

# Smart Restaurant Management through WebApplication

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**Abstract**—With various technological advancements and modern techniques the restaurant industry has reformed tremendously in recent times. The aim of the project is to design, and develop a web application for a smart restaurant that enables the customers to order food, the chefs to view and process orders, and management to see the reviews and keep track of the overall process of a restaurant. The project has been developed using Python language, flask framework, HTML, CSS, and JavaScript. This project helps improve the customer experience in restaurants and hotels using modern aspects. It works well for any kind of food establishment, from small restaurants to large hotels since the concept is easy to interpret.

**Keywords** – Smart restaurant, python, web application

## I. INTRODUCTION

The restaurant industry has always been a highly competitive and dynamic, with new trends and innovations constantly emerging. Technological advancements have recently transformed the industry, with restaurants incorporating new technologies to improve the dining experience and streamline their operations. The use of technology in restaurants is not new, but the phase of change and innovation has hastened up in recent years. With the rise of online ordering, mobile payments, and other digital tools, the restaurant industry is significantly shifting towards a more technology-enabled future.

Smart restaurants have various technological advancement which makes them a complete restaurant. With robotic waiters, a sophisticated ordering system, and a sleek and modern interior, the smart restaurant offers a one-of-a-kind experience that sets it apart from traditional restaurants. Smart restaurants have intelligent management systems which can effectively manage the speed of service. They can be managed by web applications which can reduce errors and save time. The customers order their dishes using the restaurant's web application provided at each table. The web application can be used by the chefs to view order details along with table numbers. The management can see all the orders that were taken and delivered and can also view the ratings and reviews provided by the customers.

Modernized and hi-tech restaurants have benefits for both customers and restaurant owners. For customers, it provides greater convenience, faster service, and a more engaging and immersive dining experience. For restaurant owners, it improves efficiency, reduces labor costs, and enables them to better track and analyze customer data.

The most commonly faced problem in traditional restaurants is increased manpower when compared to smart restaurants. The idle waiting time is high in conventional restaurants. There can be a mix up of orders in case of inexperienced servers. For a server to take orders from a table and get it from the kitchen requires a long time. The management of a restaurant can be difficult when compared to smart restaurants. Any complaints might not be known.

## II. LITERATURE SURVEY

A literature survey is done to gain knowledge on the previously used techniques in the domain. Tajim, et al., [11] makes use of a waiter robot which is developed using an Arduino microcontroller, RFID, IR sensor and ultrasonic sensor. The low-cost waiter robot works by using a line following algorithm and obstacle detection algorithm. It also makes use of the IOT concept through which it takes orders and sends them to the chefs. The paper makes use of a QR code which when scanned, connects to a

mobile or web application through which customers can order. The customers can also order food using the buttons available on the robot. Anjali M. Yelasange et al., [1] made use of a Raspberry pi microcontroller to design a serving robot that makes use of a predefined path using unique identification of the tables using switches provided. Prejitha.CT et al., [10] in this paper, the customers make use of a QR code available at the table.

When scanned the mobile application opens, and they can order their food using this application. The order can also be placed by using a user interface provided on the robot body. The order is sent to the kitchen directly. The robot delivers order using the line following algorithm and obstacle detection. The application is built using Android studio.

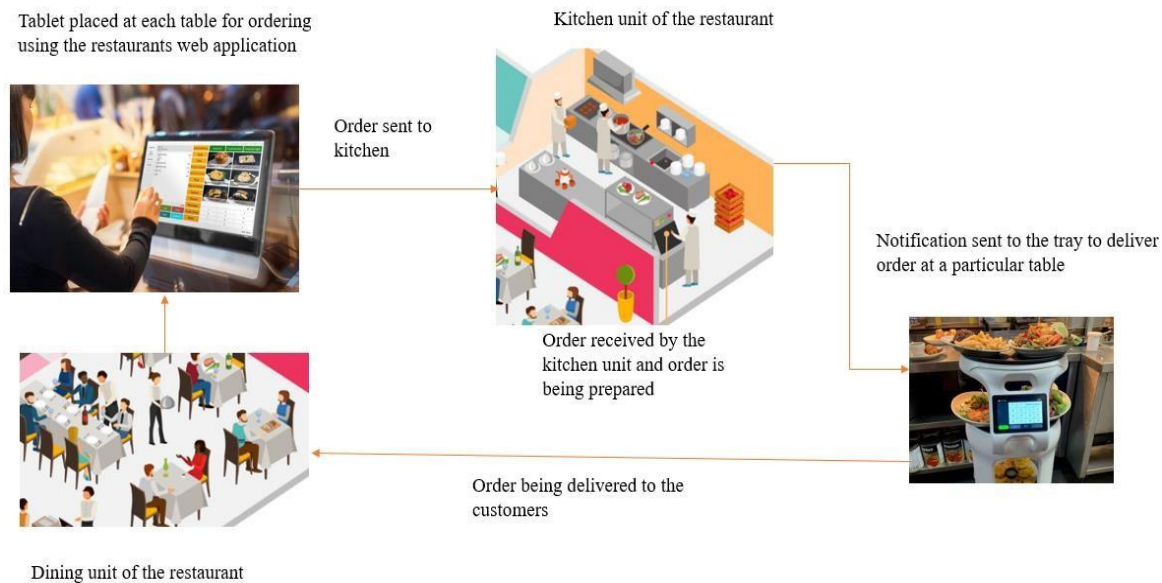


Fig. 1. Smart restaurant model

### III. SMART RESTAURANT MODEL

The smart restaurant model consists of a dining unit with the restaurant’s web application, the kitchen unit and the robotic tray as shown in Fig.1. The smart restaurant makes use of IOT to integrate these units for the effective functioning of the restaurant. The dining unit represents the tables placed at a restaurant/café which consists of a tablet placed at each table for ordering the dishes using the restaurants web application. The kitchen unit represents the kitchen area where the chefs prepare the food received via the web application. The prepared food is delivered by the robotic trays at a particular table by the instructions given to it.

#### A. DINING UNIT:

The dining unit comprises of the tables provided at a restaurant. Each table is provided with a tablet in which the smart restaurant web application has been installed. The customers can use this web application to view and order food items available at the restaurant. The customers can order food without the need to login. The customers order food using the smart menu available at the web application. The customers can also make use of this application to process payment using preferred payment methods by accessing the available QR code. The customers can also provide any comments provided in the review box.

#### B. KITCHEN UNIT:

The kitchen unit comprises of the food being prepared by the chefs. The chefs can receive orders via the web application. Once the order is received from a particular table the chefs start preparing the dishes. Once the dishes have been prepared and are ready to be served. The chefs send message to the robotic tray using IOT. Multiple logins can be created for the kitchen unit.

### **C. ROBOTIC TRAY:**

The robotic tray receives a message from the chef, to pick up the order to be delivered. The robotic tray takes the order from the kitchen, and delivers the order at a particular table based on the instructions given to it. The robotic tray will follow a path on its way to deliver the order.

## **IV. METHOD USED IN DEVELOPING A SMART RESTAURANT WEB APPLICATION**

A smart restaurant comprises of a web application to manage the restaurant more intelligently and provide better service to its customers. The web application of a smart restaurant has been successfully designed and implemented with the help of various software and programming languages. Smart restaurant web application can be built using Python programming language. It is a great tool to create such an application. HTML, CSS, python these tools can be used effectively to build a website or web app. PHP and MYSQL are used for handling requests from customers, and for effective generation of notifications.

The main objective of developing a restaurant web application is to enhance the service provided to the customers. It helps to provide better service and saves more time than traditional food ordering methods such as to provide an all-in-one service pattern, increase staff productivity in the kitchen and boost sales, learn more about the customers behavioral pattern and improve business.

The software's used in the development of a smart restaurant's web application are discussed in this chapter. For the front-end development of the web application, we use Python programming language along with flask framework to develop the application. The backend development of the application involves MySQL, HTML, CSS and JavaScript. PHP and MySQL are used to implement the login system and ensure that the data was securely stored in the database.

### **A. FEATURES OF THE WEB APPLICATION:**

The website includes several key features, including an online ordering system, menu displays, a login system for chefs and management, and customer reviews. The online ordering system allows customers to place orders directly through the website, which are then transmitted to the restaurant's kitchen for processing. This web application allows users to order their food without the necessity to login unlike other web applications. This web application is placed at every table in the dining unit of a smart restaurant for the customers to order their food. This web application is designed in a simple and easy way so that it can be used by all the people at ease. The menu displays provide customers with detailed information about the restaurant's menu offerings, including prices, ingredients, and nutritional information. The login system for chefs and management allows them to access the website's backend system to manage orders, inventory, and customer feedback. Finally, the customer reviews feature allows customers to leave feedback on their experiences at the restaurant, which can be used to improve the restaurant's services and offerings.

The homepage of the restaurant web application contains three main pages

- About – general details about the restaurant.
- Menu – For customers.
- Login – For Chefs and management.

The customers can place order by going to menu without the need to login. After the order has been placed the homepage displays the status of customer's order. The cart remains active until the billing process. Once the cart is closed after billing a feedback form appears on the screen of the homepage. The about page contains the details about the restaurant and contact details.

The Menu page contains the menu available in the restaurant with the price of the item. The Menu page consist of the tables numbers as buttons only when the table number is selected the customers can start placing the order. To enable customers to order food and pay through the website a QR code payment system is available. The customer could scan the QR code on the menu and complete the payment using their preferred payment method. The menu can be updated daily on the availability of the restaurant which is an advantage. The Fig. 2 shows the menu page of the web application.

The application has two login categories: Chefs and Management. When logged in as chef which represents the kitchen unit. The chefs receive orders from dining unit and start preparing the dishes as shown in Fig.3.

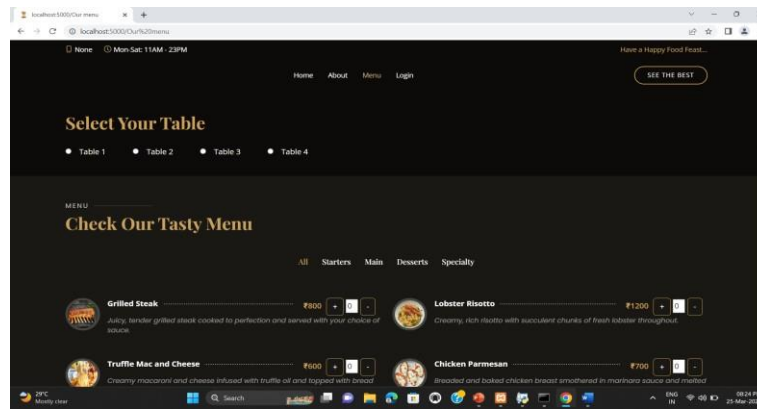


Fig. 2. Smart web application menu page

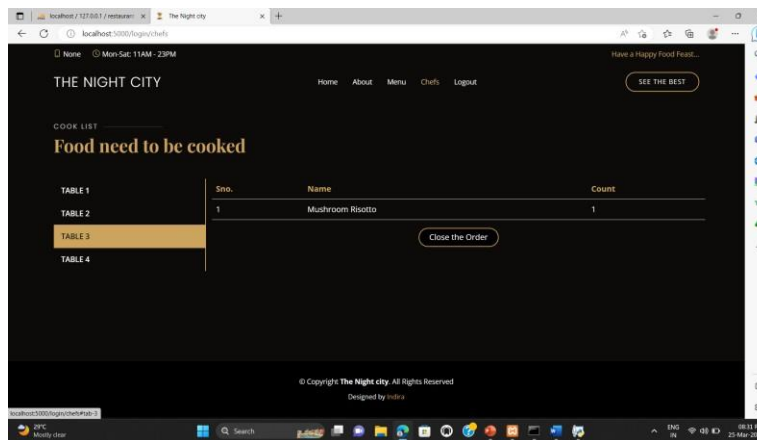


Fig. 3. Orders received from a particular table

Once the order is completed by the chefs send a message to the robot. The robotic tray delivers the order at that particular table. When logged in as management, the list of workers and their details can be viewed and can also view all the orders that were taken and delivered. The reviews and ratings provided by the customers can also be seen only by the management. Any complaints can also be seen.

#### B. SCOPE:

The restaurant is unique in that it has robotic waiters, which are used to serve customers. The concept of robots serving food can be a center of attraction to the customers. The project also includes the design and implementation of an interface for the chefs to receive and manage orders, and a system for the management team to track the overall managerial process of the restaurant.

#### C. LIMITATIONS:

The project relies on a stable internet connection and appropriate hardware to function effectively. Areas with poor network is of concern. The initial cost of set up is high. The cost of developing a robotic tray is of concern.

### V. CONCLUSION

The smart restaurant web application has been successfully designed and implemented. It is developed using python programming language and uses flask framework. The website uses HTML, CSS, JavaScript. Additionally, the website uses a MySQL database to store and retrieve data and is hosted on a secure and stable hosting environment. By utilizing these technologies and implementing various security measures, the smart restaurant web application provides a seamless user experience and ensures the security of user data. This web application is designed in a simple and easy way so that it can be used by all the people at ease. The smart restaurant website is a successful implementation of a modern restaurant ordering system that

features robotic waiters and a user-friendly interface. The website is responsive, intuitive, and effective at meeting the needs of both customers and staff.

## VI. FUTURE WORK

Future work involves expanding the web applications features and functionality and to develop a robotic tray.

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