

A Field Project Report on

QR MENU PRO

Submitted

In partial fulfillment of the requirements for the award of the degree

BACHELOR OF TECHNOLOGY

In

COMPUTER SCIENCE and ENGINEERING

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VIGNAN'S

FOUNDATION FOR SCIENCE, TECHNOLOGY & RESEARCH

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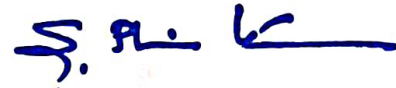
CERTIFICATE

This is to certify that the field project entitled "QR MENU PRO" being submitted by (Safeena - 231FA04B88), (Deepika - 231FA04C69), (Kailash - 231FA04C72), and (Amrutha - 231FA04C98) in partial fulfilment the requirements for the degree of Bachelor of Technology (B.Tech.) in Computer Science and Engineering at the Department of Computer Science and Engineering, Vignan's Foundation For Science Technology & Research (Deemed to be University), Vadlamudi, Guntur District, Andhra Pradesh, India.

This is a Bonafide work carried out by the aforementioned students under my guidance and supervision.


Guide


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DECLARATION

Date:

We hereby declare that the work presented in the field project titled "QR MENU PRO" is the result of our own efforts and investigations.

This project is being submitted under the supervision of **Dr. N. Sameera, Assistant Professor, CSE** in partial fulfilment of the requirements for the Bachelor of Technology (B.Tech.) degree in Computer Science and Engineering at the Department of Computer Science and Engineering, Vignan's Foundation for Science, Technology and Research (Deemed to be University), Vadlamudi, Guntur, Andhra Pradesh, India.

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CHAPTER-01

INTRODUCTION

INTRODUCTION

In today's fast-paced world, the hospitality industry is rapidly evolving to meet the growing demands for speed, convenience, and contactless service. One of the key innovations driving this transformation is digital menu technology. *QR Menu Pro: Efficient Ordering at Your Fingertips* is a modern solution designed to streamline the dining experience for both customers and restaurant staff by replacing traditional printed menus with dynamic, interactive digital ones accessible via QR codes.

This project explores the design, development, and implementation of QR Menu Pro, a user-friendly platform that allows diners to view menus, place orders, and request services directly from their smartphones. By eliminating delays in order-taking and minimizing human error, QR Menu Pro enhances operational efficiency, improves customer satisfaction, and supports a more hygienic dining environment.

The report delves into the system architecture, features, benefits, and real-world applications of QR Menu Pro, demonstrating how technology can redefine the dining experience with speed, accuracy, and simplicity.

1.1 Problem Definition

The primary issue addressed by this system is the inefficiency and limitations of traditional menu and ordering systems in the restaurant industry. Many dining establishments still depend on physical menus and manual order-taking, or use fragmented digital solutions that do not offer a seamless experience. These outdated methods lead to delays, errors, and dissatisfaction for both customers and staff. The challenges include:

- **Manual Ordering Processes:** Waitstaff must take orders manually, which increases the chances of miscommunication, delays, and human error—especially during busy hours.
- **Limited Menu Accessibility:** Physical menus may be unavailable, outdated, or unsanitary, affecting customer convenience and hygiene.
- **Lack of Real-Time Updates:** Menu changes, item availability, and promotional updates cannot be instantly reflected or communicated to customers.

- **Inconsistent Customer Experience:** Without a standardized digital platform, service quality can vary, and customers may face longer wait times or lack of order transparency.
- **Operational Inefficiency:** Staff time is spent on repetitive tasks that could be automated, reducing their ability to focus on more value-added services.

This system aims to solve these limitations by delivering a centralized, real-time, and contactless ordering platform that enhances customer convenience, improves service speed and accuracy, and streamlines restaurant operations.

1.2 Existing System

Currently, many restaurants continue to rely on traditional or semi-digital ordering methods, such as printed menus, verbal communication with waitstaff, or basic POS systems. These existing approaches present several issues:

- **Lack of Centralization:** Menus, order tracking, and customer feedback are often handled through separate tools or manually, resulting in inefficiencies and errors.
- **Hygiene and Accessibility Concerns:** Physical menus are prone to wear and contamination, making them unsuitable in health-conscious or high-turnover environments.
- **Limited Order Accuracy:** Manual order-taking can lead to miscommunication, especially in busy or noisy settings, resulting in incorrect or delayed orders.
- **Poor Customer Engagement:** The absence of interactive features such as images, customizations, or real-time updates reduces the customer's ability to make informed choices.
- **Operational Bottlenecks:** Staff are burdened with routine tasks like order entry and menu explanations, which can be automated for greater efficiency.

1.3 Proposed System

The proposed QR Menu Pro system introduces a centralized, digital, and interactive platform that optimizes the menu browsing and ordering process for both customers and restaurant staff. Key features include:

- **QR Code-Based Menu Access:** Customers scan a QR code at their table to instantly view the latest digital menu on their smartphones.
- **Interactive Menu Interface:** Rich visuals, item descriptions, filters, and customization options improve the user experience and decision-making.
- **Real-Time Menu and Order Updates:** Any changes to item availability or promotions are reflected immediately, ensuring accuracy and transparency.
- **Integrated Order Management:** Orders are directly sent to the kitchen or POS system, reducing human error and speeding up service.
- **Secure Digital Payments:** Customers can pay directly through the platform using secure and widely accepted payment gateways.
- **Scalable Design:** The platform is built to accommodate multiple outlets and large customer volumes, especially during peak hours.

1.4 Literature Review

Research into digital solutions for the hospitality and food service industries highlights the increasing demand for efficient, contactless, and customer-centric ordering systems. Numerous studies indicate that QR code-based ordering platforms not only enhance operational efficiency but also improve the overall customer experience by reducing wait times and errors.

A report by the National Restaurant Association emphasizes that digital menus and self-service technologies have seen a significant rise in adoption, particularly following global health concerns. Restaurants using QR-based menus experienced a notable increase in table turnover rates and customer satisfaction due to the convenience and speed of service.

Academic research also points to the importance of responsive interface design and clear user navigation in digital ordering platforms. Systems with intuitive layouts and interactive elements lead to higher user engagement and fewer errors during the ordering process. Furthermore, industry analysis supports the integration of real-time inventory and order tracking systems, noting that businesses using synchronized digital platforms reduce operational errors by up to 40%.

Best practices in modern restaurant tech recommend scalable and modular platforms that can adapt to future innovations—such as integration with loyalty programs, mobile wallets, or even smart table sensors—providing restaurants with greater flexibility and long-term value.

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SYSTEM REQUIREMENTS

2.1 Hardware & Software Requirements

For optimal performance, *QR Menu Pro* is designed with scalability, reliability, and ease of deployment in mind to ensure smooth restaurant operations and seamless customer interaction.

Hardware Requirements:

- **Server:** Multi-core processor (Quad-core or higher), minimum 16GB RAM, SSD storage to ensure fast menu rendering and low latency during order processing.
- **Client Devices:** Smartphones with QR code scanning capability (iOS or Android), and tablets or POS systems for staff-side access.
- **Networking:** Stable broadband internet connection with router-level firewall configurations to secure the restaurant network.
- **Backup Systems:** Cloud-based backup solutions for automated recovery and version control of critical data including menu items, order logs, and transaction history.

Software Requirements:

- **Operating System:** Linux-based (e.g., Ubuntu Server 20.04 LTS) for backend hosting; Android/iOS for end-user devices.
- **Web Server:** Nginx or Apache for efficient HTTP/HTTPS request handling and load balancing.
- **Database:** MySQL or PostgreSQL for structured storage of menu data, order logs, and user sessions.
- **Programming Languages:** Backend developed using Node.js or Python (Django/Flask); Frontend built with React.js or Vue.js for an interactive UI.
- **Security Tools:** SSL/TLS for encrypted data exchange, with regular updates, access control, and database encryption to ensure customer privacy and platform integrity.

2.2 Software Requirements Specification (SRS)

The Software Requirements Specification defines the core functional and non-functional elements of the *QR Menu Pro* platform:

Functional Requirements:

- **Menu Management:** Admins can create, update, and categorize menu items with images, descriptions, and availability status.
- **QR Code Generator:** Each table is assigned a unique QR code linked to a dynamic digital menu.
- **Customer Ordering:** Customers scan the QR code, browse the menu, customize items, and place orders directly from their smartphones.
- **Order Dashboard:** Restaurant staff view incoming orders in real time through a web-based dashboard for preparation and tracking.
- **Payment Integration:** Multiple payment options including cards, wallets, and UPI, with secure gateway integration.
- **Notification System:** Real-time alerts for new orders, payment status, and special requests via push notifications or SMS.

Non-Functional Requirements:

- **Usability:** The interface must be intuitive, responsive, and accessible on various screen sizes without needing app installation.
- **Performance:** The system should handle at least 500 concurrent orders with minimal latency during peak hours.
- **Security:** Full SSL encryption, GDPR-compliant user data handling, and regular vulnerability testing.
- **Scalability:** Modular system architecture to support new features like loyalty programs, multi-language support, or third-party POS integrations.

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SYSTEM DESIGN

3.1 Modules of System

The *QR Menu Pro* system is structured into distinct modules to enhance modularity, scalability, and ease of maintenance. Each module is designed to fulfill a specific function while interacting seamlessly with other components through well-defined APIs:

- **User Module:** Manages customer and staff registration, login/logout processes, session handling, and profile management.
- **Menu Management Module:** Allows administrators and restaurant staff to create, update, and organize digital menu items, including images, descriptions, prices, and availability.
- **QR Code Module:** Generates unique QR codes for each table or section, linking directly to the relevant digital menu interface.
- **Ordering Module:** Facilitates real-time customer orders, item customization, and special requests, with direct routing to the kitchen or POS system.
- **Payment Module:** Integrates with secure payment gateways to process transactions using credit/debit cards, UPI, and digital wallets.
- **Notification Module:** Sends automated push notifications or SMS/email alerts to staff and customers for order status updates, promotions, and feedback requests.
- **Admin Module:** Provides tools for restaurant managers to oversee operations, manage menus and staff access, analyze customer behavior, and handle technical or service issues.

Each module operates independently but integrates into a unified system to support agile development and future feature extensions.

3.2 UML Diagrams

To ensure a clear understanding of the system architecture and interactions, several UML diagrams are developed to visually represent the *QR Menu Pro* system:

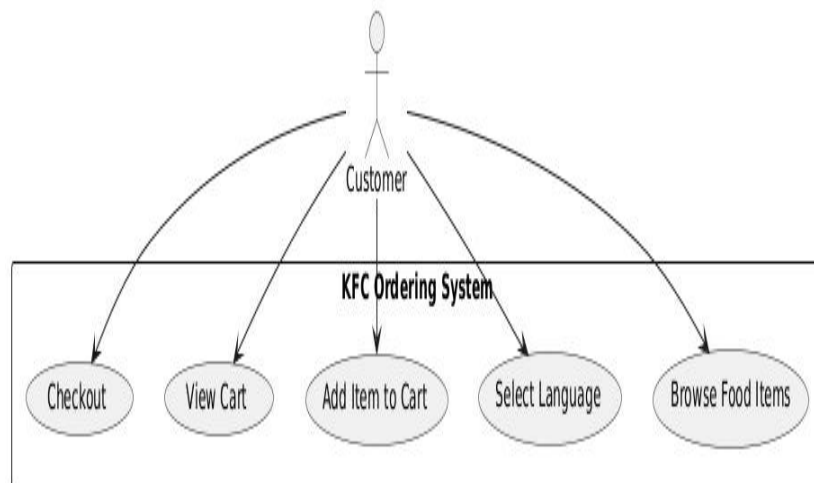
- **Use Case Diagrams:** Show how different user roles—customers, staff, and administrators—interact with system functions like scanning QR codes, placing orders, managing menus, and processing payments.
- **Class Diagrams:** Depict the main entities of the system such as User, MenuItem, Order, Payment, and Notification, along with their attributes and relationships.

- **Sequence Diagrams:** Illustrate the flow of actions during critical processes, such as placing an order, updating the menu, or handling a payment transaction.

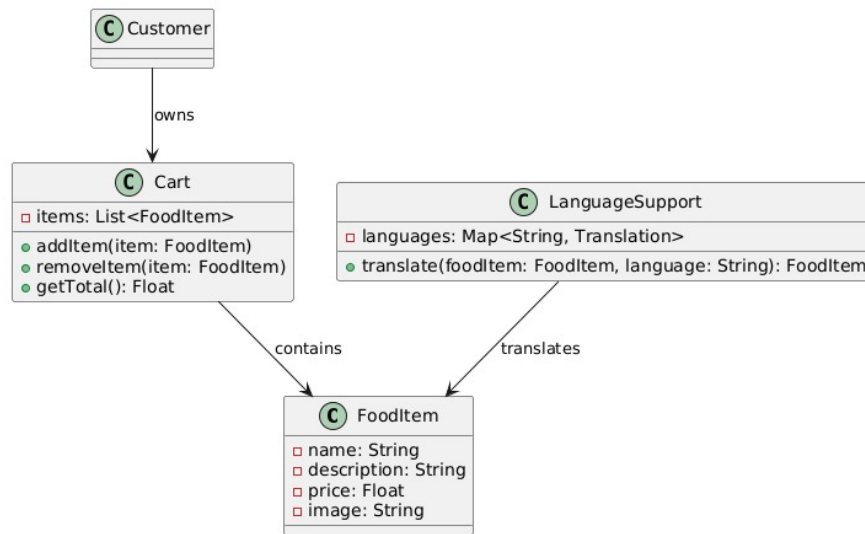
These diagrams guide developers and stakeholders by offering a visual blueprint of system behavior, promoting clear communication and smoother implementation.

UML Diagram	Purpose
Use Case Diagram	How users interact (ordering, language selection, checkout)
Class Diagram	Structure of your food items, cart, language system
Activity Diagram	Flow of ordering a food item
Sequence Diagram	Steps from selecting an item to checking out
Component Diagram	How your webpage is structured (frontend parts)

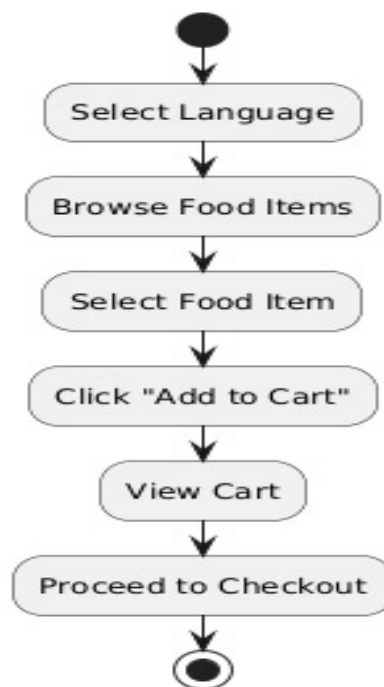
Use Case Diagram



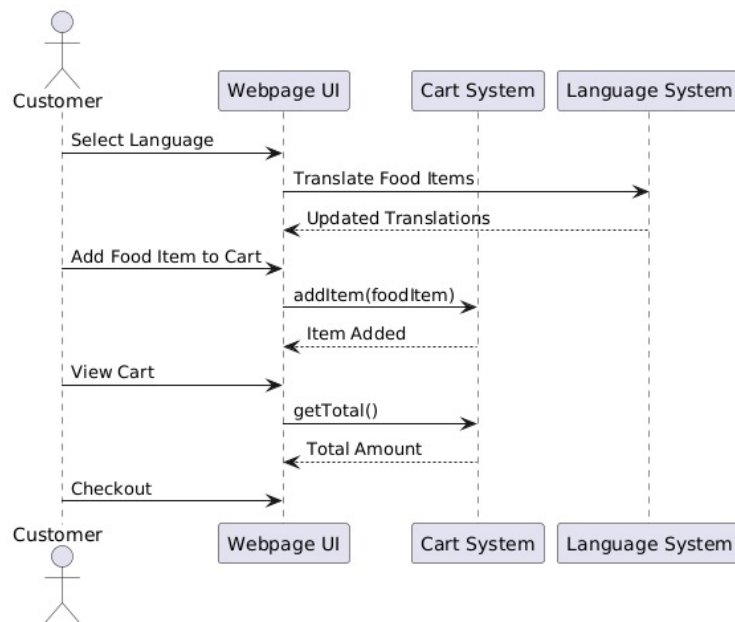
Class Diagram



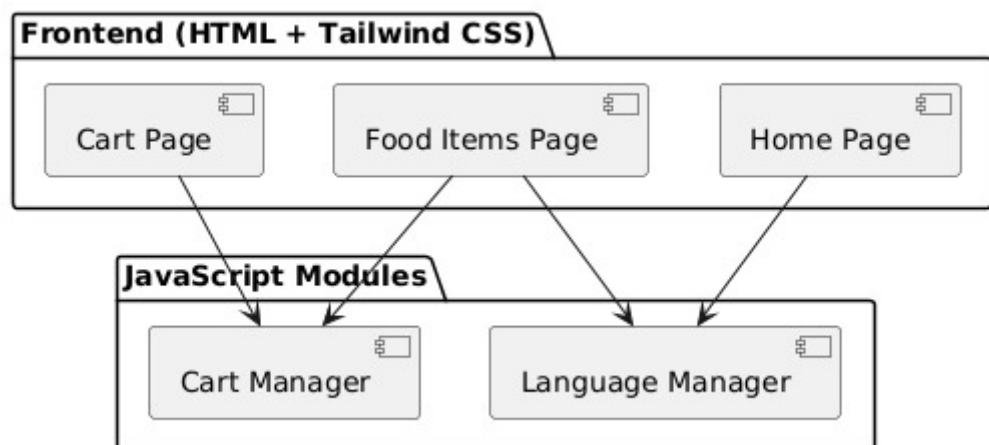
Activity Diagram



Sequence Diagram



Component Diagram



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IMPLEMENTATION

4.1 Sample Code

Below is a **sample code** snippet (frontend and backend) and a **sample SQL code** that represent a basic version of a QR menu ordering system module. These samples are simplified for clarity and can be expanded for production use.

```
// server.js
const express = require('express');
const app = express();
const bodyParser = require('body-parser');
const mysql = require('mysql2');

app.use(bodyParser.json());

// Connect to MySQL
const db = mysql.createConnection({
  host: 'localhost',
  user: 'root',
  password: '',
  database: 'qr_menu_pro'
});

db.connect(err => {
  if (err) throw err;
  console.log('MySQL Connected!');
});

// Endpoint to get menu
app.get('/menu', (req, res) => {
  db.query('SELECT * FROM menu_items WHERE available = 1', (err, result) => {
    if (err) throw err;
```

```

    res.json(result);
  });
});
// Endpoint to place order
app.post('/order', (req, res) => {
  const { table_id, items } = req.body;
  const query = 'INSERT INTO orders (table_id, items, status) VALUES (?, ?, "pending")';
  db.query(query, [table_id, JSON.stringify(items)], (err, result) => {
    if (err) throw err;
    res.json({ success: true, orderId: result.insertId });
  });
});

app.listen(3000, () => {
  console.log('Server running on port 3000');
});

```

Sample SQL Code

```

-- Create Database
CREATE DATABASE qr_menu_pro;

USE qr_menu_pro;

-- Menu Items Table
CREATE TABLE menu_items (
  id INT AUTO_INCREMENT PRIMARY KEY,
  name VARCHAR(255),
  description TEXT,
  price DECIMAL(10, 2),
  available BOOLEAN DEFAULT TRUE
);

-- Orders Table
CREATE TABLE orders (
  id INT AUTO_INCREMENT PRIMARY KEY,

```

```
table_id INT,  
items JSON,  
status VARCHAR(50), order_time TIMESTAMP DEFAULT CURRENT_TIMESTAMP  
);
```

-- Sample Insert Data

```
INSERT INTO menu_items (name, description, price, available)
```

```
VALUES
```

```
('Margherita Pizza', 'Classic cheese pizza', 299.00, TRUE),
```

```
('Pasta Alfredo', 'Creamy white sauce pasta', 349.00, TRUE),
```

```
('Lemonade', 'Fresh squeezed', 99.00, TRUE);
```

Explanation

PHP Code:

- The script establishes a connection to the **rental system database** using the mysqli extension in PHP, ensuring compatibility with modern MySQL servers.
- It processes **user registration** by capturing input data such as name, email, password, and password confirmation from an HTML form.
- **Password security** is handled using PHP's password_hash() function, which encrypts the password before it is stored in the database, improving protection against data breaches.
- To ensure database security, the code uses **prepared statements** to insert data. This prevents **SQL injection attacks**, which are a common security risk in web applications.
- Upon successful form submission and database insertion, the system redirects the user to the **login page**, signaling successful registration.

SQL Code:

- The SQL code begins by **creating the users table**, which stores information about renters and hosts, such as their name, email, hashed password, and role.
- It then defines the **properties table**, where each property listing is stored with fields like title, description, location, price, and availability dates.

- A **foreign key constraint** (user_id) is added to the properties table, linking each property to its owner in the users table, ensuring relational integrity.

Date fields (available_from, available_to) are included to enable time-based search filters, allowing users to find available properties within their desired time frame.

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RESULT

5.1 OUTPUT SCREEN:

QR Code: scanner to get the menu



Fig:5.1.1: login page

The QR MENU PRO provides a clean, responsive user interface. Screenshots (conceptual descriptions follow) include:

- Home Screen: A dashboard that comes with multilingual option to read the menu and also displaying the images of the dish.

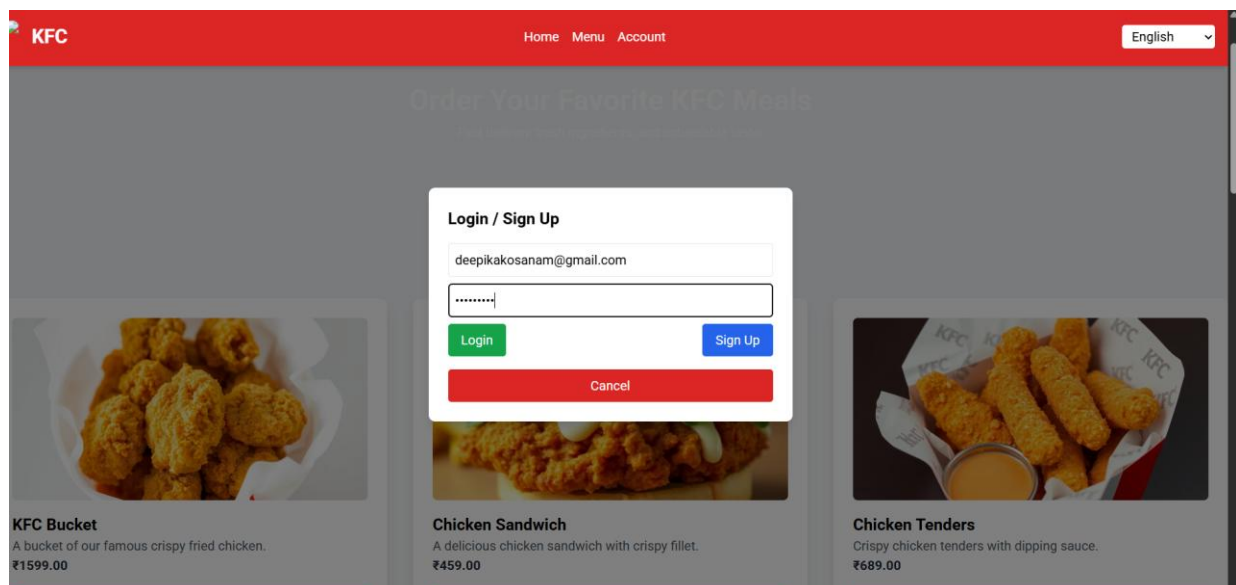


Fig:5.1.2: Home page (2)

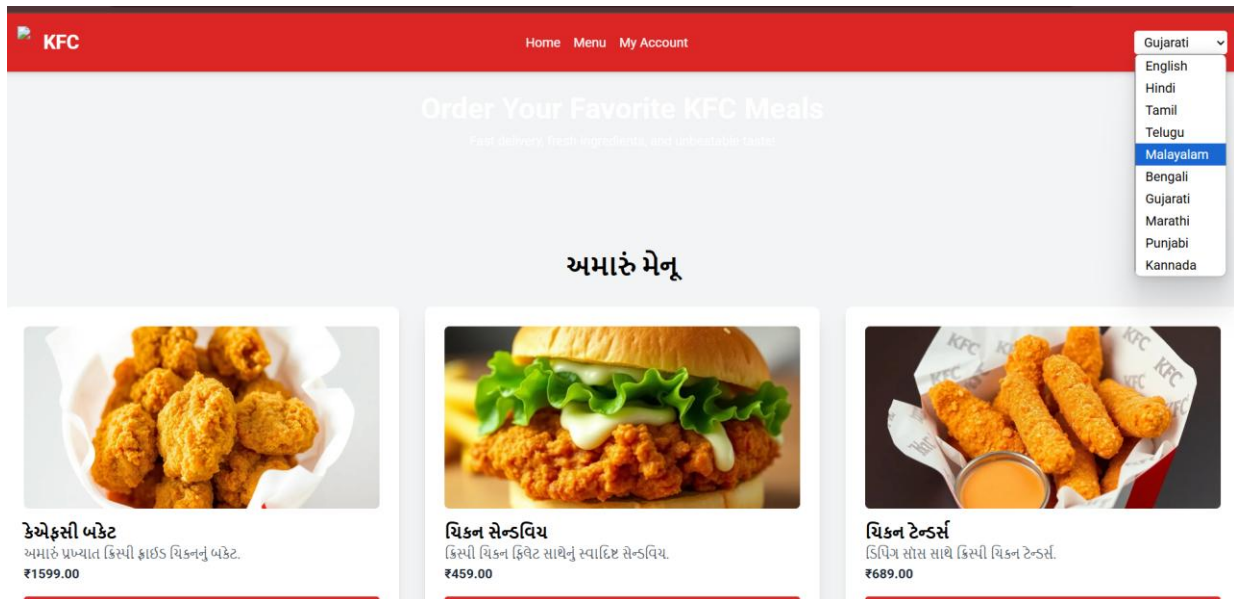


Fig:5.1.2: Home page(3)

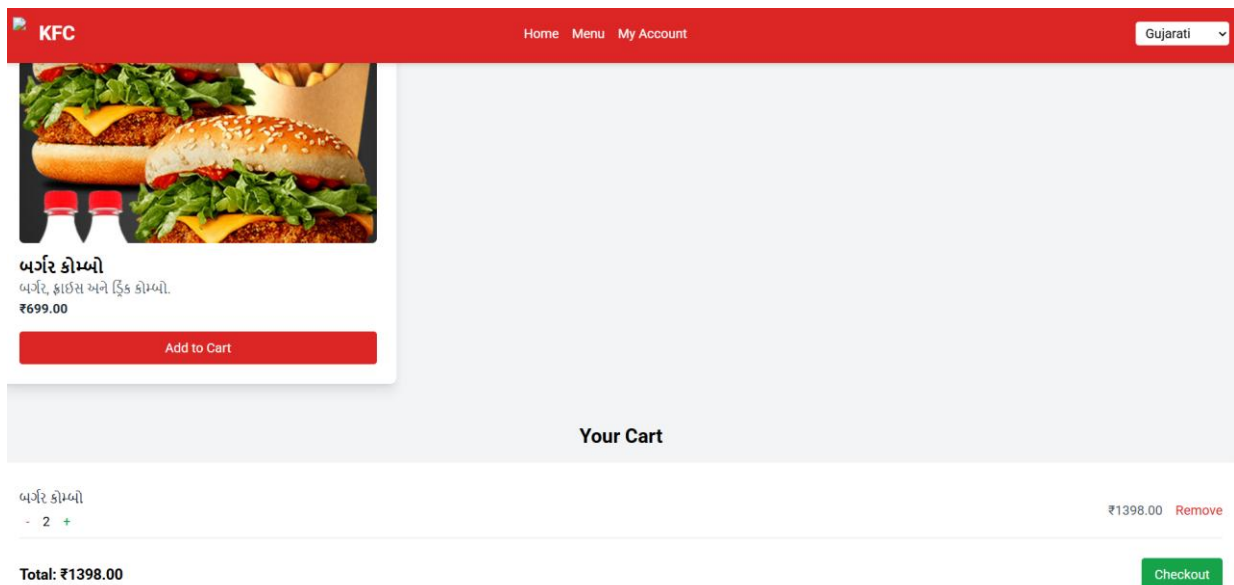
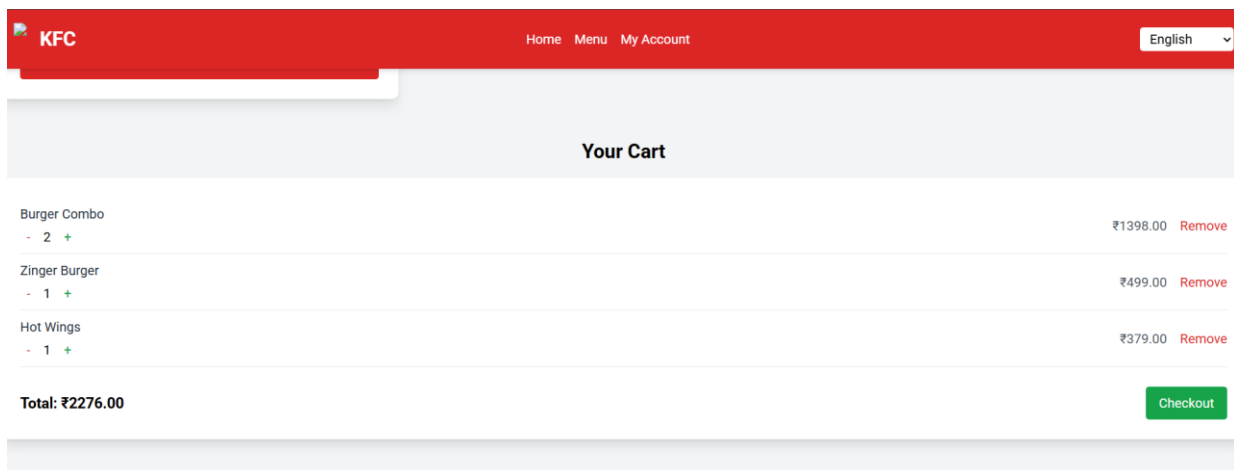


Fig:5.1.2: Home page(3)

Cart : Provides the list of items added to the cart,total amount and the checkout option.



- payment: payment includes payment methods to pay for the order

Fig:5.1.2: Home page(4)

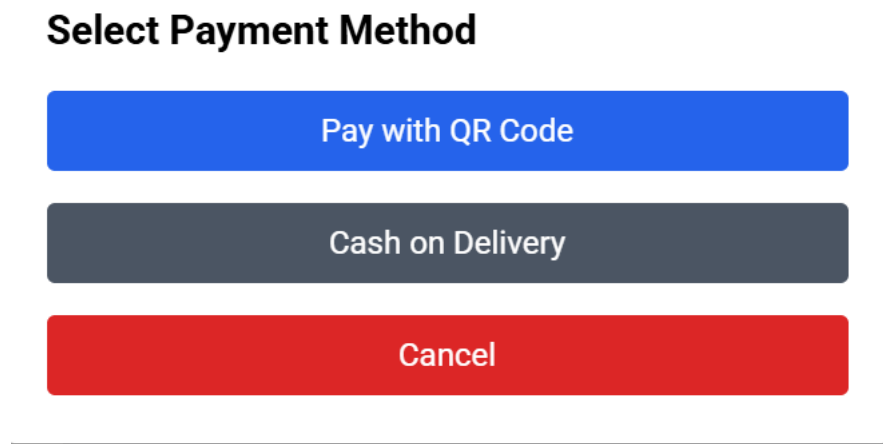



Fig:5.1.2: Home page(5)

Select Payment Method

Pay with QR Code

Cash on Delivery



Scan this QR code to confirm payment. Valid for 2 minutes.

Confirm Payment

Time remaining: 1:43

Cancel

Fig:5.1.2: Home page(6)

Your Cart

Select Payment Method

Pay with QR Code

Cash on Delivery

Please prepare ₹2276.00 for delivery

BRODIPET,GUNTUR DOOR-NO501|

Confirm Order

Cancel

Fig:5.1.2: Home page(6)

Fig:5.1.2: Home page(6)

CHAPTER-06

CONCLUSION

In conclusion, an online rental website plays a crucial role in transforming the rental industry by providing a convenient, efficient, and user-friendly platform for renting goods and services. It streamlines the rental process by enabling users to browse, book, and make payments seamlessly from anywhere, reducing the need for physical interactions and paperwork.

The implementation of an online rental system benefits both businesses and customers by improving accessibility, optimizing inventory management, and ensuring secure transactions. With features such as real-time availability, automated booking, and integrated payment gateways, these platforms enhance user experience and operational efficiency.

Despite its advantages, challenges such as security concerns, fraudulent activities, and system maintenance must be addressed to ensure a reliable and trustworthy platform. Continuous updates, strong cybersecurity measures, and responsive customer support are essential to maintaining a successful online rental website.

As technology continues to advance, the future of online rental platforms looks promising, with trends like AI-driven recommendations, blockchain-based security, and enhanced mobile integration shaping the industry. By adopting these innovations, online rental websites can continue to evolve, providing even more value to users and businesses.

CHAPTER-07

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These references we have used in designing, developing, and optimizing our project effectively

GITHUB :- <https://github.com/Deepika4C69/QR-MENU-PRO.git>