payment facility.

		orders with no more waiting for waiters.		
11	Akash Patil, Rinkesh Kalani,Bhavesh Patil,Sachin Shinde, Prof. S. M. Shedole, 2017	In this system customers first order the food by using an android based touchpad. Then the order is further carried to the kitchen for fulfilling the order and then the bill is generated on the customer's touchpad.	This system will help to reduce the cost of labor and errors.	Customer needs to install the android application.
12	Shraddha S. Dhoke, Tanvi K. Mhatre, Prof. Prashant H. Rathod, 2017.	The customer at the table must scan the QR Code which will redirect him to the restaurant web page where he can view the menu and order his desired food. The order will be transmitted to the kitchen screen with the table number, the chef will view the order, prepare and send it to the table.	This method helps the management to know customers order details in few seconds.	There is no facility of online payment,the customers need to pay the bill manually.
13	Dr.B.Shadakshr appa, Kotra Chaithanya, Suresh.J,	In the proposed model, in addition to viewing the menu and ordering, the system calculates the prices	prevent errors in billing.	The QR code needs to be changed every time, if there

	Mahesh R, Deepak Kumar 2018.	and sends the bill to the customer's smartphone along with the connection link to the bank portal so that the customer can pay the bill electronically.		is any update of the menu item or price and this is the major problem here.
14	Diogo Davidson Albuquerque, Vinod Kumar Shukla,Amit Verma,Sanjay Kumar Tyagi,Purushm Sharma, 2020.	The proposed method is that mobile application, which can work with QR code technology and in a coordinated manner with Geo-Fencing technology,Which will enhance the guest experience.	It is a user-friendly and affordable technology.	The major disadvantages of the technology are the privacy issue and the service is only activated once the user allows it on his phone to consume more battery and disclose the details.
15	Syed Ramees C R, Sreerag M,Urmila Pillai L V,Anjaly A J,Abitha Abbas,	The proposed method is that using smartphones, the customer will scan the QR code that is about on the table, and open the menu to	It reduce the time spent on making the orders.	In this method the customer's need to pay the bill manually.

	2020.	order the food. Upon ordering, the notification will be delivered to the kitchen and the cashier on with the table number. The current menu and offers are updated on this menu. The Robot will deliver food.		
16	Renjith V Ravi, Amrutha N R, Amritha E,Haneena.P,Jaseena.T,2019.	The proposed method is that using smartphones customers can order easily. By using a thermal printer taken bill which is given to the kitchen.The ordered food can be supplied by the waiter.	The main advantage of this project is that, it can reduce the number of working staff and handwritten menu by the waiter can be replaced by touch screen.	In this there is no need to install any android application for the bill payment.
17	Syed Viquar Ahmed,V. Taj Kiran, 2019	In this system the customer first orders the food from the touchpad looking at various combinations of food that is further carried to the kitchen for fulfilling the	It will provide quality of service and customer satisfaction.	There is no facility of online payment.



		order. Then the same is passed for the bill at the customer's tablet. Thus, the system presents an automated food ordering with real time customer feedback.		
18	Ashwini Bankar, Sheeja S. Suresh, 2015	The proposed method is that with the help of digital screen touch customers make orders and HTML pages are used for the information of the restaurant. By using Paypal Android Application the online bill payment and robot will serve the meal. This wireless technology has been connected to the cash counter and the kitchen via RF module. Robotic technology has been used to enhance the speed and reliability to take the orders.	In this Robots used to serve the meal to the customers and no need of staff. The Customer has the liberty to take his own order.	The main disadvantage is that customers need to pay the online payment using Paypal Android Application and should be installed.
19	Mayur D. Jakhete, Piyush C. Mankar, 2015.	The proposed method is that used highly advanced technology and growing technology. It provides the	Easy to install because of the wireless	Status and feedback of order is not obtained.

		customers to interact easily with the wireless technology In this Graphical LCD is used for displaying the menu	interface.,Fast response and efficient and low cost design and low power consumption	Limited distance.
20	Varsha Chavan, Priya Jadhav, Snehal Korade and Priyanka Teli, 2015.	The proposed method is that “Food Pre-Order System using Web Based Application” in which customers are able to create the order before they approach the restaurant by using a smartphone and can save the order. The list of selected pre-ordered items shall be shown on the kitchen screen, and when confirmed, order slip shall be printed for further order processing. The solution provides an easy and convenient way to select pre-order transactions from customers.	customers can easily order the food and save the order for further purposes.	In this customer’s need to pay the bill manually and private logins are being used.

## **2.2 CONCLUSION**

This chapter provides a brief review of various existing approaches discussed in the earlier applications. The proposed QR based food ordering in restaurants is much better than the existing Android and Touch screen based ordering in terms of features. The customer gets fine dining experience through this QR based ordering.

## **Chapter 3**

### **SYSTEM REQUIREMENTS**

#### **PREAMBLE**

The previous chapter gives a brief introduction to the literature review done related to the topic of our work and provides a brief review of various existing approaches discussed in the earlier research works. We have discussed the various research papers and journals with their merits, demerits, and proposed methods in this chapter. This chapter gives a brief introduction about tools and requirements those are used for project implementation.

#### **3.1 TOOLS USED**

##### **3.1.1 Web Technology**

The proposed system is a cross platform system, which includes Windows desktop client and Android mobile phone client. Therefore, it is required to implement web services in order to support the Android mobile phone client device to fetch data from the database server and store data back to the database server. In this project, we used react and react native for web and mobile app development. And we used firebase as our database and used firebase functions to connect the data with the frontend.

##### **3.1.2 Database Environment**

The proposed system will need a database system to support in order to store the huge amount of data. Firestore database system will be chosen to support the proposed system because it is a well-known open source database management system. Other than that, Firebase database system provides software developers with a client program like firebase functions with easy integration of data to user interface and it will speed up the development progress.

### 3.1.3 System Platform

The project is a cross platform based system which includes web based application and a hybrid mobile application developed in react native which can be used for android as well as IOS platforms.

### 3.1.4 Visual Studio Code(IDE)

Visual Studio code is an integrated development environment that is supported by all programming languages. Furthermore, Visual Studio Code is a source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets etc.

### 3.1.5 Draw.io

In this project, Draw.io software has been used to create documents for several system planning diagrams such as Use-Case diagram, Activity diagram, Class diagram etc. By doing so, software developers are able to visualize the system and communicate information much more concisely and clearly.

## 3.2 SOFTWARE REQUIREMENTS/HARDWARE REQUIREMENTS

This section will show the list of all software and hardware that are involved in the development process. All these elements are important in the process of development of this system. List of software and hardware are shown below.

### 3.2.1 Software Requirement

No.	Software	Description
1.	Visual Studio Code	To code the program and to run the application
2.	Reactjs	Programming framework to build the customer webapp.
3.	React Native	Programming framework to build the manager app.

4.	Firebase	database used for both the customer webapp and manager app
5.	Google docs & Google slides	Used for documentation of projects.
6.	draw.io	Used for UML diagrams.

### 3.2.2 Hardware Requirement

No.	Hardware	Description
1.	Laptop	Processor : intel i5 RAM:4GB OS : Window 10
2.	Smart Phone	Used to scan the QR code.

### 3.3 CONCLUSION

In this chapter, we discussed in detail about tools and environments used and specified about the frontend tools, backend tools, communication interfaces, software and hardware requirements.

## Chapter 4

### SYSTEM DESIGN

#### PREAMBLE

The previous chapter gives a brief introduction about tools and requirements. This chapter gives detailed explanation of the project in a diagrammatic representation using uml diagrams.

#### 4.1 ARCHITECTURE DIAGRAM

An architectural diagram is a diagram of a system that is used to abstract the overall outline of the software system and also the relationships, constraints, and boundaries between components. It's a vital tool because it provides an overall view of the physical deployment of the software system and its evolution roadmap.

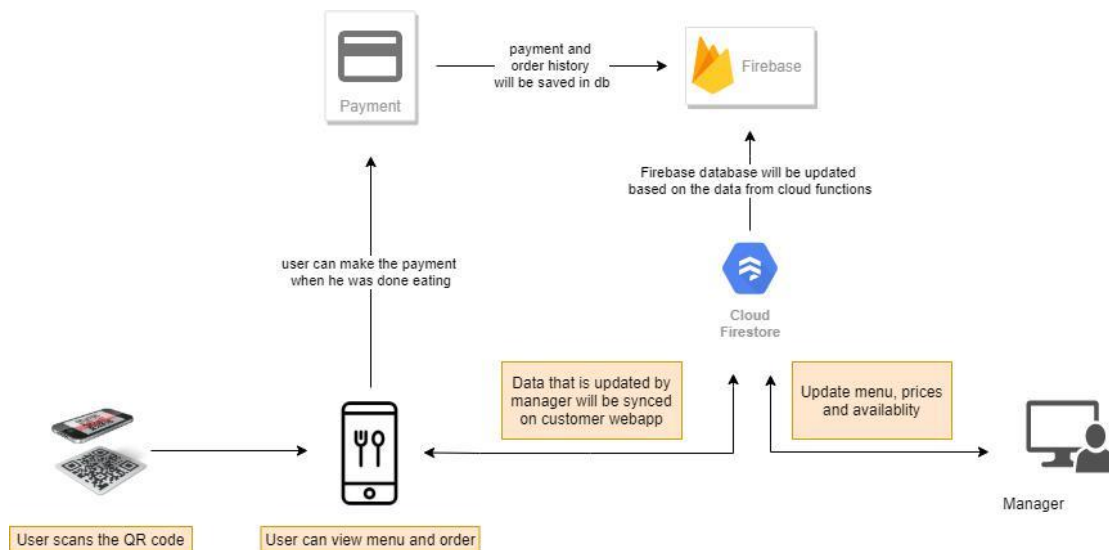


Fig 4.1 Architecture Diagram

## 4.2 USE CASE DIAGRAM

The main purpose of the use case diagram is to point out what system functions are performed for which actor. Roles of the actors within the system can be depicted. It invokes persons, use cases, and several other things that invoke the actors and components in command of the implementation of use case diagrams.

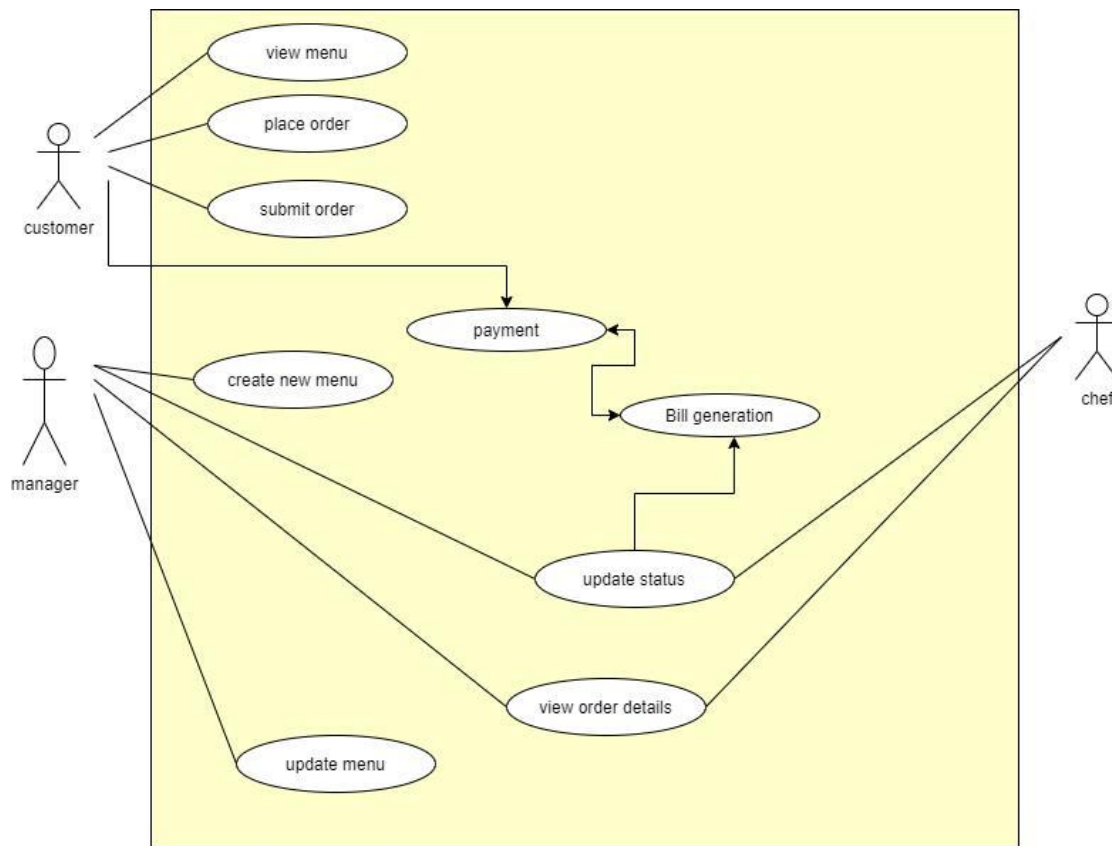


Fig 4.2 Use Case Diagram



### 4.3 CLASS DIAGRAM

The class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the application, and for detailed modeling, translating the models into programming code

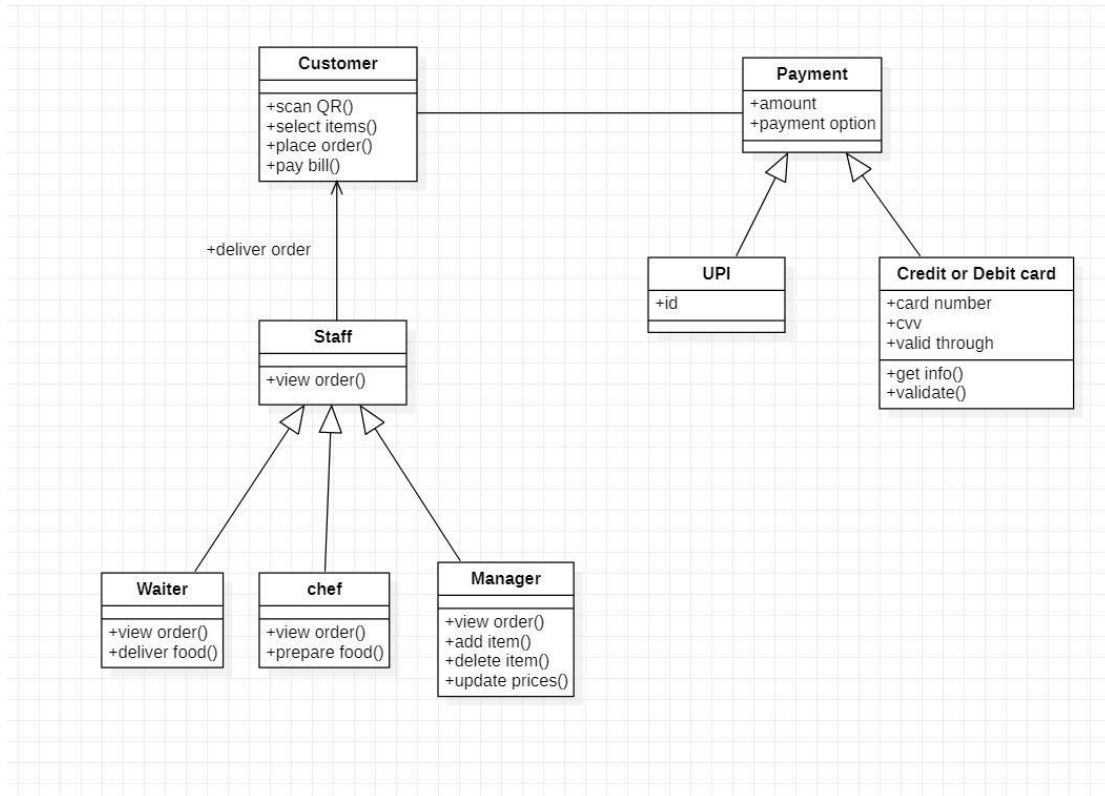


Fig 4.3 Class Diagram

Classes that are used here are customers that include the operations related to ordering of food, staff can view the order details and the chef prepares the order, the waiter delivers the order and the class payment has different options to pay the bill.

## 4.4 BEHAVIOUR DIAGRAM

A behavior diagram is supposed to provide clarity, for example, regarding internal processes, business processes or the interaction of various systems.

### 4.4.1 Sequence Diagram

Sequence diagrams describe interactions among classes in terms of an exchange of messages over time and is additionally termed as an event diagram. A sequence diagram is the best way to visualize and validate various runtime scenarios.

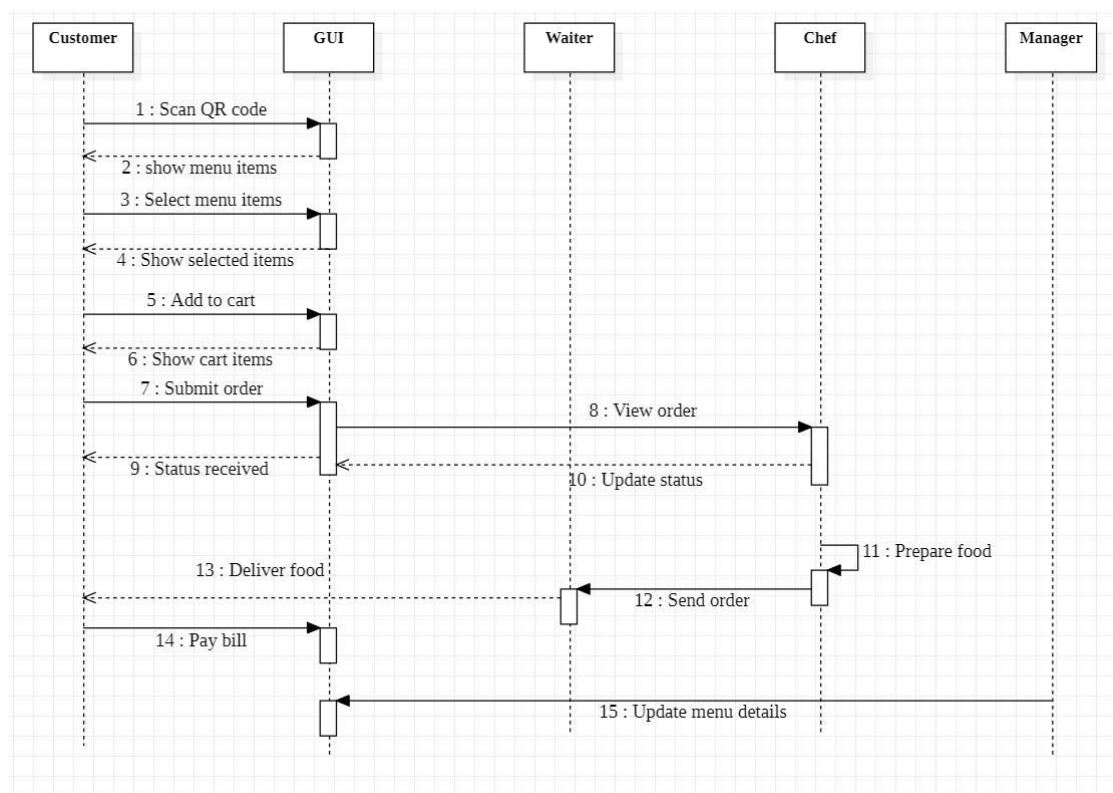


Fig 4.4.1 Sequence Diagram

The above sequence diagram shows the interaction among the objects in a sequential order. Lifeline should be used to represent an individual participant in a sequence diagram. The objects used here are customer, GUI, waiter, chef, manager all these objects explain how the operations are carried out.

#### 4.4.2 Collaboration Diagram

The Collaboration Diagram in UML is also called a communication diagram. The purpose of a collaboration diagram is to emphasize structural aspects of a system, i.e., how various lifelines in the system connect.

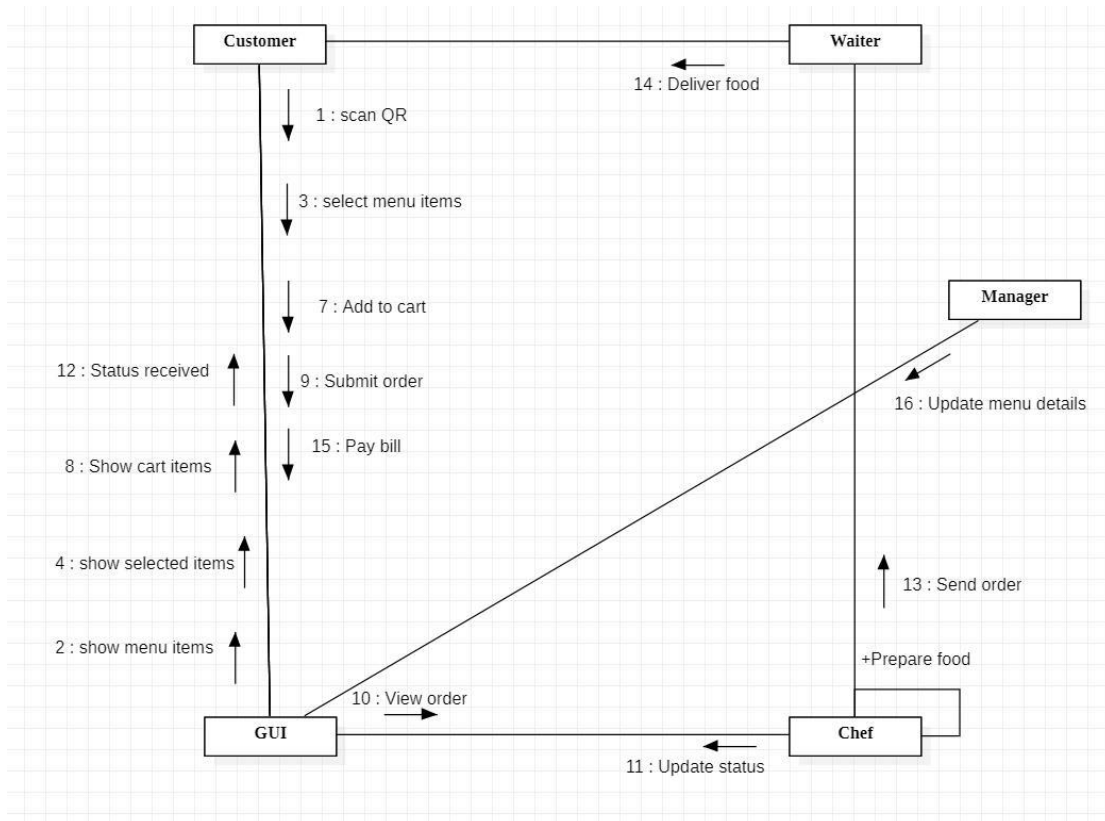


Fig 4.4.2 Collaboration Diagram

The above collaboration diagram represents QR based food ordering in restaurants. The diagram contains lifelines along with connectors, self-loops, forward, and reverse messages all these shows flow of the communication among the objects. Messages passed over sequencing is indicated by numbering each message hierarchically.

#### 4.4.3 State Diagram

The state machine diagram is additionally referred to as Statechart or State Transition diagram, that shows the order of states undergone by an associated object among the system. It captures the software system's behavior. It models the behavior of a class, a subsystem, a package, and a whole system.

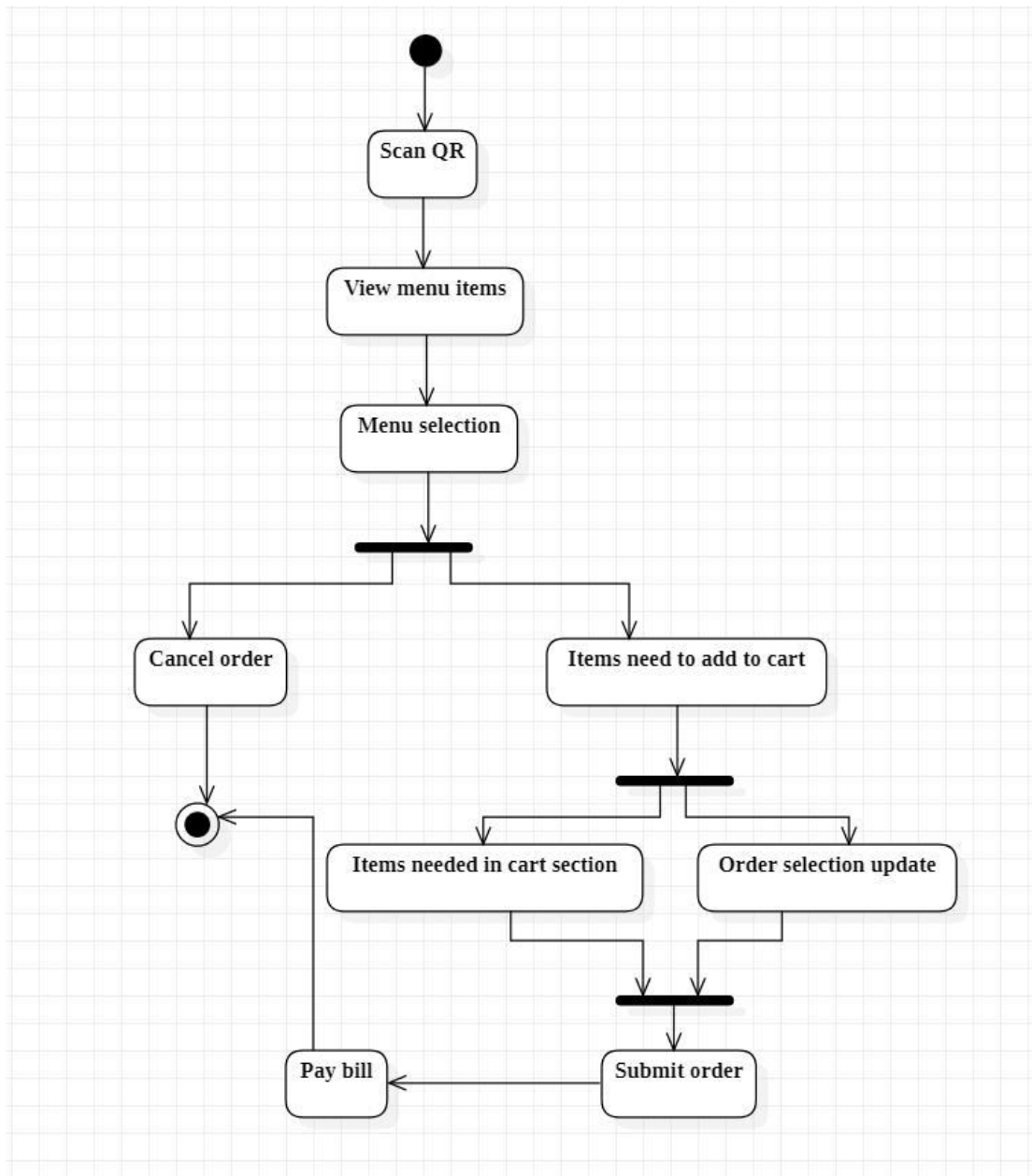


Fig 4.4.3 State Diagram

The above state chart diagram represents the flow of execution from one state to another state of an object. Here fork and join are used, fork represents where a single transition splits into concurrent multiple transitions and join represents where the concurrent transitions reduce back to one.

#### 4.4.4 Activity Diagram

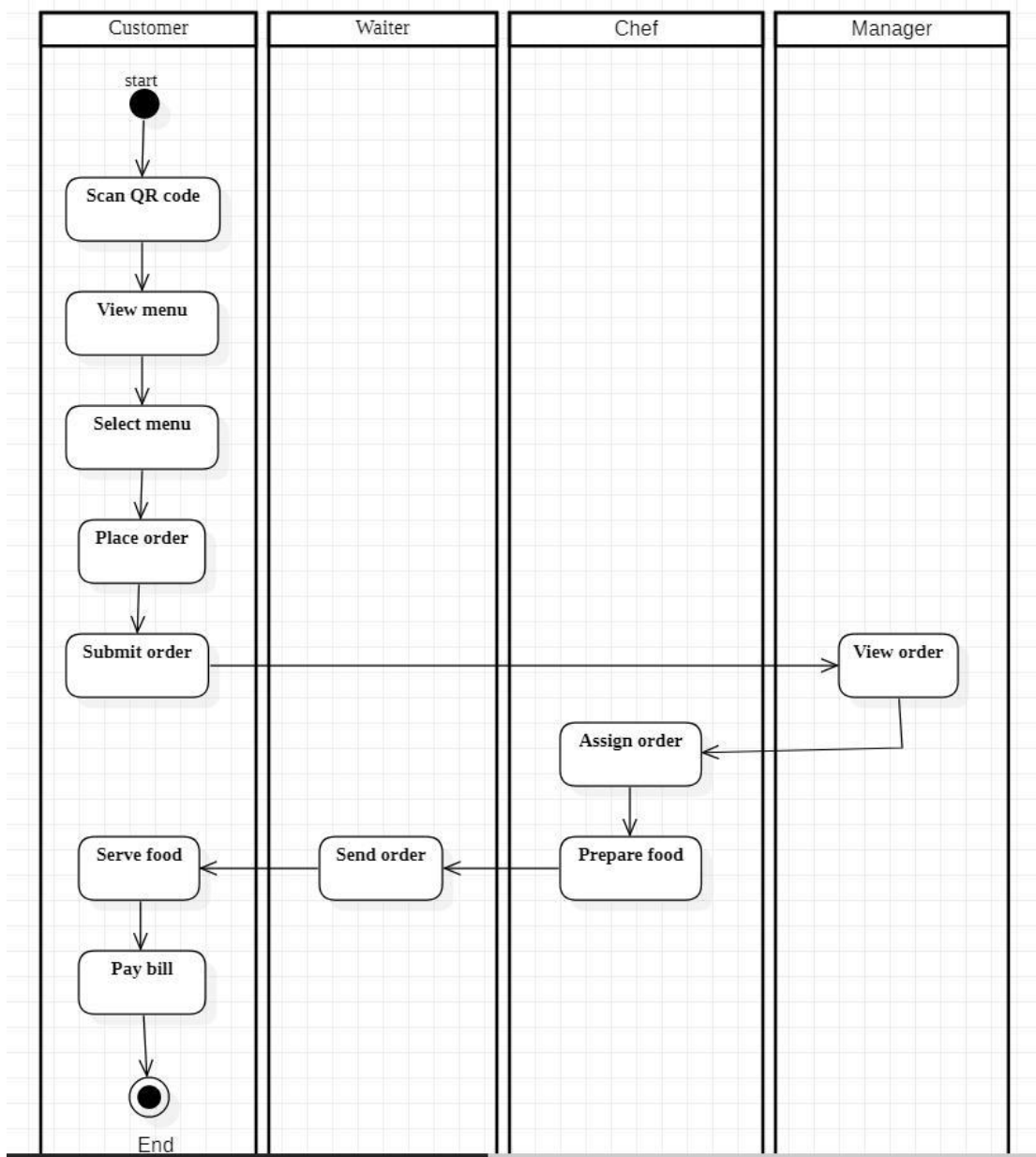


Fig 4.4.4 Activity Diagram

Activity diagram is generally a flowchart to represent the flow from one activity to another activity. The activity can be described as an associated operation of the system. It shows different flows such as branched, parallel, concurrent, and single. Swimlanes are used to show that activities are performed by that organisation within the activity diagram.

## 4.5 IMPLEMENTATION DIAGRAM

### 4.5.1 Component Diagram

Component diagrams are usually drawn to help model implementation details and ensure that each side of the system's required functions is covered by planned development. A component is a logical unit block of the system, a rather higher abstraction than classes.

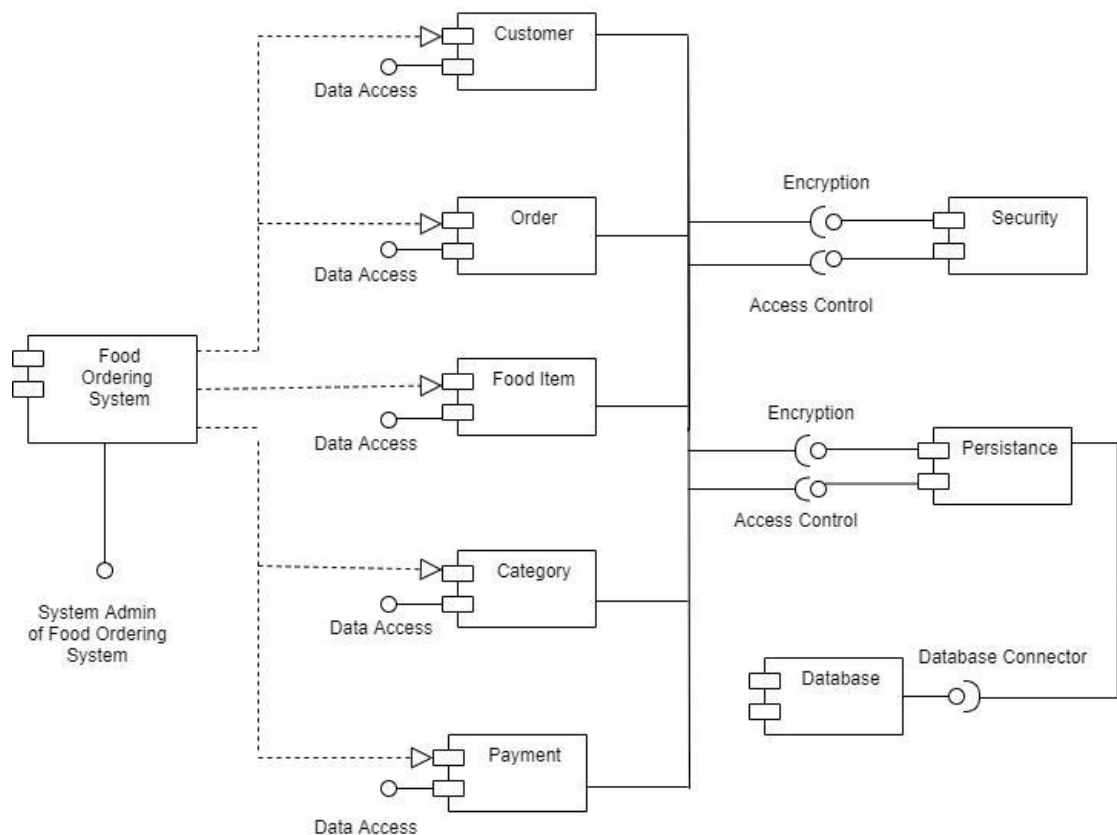


Fig 4.5.1 Component Diagram

Interfaces in component diagrams show how components interact with each other. The assembly connector allows linking the component's needed interface with the provided interface of another component. The components enclosed within the component diagram are Food ordering system, customer, order, food item, category, payment, security, persistence and database.

#### 4.5.2 Deployment Diagram

Deployment diagrams could be a reasonably structured diagram used in modeling the physical aspects of a system. Deployment diagram is usually represented by a node which is either a hardware device or some software execution environment. Nodes might be connected through communication paths to create networked systems of arbitrary complexity.

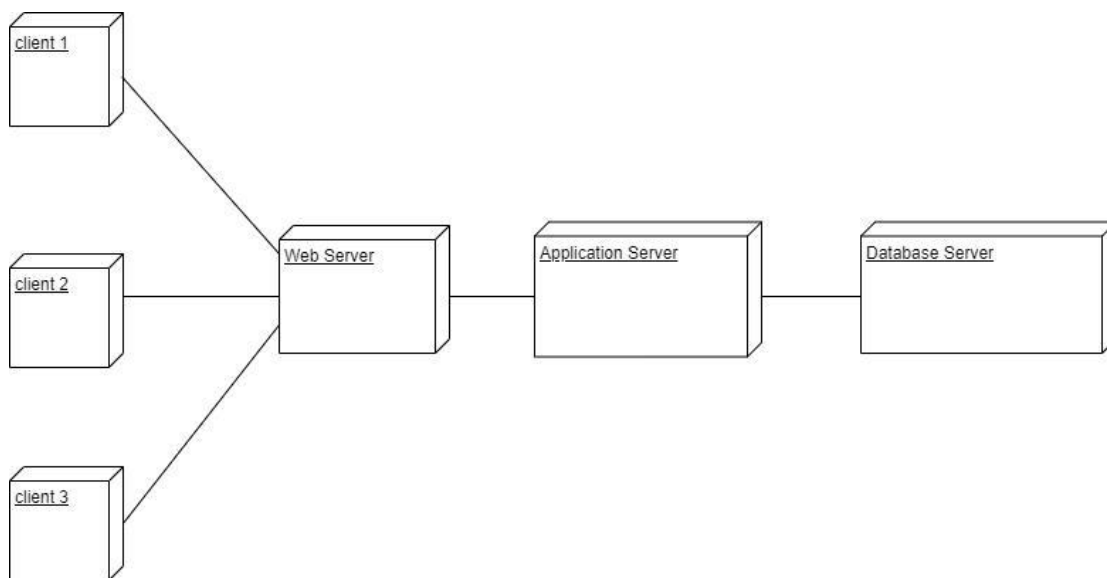


Fig 4.5.2 Deployment Diagram

#### 4.6 DATA FLOW DIAGRAM

Data flow diagram represents the flow of data of a system or a process. It also gives insight into the inputs and outputs of each entity and the process itself. DFD does

not have control flow and no loops or decision rules are present. The DFD should maintain consistency across all the DFD levels.

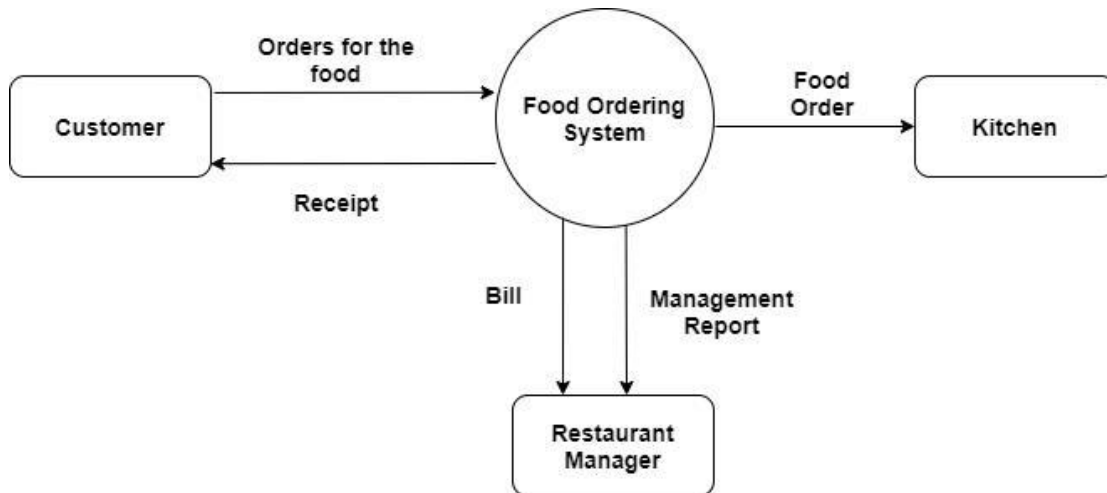


Fig 4.6 Data Flow Diagram(Level 0)

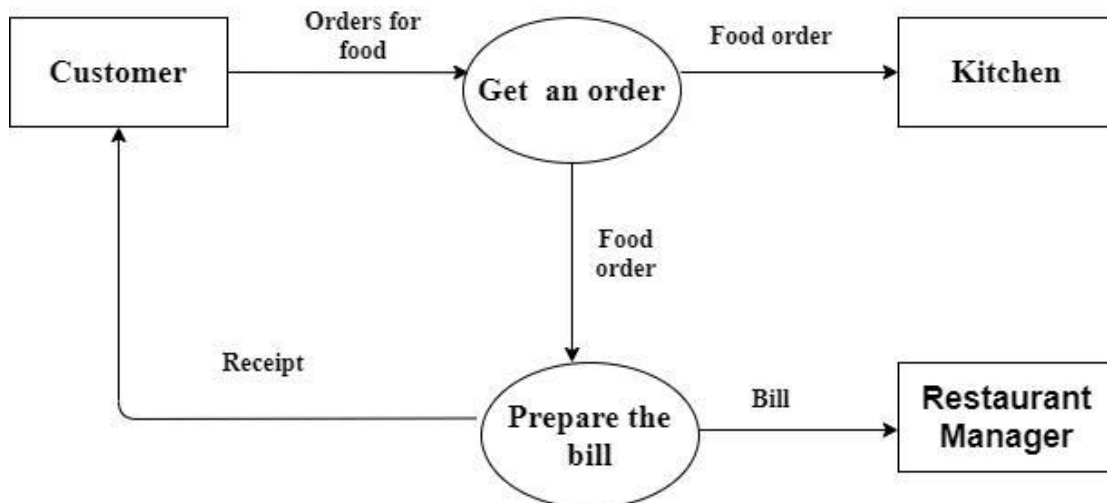


Fig 4.6 Data Flow Diagram(Level 1)



## **4.7 CONCLUSION**

In this chapter, we explained the project in a diagramatic representation using diagrams such as architectural, use case, class, behaviour, implementation and data flow diagrams.

## **Chapter 5**

### **IMPLEMENTATION**

#### **PREAMBLE**

The previous chapter gives the diagrammatic representation of the project. This chapter gives a brief introduction about the modules in the project.

#### **5.1 PROPOSED METHODOLOGY**

Our automation system uses QR codes to launch the web application. The web application is developed in Reactjs and Firebase. The QR codes are unique for every table at the restaurant. The user can scan the QR code with their devices to launch the web application from there the user can access the menu and can order. As soon as the customer orders from the application the order will be notified in the manager app with red color in the table field from which the customer orders. The manager can view the tables which need to be served and which table needs assistance. And he can create/update the menu, availability of items and categories of items.

#### **5.2 PROPOSED METHODOLOGY MODULE**

This project consists of three modules as follows

- Customer
- Manager
- Chef

#### **5.3 CUSTOMER MODULE**

The main purpose of developing this module is to place the order within the restaurant by scanning QR code. In this module the customer scans the QR code that is placed on the table, after the QR Code scanning the customer gets into the restaurant website home page displaying the categories of food items. This categories the food items into drinks, breakfast, lunch, dinner, etc. This helps the customers to simply access to their favourite food item, once selecting the food items the customer should add the food

items to cart page therefore the customer will place the order by clicking the submit button. If the customer desires something and he/she wishes to call the waiter, then there's an option called Call assistance. And the customer will do online payment also.

#### **5.4 MANAGER MODULE**

The main aim of developing this module is to manage all the details of food items being served within the restaurant. Therefore all the records of the food items will be updated by the admin and also the customers can view the food item lists. And this module additionally manages the order detail i.e. the food items ordered and also the details of the table number, wherever that food item needs to be served. The food items are categorized as per the admin needs. Admin manages all the payment records of all the customers.

#### **5.5 CHEF MODULE**

The main purpose of this module is to prepare the order when he gets the notification. After placing the order by the customer, it displays in the kitchen means that the chef got the notification regarding food order along with the table number. Then he prepares the food if it is not available, and he assigns the waiter to serve the food to the customer.

#### **5.6 CONCLUSION**

In this proposed system there is a QR Code on each table of the restaurant. For ordering of the food items the customer just scans the QR Code, after the QR Code scanning the customer gets into the restaurant website page displaying the menu items and their respective price. Along with the displaying of food prices, the customer can also view the making of the food stuffs. This concept is satisfactory for both the hotel administration and the customers.

## **Chapter 6**

### **TESTING**

#### **PREAMBLE**

This chapter completely deals with testing the model. By analyzing all the previous chapters, a clear explanation about the problem statement, aim of the project, related reference papers, system requirements, system design, methodology and modules related to the project. Whereas in this chapter it completely deals with the testing phase related to the model.

#### **6.1 SOFTWARE TESTING**

Testing is the process of evaluating a system or its components with the aim to find whether it satisfies the specified requirements or not. Testing is executing a system in order to identify any gaps, errors, or missing requirements in contrast to the actual requirements.

Software testing is the process used to evaluate the quality of computer software. Software testing is an experimental technical investigation conducted to provide stakeholders with information about the quality of the product with respect to the context in which it is planned to operate. This includes, but is not limited to, the process of executing a program or application with the intent of finding software bugs. Quality is not pure, it is of value to some person. With that in mind, testing furnishes a criticism or comparison that compares the state and behavior of the product against specification. An important point is that it compares the state and behavior of the product against a Specification. An important point is that software testing should be distinguished from the separate area of Software Quality Assurance, which encompasses all business process areas, not just testing.

##### **6.1.1 Verification**

Verification is the process of evaluating work-products of a development phase to determine whether they meet the specified requirements. Verification ensures that the

product is built according to the requirements and design specifications. It also answers the question, are we building the product, right?

## **Verification Testing**

Verification testing can be best demonstrated using V-Model. The artifacts such as fastest Plans, requirement specification, design, code and test cases are evaluated.

### **6.1.2 Validation**

The process of evaluating software during the development process or at the end of the development process to determine whether it satisfies specified business requirements. Validation Testing ensures that the product actually meets the client's needs. It can also be defined as to demonstrate that the product fulfils its intended use when deployed in an appropriate environment. It answers the question, Are we building the right product?

## **6.2 TYPES OF TESTING**

Software testing methods are traditionally divided into black box testing and white box testing. These two approaches are used to describe the point of view that a test engineer takes when designing test cases.

### **Black box testing**

It is a testing technique which is used to test the software without the knowledge of the internal structure of the program or application. It is also known as data driven, box testing, data, and functional testing. Testing is based on external expectations; internal behavior of the application is unknown. This type of testing is ideal for higher levels of testing like System Testing, Acceptance testing. Programming skill is not needed to perform Black Box testing. Implementation knowledge is not required for doing Black Box testing. The main objective of this testing is to check what functionality of the system under test.

## White box testing

White box testing is when the tester has access to the internal data structures, code and algorithms. White box testing methods involve creating tests to cause all statements in the program to be executed at least once. Other examples of white box testing are mutation testing and fault injection methods. The main objective of White Box testing is to check the quality of the code.

## Regression testing

After modifying software, either for a change in functionality or to fix defects, regression test re-runs previously passing tests on the modified software to ensure that the modifications haven't unintentionally caused a regression of previous functionality. Regression testing can be performed at any or all of the above test levels.

## Acceptance testing

Acceptance testing is executed by the client and verifies whether the end to end flow of the system is as per the business requirements or not and it is as per the needs of the end-user. Clients take up the software only when all the features and functionalities of the software work as expected. It is the last phase of the testing, after the software goes into production. It is also known as User Acceptance Testing (UAT).

## 6.3 TEST CASES

**Table 6.1 shows the test case for Manager Login**

Test Objective: To ensure the user able to login with valid name and password

Input	Expected output	Actual output
Login by entering the correct name and password.	The system lets the user login.	The user login successfully.
Login by entering the wrong password.	The system does not allow the user to login.	The user can't login to the system.
Login by does not enter any value.	The system does not allow the user to login.	The user can't login to the system.

**Table 6.2 test case for Add menu item**

Test Objective: To ensure the staff able to add new menu into the system

<b>Input</b>	<b>Expected output</b>	<b>Actual output</b>
Enter all the information of the food	The food information is stored into the database.	The food information is stored into the database and the user can view the food in the list.
Enter few information of food	The food information will not be stored into the database.	The system does not allow the user to add new food.
Click Save button without entering any information	The food information will not be stored into the database.	The system does not allow the user to add new food.

**Table 6.3 Add new category**

Test Objective: To ensure the staff is able to add new categories into the system.

<b>Input</b>	<b>Expected Output</b>	<b>Actual Output</b>
Enter the information of the category	The category information is stored into the database.	The category information is stored into the database and the user can view the category in the list.
Click save button without entering any information.	The category information is not stored in the database.	The system does not allow the user to add a new category.

**Table 6.4: Customer Order food**

Test Objective: To ensure the customer is able to order the food.

<b>Input</b>	<b>Expected output</b>	<b>Actual output</b>
Add items to the cart and order	The order is processed successfully.	The customer is allowed to make the order.
Update the quantity of the items added to cart and order	The order is processed successfully.	The customer is allowed to make the order.
Click Order button without entering any information	The order does not process successfully.	The customer is not allowed to make the order.



## **6.4 CONCLUSION**

In this chapter the testing is performed to check whether the accuracy is increased or not. From tables above one can conclude that for all the models there is an increase in the accuracy, so all the test cases are valid. This type of testing is known as White Box Testing as we already know there must be an increase in the accuracy.

## **Chapter 7**

### **EXPERIMENTAL RESULTS**

#### **PREAMBLE**

This chapter shows the experimental results and concludes the final year report and outlines the future works for this system QR based Ordering System in solving a real life problem. It will show the results and outcomes of the project and here there is a comparison of the results with the base paper. It will discuss the constraints of the system and suggest ways to improve the system to be better in the future.

#### **7.1 RESULTS**

This system is user-friendly and also ensures good quality of service and customer satisfaction. It will bring lots of convenience to the restaurant employees when they perform their duty within the restaurant as well as improve the consumer dining experience. A better and easier management for the store in busy times and avoid congestion at the checkout counter. The menu prices and items can be easily updated any time and the feedback from the customers can be taken easily as a result Food wastage can be minimized by the insights provided from the previous orders.

#### **7.2 RESULTS COMPARISON**

In our QR based ordering system we have all the modules that are required for the automation of the traditional ordering system. Here the customer can order the items directly from the web app by scanning the QR code placed at the table. Then the order will go directly to the kitchen and the chefs can prepare the food accordingly and so that the time will be less. The customers can pay the bill online at the end using UPI, wallets or card. And the restaurant manager can see all the orders history and plan accordingly for the food preparation. And by using our system the prices can be updated dynamically and it will be very easy for the manager to manage the menu items, categories and prices. Also, sometimes it is difficult to call the staff when the customers wish to request something. The staff might not hear the voice of customers as they are busy serving the food. Therefore, a feature that can call staff through the system has been implemented in our application.

### **7.3 APPLICATION**

The QR based Ordering system is mainly used for the better customer experience in the restaurants and it reduces the waiting time of the customers. And using this system the restaurants can have minimum waiters so that cost will be reduced and the restaurants can give better experience to the customers so that there may be better sales and revenue for the owners.

### **7.4 SUMMARY**

In this chapter we discussed about the results and outcome of the system that was developed and we gone through the result comparison where some features are added to our system and we have seen the applications of our QR based ordering system in detail in this chapter in the next chapter we can discuss about the conclusion and future enhancement of our project.

## **Chapter 8**

### **CONCLUSION AND FUTURE ENHANCEMENT**

#### **8.1 CONCLUSION**

Nowadays, technology brings a lot of convenience to the people. Many companies use management systems to grow their business as it is efficient for both sellers and customers. The beverage and food industry also started the trend to use management systems for their business. Many restaurants that are still using the traditional ordering system will face a few difficulties and problems such as carelessness of waiters, ugly handwriting of waiters, and giving wrong bill payment to the customers. All of these problems will cause dissatisfaction to the customer. This will also affect the image of the restaurant. The traditional ordering system is also difficult to update the latest information to the customers. In conclusion, this QR based ordering system helps to increase the productivity and efficiency of the restaurant. It reduces the manual work for the staff. By having this ordering system, the customers can make their order through the system. Then, the order will pass to the kitchen. The chef will start to cook when they see the order of the customers. Everything is done by the system and the staff just needs to serve the food to the customers and wait for the customers to make the payment.

#### **8.2 FUTURE ENHANCEMENT**

More and more restaurants are starting to implement their own ordering system. It is because the system helps to enhance the productivity of staff. Restaurant ordering system not only benefits the restaurant, it also benefits the customers. The customers can make their order in an efficient and fastest way.

In the future, the system can implement a feature in mobile applications that may implement some mini games that are able to entertain customers while they are waiting for the food to be served. And we can also introduce some chat features for the customers that are currently in the restaurant. Lastly, provide customizable menus to the system where guests can add some notes on how they want their food, for example if guests want to add more spicy on their food they can simply add notes through the system before order.

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## **APPENDIX-A**

### **SOURCE CODE**

#### **A.1 Manager Mobile App**

**//App.js**

```
import React, { Component, useState } from  
'react'; import { YellowBox } from 'react-native';  
import Login from './screens/Login';  
import Signup from './screens/Signup';  
import Profile from './screens/Profile';  
import MainTab from './components/MainTab';  
import Orders from './screens/Orders';  
import Menu from './screens/Menu';  
import Temp from './screens/SearchPage';  
import { createStackNavigator } from 'react-navigation-  
stack'; import { createAppContainer } from 'react-  
navigation'; import * as firebase from 'firebase';  
import SearchPage from './screens/SearchPage';  
  
import { AppRegistry } from 'react-native';  
import { Provider as PaperProvider } from 'react-native-paper';  
  
YellowBox.ignoreWarnings(['Setting a timer']);  
  
const AppNavigator = createStackNavigator({  
  Login: Login,  
  Signup: Signup,  
  Main: MainTab,
```



```

    Profile: Profile,
    Menu: Menu,
  }, {
    initialRouteName: 'Login',
    defaultNavigationOptions: {
      headerStyle: {
        backgroundColor: '#fff',
        width: 0,
        height: 0
      },
    }
  });

const AppContainer = createAppContainer(AppNavigator);

export default class App extends React.Component
{
  render() {
    //return <AppContainer/>;
    return (
      <PaperProvider>
        <AppContainer />
      </PaperProvider>
      // <AppContainer />
    );
  }
}

/*bugsnagClient.notify(new Error('Test error'))*/
AppRegistry.registerComponent('App', () => App);

//MainTab.js

import React from 'react';

```

```
import { Platform } from 'react-native';
import { createStackNavigator } from 'react-navigation-stack';
import { createBottomTabNavigator } from 'react-navigation-
tabs'; import TabBarIcon from './TabBarIcon'; import Profile
from './screens/Profile';
import Table from './screens/Table';
import Orders from './screens/Orders';
```

```
const config = Platform.select({
  web: { headerMode: 'screen' },
  defaultNavigationOptions: {
    headerStyle: {
      backgroundColor: '#fff',
      width: 0,
      height: 0
    }
  }
});
const HomeStack = createStackNavigator(
  {
    Home: Table
  },
  config
);
HomeStack.navigationOptions = {
  tabBarLabel: 'Tables',
  headerStyle: {
    backgroundColor: '#fff',
    width: 0,
    height: 0
  }
}
```

```

tabBarIcon: ({ focused }) => (
  <TabBarIcon
    focused={focused}
    name={
      Platform.OS === 'ios'
        ? `ios-star${focused ? '' : '-outline'}`
        : 'md-information-circle'
    }
  />
),
};

```

```

HomeStack.path = '';

```

```

const OrderStack = createStackNavigator(
  {
    Orders: Orders,
  },
  config
);

```

```

OrderStack.navigationOptions = {
  tabBarLabel: 'Order',
  tabBarIcon: ({ focused }) => (
    <TabBarIcon focused={focused} name={Platform.OS === 'ios' ? 'ios-person' : 'md-options'}
  /> ),
  headerMode: 'none'
};

```

```

OrderStack.path = '';

```

```

const ProfileStack = createStackNavigator(
  {
    Profile: Profile,
  },
  config,
);

```

```

ProfileStack.navigationOptions = {
  tabBarLabel: 'Profile',
  tabBarIcon: ({ focused }) => (
    <TabBarIcon focused={focused} name={Platform.OS === 'ios' ? 'ios-person' : 'md-options'} />
  ),
};
ProfileStack.path = '';

```

```

const tabNavigator =
  createBottomTabNavigator({ HomeStack,
    OrderStack,
    ProfileStack,
  });
tabNavigator.path = '';
export default tabNavigator;

```

## A.2 Customer Web App

//App.js

```

import React from 'react';
import { Component } from 'react';
import Main from './components/MainComponent';

```

```

import './App.css';
import { BrowserRouter } from 'react-router-dom';
import { Provider } from 'react-redux';
import { ConfigureStore } from './redux/configureStore';
import { createBrowserHistory } from 'history';

const store = ConfigureStore();
const history = createBrowserHistory(); // use to track the user url to identify the table

class App extends Component {
  constructor(props) {
    super(props)
    this.state = {
      tableID: ""
    }
  }

  retrieveInfoFromURL = () => {
    // console.log("(Appjs)history: ", history.location.pathname)
    var pathArray = String(history.location.pathname).substring(1).split("/");
    // console.log(pathArray[0]);
    // this.setState({ tableID: String(history.location.pathname).substring(1)
    // }); return pathArray;

  }

  render() {
    return (
      <Provider store={store}>
        <BrowserRouter history={this.props.history}>
          <div className="App">
            <Main pathArray={this.retrieveInfoFromURL()} />
          </div>
        </BrowserRouter>
      </Provider>
    )
  }
}

```

```

        </BrowserRouter>
      </Provider>
    );
  }
}
export default App;

```

## //MainComponent.js

```

import React, { Component } from 'react';
import { BrowserRouter, Route, Redirect, withRouter } from 'react-router-dom';
import { connect } from 'react-redux';
import { fetchMenu, fetchCategories } from './redux/ActionCreators';
import Menu from './MenuComponent';
import Cart from './CartComponent';
import Promotion from './PromptDishComponent';
import OrderHistory from './OrderHistoryComponent';

import { firestore } from 'firebase';
import { restaurants, database } from '../Firestore/firebase'

// const db = firestore();
const mapStateToProps = (state) => {
  return {
    // menu: state.menu,
    // categories: state.categories,
    cart: state.cart,
    currentCategory: state.currentCategory,
    // orders: state.orders
  }
}

```

```

const mapDispatchToProps = dispatch => ({
  // fetchMenu: () => dispatch(fetchMenu()),
  // fetchCategories: () => dispatch(fetchCategories()),
});

class Main extends Component {
  constructor(props) {
    super(props);
    this.state = {
      restaurant: this.props.pathArray[0] ? this.props.pathArray[0] : null,
      table: this.props.pathArray[1] ? this.props.pathArray[1] : null,
      orders: [],
      menu: [],
      cart: [],
      tax: 0
    }
    console.log("(Main)props tableID: ", this.state.table);
  }

  componentDidMount() {
    this.getOrders(this.state.restaurant, this.state.table);
    this.getMenu(this.state.restaurant);
    this.getCart(this.state.restaurant, this.state.table);
  }

  render() {
    return (
      <div>
        <BrowserRouter >
          <Route path={'/' + this.state.restaurant + '/' + this.state.table +
            '/promotions'} component={() => <Promotion restaurant={this.state.restaurant}
            table={this.state.table} menu={this.state.menu} />} />
          <Route path={'/' + this.state.restaurant + '/' + this.state.table + '/cart'} component={()
            => <Cart restaurant={this.state.restaurant} table={this.state.table} cart={this.state.cart}
            tax={this.state.tax} />} />
        </BrowserRouter >
      </div>
    );
  }
}

```

```

        <Route path={'/' + this.state.restaurant + '/' + this.state.table + '/menu'}
component={() => <Menu restaurant={this.state.restaurant} table={this.state.table}
menu={this.state.menu} currentCategory={this.props.currentCategory} /> } />

        <Route path={'/' + this.state.restaurant + '/' + this.state.table + '/orderHistory'}
component={() => <OrderHistory restaurant={this.state.restaurant}
table={this.state.table} orders={this.state.orders} tax={this.state.tax} /> } />

        <Redirect

            to={'/' + this.state.restaurant + '/' + this.state.table + '/menu'}

        />

    </BrowserRouter>

</div>

);
}

```

```

getMenu = (restaurantName) => {
    const menuRef = restaurantName + "Menu";
    if (restaurantName !== null) {
        database.collection(menuRef).get().then(snapshot => {
            const menu = snapshot.docs.map(doc => doc.data());
            // console.log("ready to dispatch menu: " + JSON.stringify(menu)); // array of
            food this.setState({ menu: menu });
        })
        .catch((err) => {
            console.log('Error fetching menu', err);
        });
    }
};

getCart = (restaurantName, tablename) => {
    if (restaurantName !== null && tablename !== null) {
        // get the tax
        restaurants.doc(restaurantName)
            .get()
            .then(doc => this.setState({ tax: doc.data().tax }));
    }
};

```



```

    restaurants.doc(restaurantName).collection('tables').doc(tablename).collection('cart')
      .onSnapshot(snapshot => {

        const cart = snapshot.docs.map(doc => doc.data());
        // console.log("Received doc snapshot: ",
          (orders)); this.setState({ cart: cart });

      },
      err => {
        console.log(`Encountered error: ${err}`);
      });
  }
};

getOrders = (restaurantName, tablename) => {
  if (restaurantName !== null && tablename !== null) {
    restaurants.doc(restaurantName).collection('tables').doc(tablename).collection('orders')
      .onSnapshot(snapshot => {

        const orders = snapshot.docs.map(doc =>
          doc.data()); // console.log("Received doc snapshot: ",
          (orders)); this.setState({ orders: orders });

      },
      err => {
        console.log(`Encountered error: ${err}`);
      });
  }
};
}

export default withRouter(connect(mapStateToProps, mapDispatchToProps)(Main));

```

## APPENDIX-B

### SCREENSHOTS

#### B.1 Login and Signup screens

The below figure B.1 shows the result of screenshots of login and signup screens of the manager app which is developed in react native.

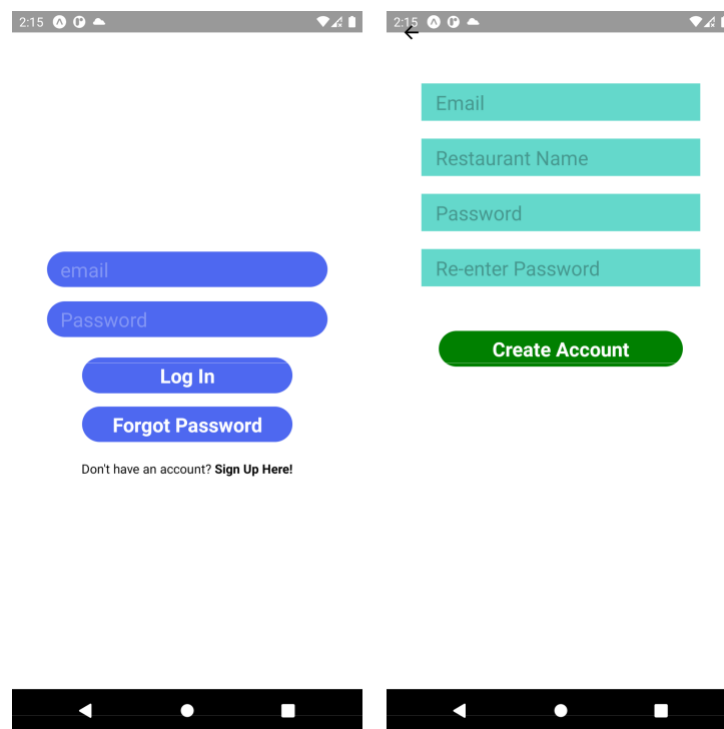


Figure B.1 Login and Signup screens

#### B.2 Restaurant Tables screen

In the below figure B.2 shows the screen of the restaurant tables where the manager can edit and access the details of dishes ordered from the particular table.

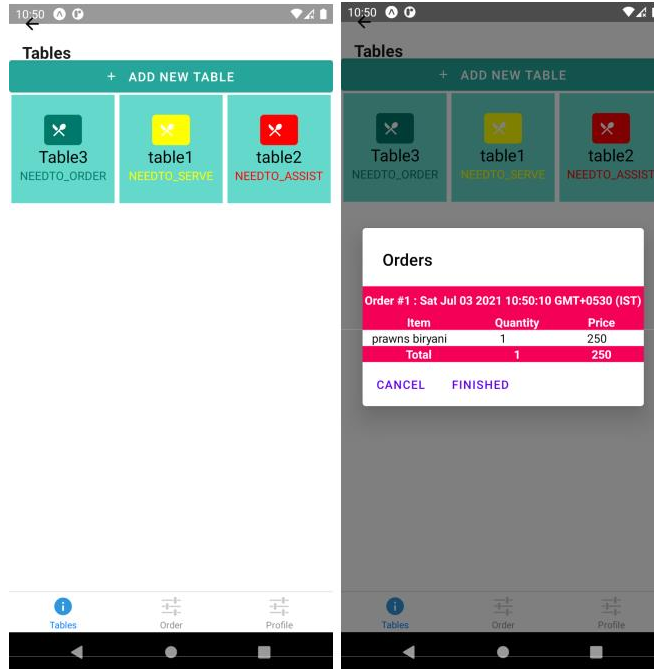


Figure B.2 Restaurant Tables screens

### B.3 Orders screen

The below figure B.3 shows the order screens of the manager app where he can see the orders he needs to serve and also the orders he served previously.



Figure B.3 Restaurant Orders screen

## B.4 Profile and Menu screens

The below figure B.4 shows the profile and menu screens of the manager app where he can see his profile and can edit the categories, menu items and prices of the items.

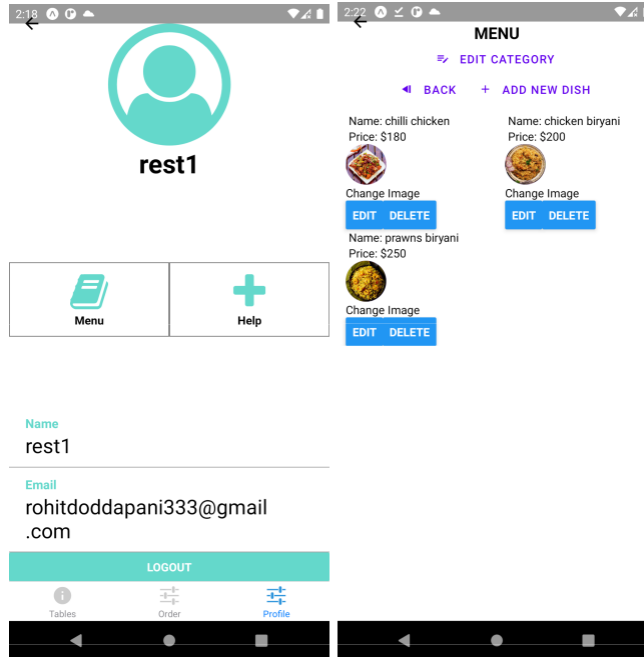


Figure B.4 Profile and Menu screens

## B.5 Customer home screen

The below figure B.5 shows the home screen of the customer app where the customer can see the menu items and its prices and can add to cart.

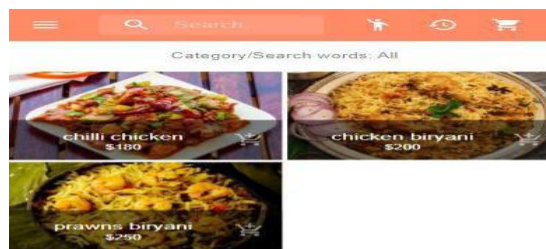


Figure B.5 Customer Home Screen

## B.6 Customer Cart Screen

The below figure B.6 shows the cart screen of the customer app where the customer can see the menu items in his cart and can order from there.

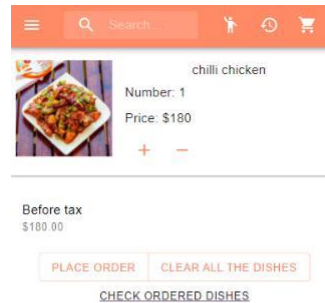


Figure B.6 Customer Cart Screen

## B.7 Customer Order history Screen

The below figure B.7 shows the order history screen of the customer app where the customer can see the items ordered and from there he can add more items or checkout.

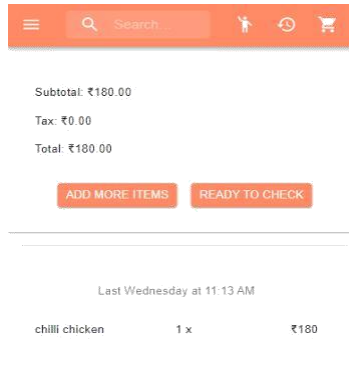


Figure B.7 Customer Order History Screen

## B.8 Customer Checkout and Payment Screen

The below figure B.8 shows the checkout and payment screen of the customer app where the customer chooses to pay online and he pays by using UPI or cards or wallets.

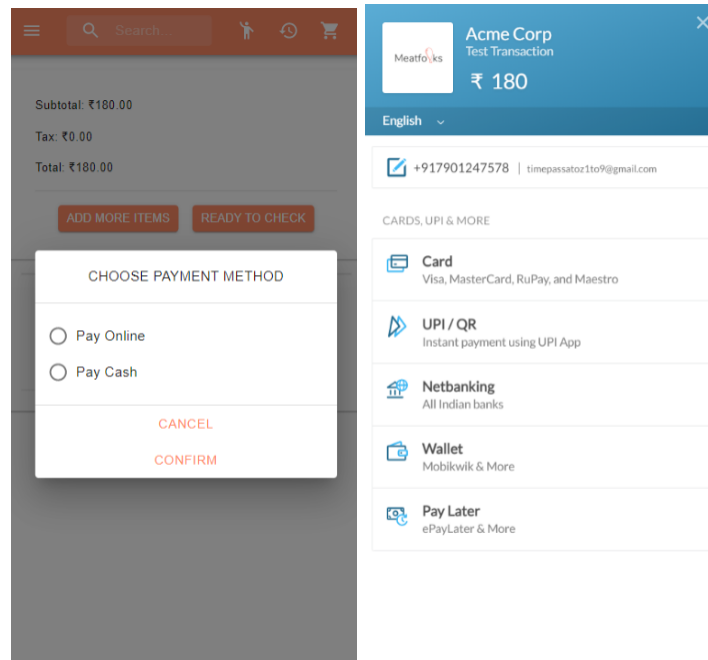


Figure B.8 Customer Checkout and Payment Screen



## APPENDIX-C

### STUDENT CONTRIBUTION

S.NO	Topic	17K61A0590	17K61A0597	17K61A0522	17K61A05E7
1.	Problem Statement	✓	✓	✓	
2.	Literature survey	✓	✓	✓	✓
3.	Problem Formulation	✓	✓	✓	✓
4.	Identify Requirements		✓	✓	✓
5.	Designing	✓	✓		
6.	Implementation	✓		✓	
7.	Testing			✓	✓
8.	Documentation	✓	✓	✓	✓

## APPENDIX D

### POs, PSOs, PEOs and Cos Relevance with Project

#### COURSE OUTCOMES

Course Outcome No	Description
CO1	Develop problem formation and design skills for engineering and real-world problems
CO2	Collect and Generate ideas through literature surveys on current research areas which help to analyze and present to impart knowledge in different fields.
CO3	Import knowledge on software & hardware to meet industry perspective needs and standards.
CO4	Create interest to carry out research on innovative ideas as a lifelong learning.
CO5	Ability to work with a team and enrich presentation and communication skills.
CO6	Create a platform that makes students employable.

<b>COs / POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO1</b>	3	0	0	1	0	1	1	1	3	3	0	1	3	0
<b>CO2</b>	3	3	0	0	0	2	0	0	3	2	0	0	3	0
<b>CO3</b>	2	0	1	1	3	0	0	0	3	2	0	0	3	0
<b>CO4</b>	3	0	0	3	3	0	3	1	3	3	1	1	3	0
<b>CO5</b>	2	0	0	0	2	0	0	0	3	3	0	3	3	0
<b>CO6</b>	2	1	0	0	3	1	0	3	3	2	2	2	3	0
<b>Overall Course</b>	3	1	1	1	2	1	1	1	3	2	1	1	3	0

## PROGRAM OUTCOMES (POs):

PO	Program Outcome	Relevance
PO1	<b>Engineering Knowledge:</b> Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.	Applying the engineering knowledge of programming languages like Javascript, HTML,CSS.
PO2	<b>Problem Analysis:</b> Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.	Done with literature survey and found the complex problems and then analyzed the solutions to overcome the drawback in the existing features.
PO3	<b>Design/Development of Solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, environmental considerations.	By using the Star UML we designed the UML diagrams which includes Use case diagram, class diagram, Activity diagram, sequence diagram etc.. and by using Draw.io we designed the architecture diagram and data flow diagram to give the detailed idea for doing the project.
PO4	<b>Conduct investigations of complex problems</b> using research based knowledge and research methods including design of	We have investigated the project using previous research papers.

	experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.	
PO5	<b>Modern Tool Usage:</b> Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.	We have used modern tools like React and React Native which are developed by facebook.
PO6	<b>The Engineer and Society:</b> Apply reasoning informed by contextual knowledge to assess societal, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.	To make customers satisfied and to give better experience in the restaurants we have used QR technology.
PO7	<b>Environment and sustainability:</b> Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.	By using QR codes which will be very easy for customers to order and also very efficient for restaurant owners.
PO8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.	Only the people that are in the restaurant and who scans the QR code can see the menu and order.
PO9	<b>Individual and Team Work:</b> Function	To provide solutions for the

	effectively as an individual and as a member or leader in diverse teams and in multidisciplinary.	project activities carried out as an individual and as a team.
PO10	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective and give and receive clear instructions.	Effective communication was done in front of the panel members when reviews were conducted and it improves communication in every individual.
PO11	<b>Life-long Learning:</b> Recognize the need for and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.	This problem statement is still an open-ended problem with respect to resources, accuracy and time dependent issues.Lot of scope is there for future purposes to solve this problem.
PO12	<b>Project Management and Finance:</b> Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team to manage projects and in multidisciplinary environments.	All the members in the team are working together to fulfil requirements and manage projects.

### PROGRAM SPECIFIC OUTCOME (PSOs):

PSO	Program Specific Outcome	Relevance
PSO1	<b>Mobile and Web Application Development:</b> Ability to develop mobile and web application using reactjs, react native and firebase.	In future we may extend our project by making an IOS compatible application
PSO2	<b>Cloud Services:</b> To deploy our system in the firebase cloud hosting.	We can deploy our application in firebase hosting.

### PROGRAM EDUCATIONAL OUTCOMES (PEOs):

PEO	Program Educational Outcome	Relevance
PEO1	Graduates are well trained, confident, research oriented and industry ready professionals who are intellectual, ethical and socially committed.	By giving presentations in front of professors our confidence has been enhanced.
PEO2	Graduates will have the technical, communication skills and character that will prepare them for technical roles.	We have used technical skills to develop a program using JavaScript, HTML and CSS.
PEO3	Graduates will be able to analyse, design and develop advanced computer applications to provide solutions to real world problems.	Problems are analysed to design appropriate solutions.

## COs RELEVANCE TO POs

CO	PO	PI	Relevance
CO1	PO1	1.7.1	Apply theory and principles of computer science engineering to solve an engineering problem
	PO3	3.8.2	Ability to implement and integrate the modules.
	PO4	4.4.3	Ability to choose appropriate hardware/software tools to conduct the experiment.
	PO6	6.4.1	Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public
	PO7	7.3.1	Identify risks/impacts in the life-cycle of an engineering product or activity
	PO8	8.4.2	Examine and apply moral & ethical principles to known case studies
	PO9	9.5.2	Treat other team members respectfully
	PO10	10.4.2	Produce clear, well-constructed, and well-supported written engineering documents
	PO12	12.5.2	Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field
CO2	PO1	1.7.1	Apply theory and principles of computer science engineering to solve an engineering problem



	PO2	2.5.1	Evaluate problem statements and identifies objectives
	PO6	6.3.1	Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at global, regional and local level
	PO9	9.6.1	Present results as a team, with smooth integration of contributions from all individual efforts
	PO10	10.5.1	Listen to and comprehend information, instructions, and viewpoints of others
CO3	PO1	1.5.1	Apply laws of natural science to an engineering problem
	PO3	3.6.1	Ability to explore design alternatives.
	PO4	4.4.3	Ability to choose appropriate hardware/software tools to conduct the experiment.
	PO5	5.6.1	Discuss limitations and validate tools, techniques and resources
	PO9	9.6.1	Present results as a team, with smooth integration of contributions from all individual efforts
	PO10	10.4.2	Produce clear, well-constructed, and well-supported written engineering documents
CO4	PO1	1.7.1	Apply theory and principles of computer science engineering to solve an engineering problem
	PO4	4.6.1	Use appropriate procedures, tools and techniques to collect and analyse data
	PO5	5.5.2	Demonstrate proficiency in using discipline specific tools
	PO7	7.4.1	Describe management techniques for sustainable

			development
	PO8	8.4.2	Examine and apply moral & ethical principles to known case studies
	PO9	9.4.1	Recognize a variety of working and learning preferences; appreciate the value of diversity on a team
	PO10	10.4.2	Produce clear, well-constructed, and well-supported written engineering documents
	PO11	11.6.1	Identify the tasks required to complete an engineering activity, and the resources required to complete the tasks.
	PO12	12.4.2	Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
CO5	PO1	1.6.1	Apply engineering fundamentals
	PO5	5.6.2	Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.
	PO9	9.4.2	Implement the norms of practice (e.g. rules, roles, charters, agendas, etc.) of effective team work, to accomplish a goal.
	PO10	10.4.1	Read, understand and interpret technical and nontechnical information
	PO12	12.4.2	Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
CO6	PO1	1.7.1	Apply theory and principles of computer science engineering to solve an engineering problem
	PO2	2.5.3	Identifies mathematical algorithmic knowledge that applies to a given problem

	PO5	5.5.2	Demonstrate proficiency in using discipline specific tools
	PO6	6.3.1	Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at global, regional and local level
	PO8	8.4.2	Examine and apply moral & ethical principles to known case studies
	PO9	9.5.2	Treat other team members respectfully
	PO10	10.5.1	Listen to and comprehend information, instructions, and viewpoints of others
	PO11	11.6.1	Identify the tasks required to complete an engineering activity, and the resources required to complete the tasks.
	PO12	12.5.2	Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field

### COs RELEVANCE TO PSOs:

CO	PSO	Relevance
CO1	PSO1	We are trying to solve a problem of customer experience in the restaurants by minimizing the time.
	PSO2	
CO2	PSO1	Done with literature survey and found the complex problems and then analysed the solutions to overcome the drawback in the existing features.

	PSO2	
CO3	PSO1	We are using Reactjs for web application, React Native for the mobile application and firebase for database.
	PSO2	
CO4	PSO1	It creates interest to carry out research on innovative ideas.
	PSO2	
CO5	PSO1	To provide solutions for the project activities carried out as an individual and as a team. Effective communication was done in front of the panel members when reviews were conducted and it improves communication in every individual.
	PSO2	
CO6	PSO1	
	PSO2	