A

Mini-Project Synopsis

on

E-MENU FOOD ORDERING SYSTEM

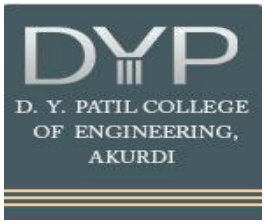
SUBMITTED BY

Student Name	Exam. Seat No.
Chinmay Surendra Bhintade	T1900803032
Shreya Chandrakant Patil	T1900803133
Yash Rajendra Ranware	T1900803146

PROJECT GUIDE

Dr. Mrs. Sarika Patil

Mrs. Mrunali Pant



DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION

D. Y. PATIL COLLEGE OF ENGINEERING

AKURDI, PUNE – 411044

2024 - 2025

1. ABSTRACT: -

The "Wireless Two-Way Restaurant E-Menu Food Ordering System with Chef Alert" is an innovative solution designed to streamline the food ordering process in restaurants, enhancing customer experience and operational efficiency. This system integrates a touchscreen-based electronic menu (E-Menu) for customers and a real-time alert mechanism for chefs, facilitated by the Blynk IoT platform.

On the customer side, an interactive LCD touchscreen displays the restaurant's menu, allowing customers to browse, select, and place orders directly from their table. The orders are wirelessly transmitted to the kitchen in real-time, eliminating the need for manual order-taking and reducing human errors. On the chef's side, the Blynk app provides instant notifications of incoming orders, ensuring prompt preparation and minimizing delays. The system also supports two-way communication, enabling chefs to update order statuses, such as "preparing" or "ready," which is reflected on the customer's E-Menu display.

The project leverages IoT technology, utilizing microcontrollers such as ESP8266 or ESP32 for wireless communication and integration with the Blynk cloud platform. The system is designed to be user-friendly, cost-effective, and scalable, making it suitable for small to medium-sized restaurants. By automating the ordering process and improving communication between customers and the kitchen, this system aims to enhance customer satisfaction, reduce wait times, and optimize restaurant operations.

The system includes a touchscreen E-Menu that allows customers to place orders, which are transmitted to the kitchen in real-time via Wi-Fi. Chefs receive instant notifications through the Blynk app, ensuring timely preparation and reducing delays. Additionally, the system supports two-way communication, enabling chefs to update order statuses, which are reflected on the customer's E-Menu display. Designed as a scalable and cost-effective IoT-based solution, this system enhances efficiency and improves the overall dining experience.

2. LITERATURE SURVEY:

i. B. Gopi, R. V. Patil, V. Venkataramanan and M. Manikandan, "User Flexible Approach for Autonomous Restaurant Menu Ordering System," 2023 8th International Conference on Communication and Electronics Systems (ICCES), Coimbatore, India, 2023, pp. 386-390, doi: 10.1109/ICCES57224.2023.10192864**.**

ii. P. A. Gbadega, Y. Sun, N. Mazibuko and K. T. Akindeji, "Design and Implementation of a Smart Restaurant Menu Ordering System Using a WiFi Module and RFID Technology," 2024 International Conference on Science, Engineering and Business for Driving Sustainable Development Goals (SEB4SDG), Omu-Aran, Nigeria, 2024, pp. 1-8, doi: 10.1109/SEB4SDG60871.2024.10630344.

iii. S. Deivanayagi, K. T. Sundari, K. A, K. GM and S. S, "Smart Menu Ordering System," 2024 International Conference on Power, Energy, Control and Transmission Systems (ICPECTS), Chennai, India, 2024, pp. 1-5, doi: 10.1109/ICPECTS62210.2024.10780283.

iv. R. Sonwane, A. Deshmukh and S. Choudhary, "Designing Web Application of Online Food Ordering for Restaurant Chain using Web Technologies," 2023 3rd International Conference on Pervasive Computing and Social Networking (ICPCSN), Salem, India, 2023, pp. 1055-1058, doi: 10.1109/ICPCSN58827.2023.00179.

v. S. Agarwal, P. Kumar and G. Kaur, "IoT-based Restaurant Menu Ordering System using Arduino UNO," 2023 3rd International Conference on Innovative Mechanisms for Industry Applications (ICIMIA), Bengaluru, India, 2023, pp. 118-122, doi: 10.1109/ICIMIA60377.2023.10426393.

vi. A. v. Kulkarni, A. R. Ravindra, M. S. Sangeethi, B. Sreevidya and M. Rajesh, "Online Food Order Management System With Recommendation Integrated ASP.Net and Microsoft SQL Server," 2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT), Kamand, India, 2024, pp. 1-6, doi: 10.1109/ICCCNT61001.2024.10725510.

vii. M. Kavitha, J. Venkatesh, S. K. Salma and S. R. Moosa, "Virtual Reality (Hologram) based Food Supply System in Smart Restaurant based Menu Ordering System," 2022 7th International Conference on Communication and Electronics Systems (ICCES), Coimbatore, India, 2022, pp. 449-454, doi: 10.1109/ICCES54183.2022.9835976.

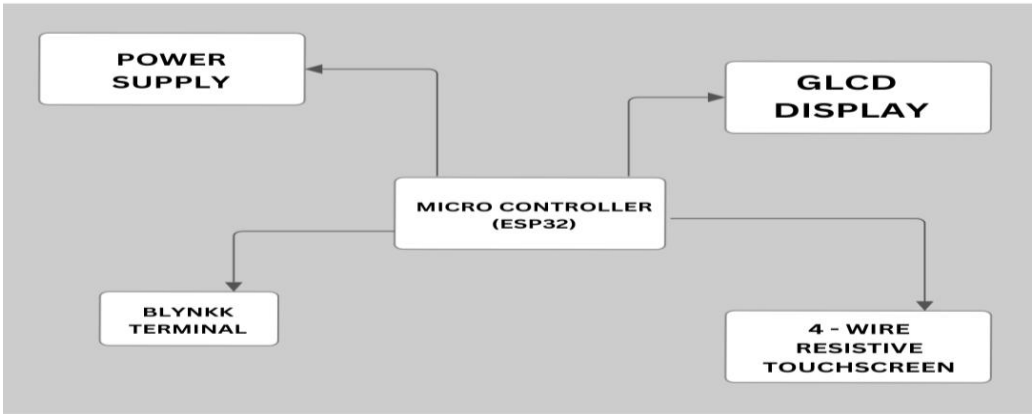
viii. T. Raibagi, A. Vishwakarma, J. Naik, R. Chaudhari and G. Kalme, "Orderista - AI-based Food Ordering Application," 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), Coimbatore, India, 2021, pp. 34-37, doi: 10.1109/ICAIS50930.2021.9396040.

ix. G. Bagyalakshmi, J. R. Jayanth, R. Valarmathi and V. S. Balaji, "Smart Restaurant Management System using LABVIEW," 2024 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS), Bhopal, India, 2024, pp. 1-7, doi: 10.1109/SCEECS61402.2024.10482325.

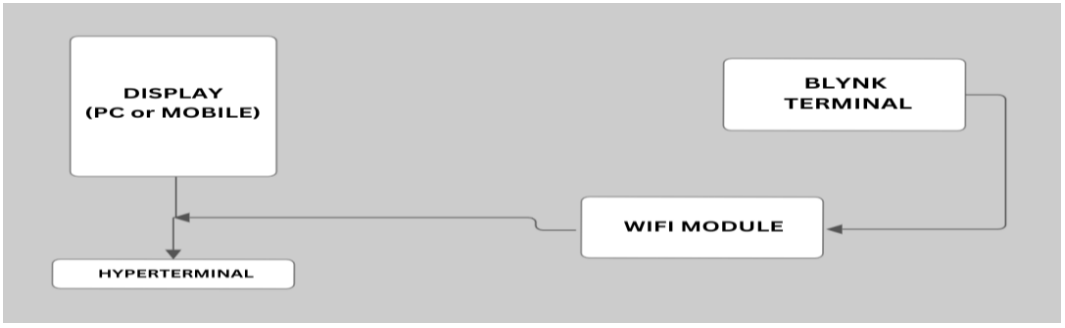
x. J. C. El Fiorenza, A. Chakraborty, R. Rishi and K. Baghel, "Smart Menu Card System," 2018 3rd International Conference on Communication and Electronics Systems (ICCES), Coimbatore, India, 2018, pp. 847-849, doi: 10.1109/CESYS.2018.8724045.

3. BLOCK DIAGRAM & EXPLANATION:

Transmitter side:



Receiver side:



Explanation: -

Transmitter Side (Customer Side)

This diagram illustrates the customer's interface for ordering food using an electronic menu.

Components and Working

- **Microcontroller (ESP32):** The central processing unit that receives orders and updates statuses.
- **Power Supply:** Provides necessary power to the ESP32 and connected components.
- **GLCD Display**: Shows incoming orders to the chef.
- **4-Wire Resistive Touchscreen:** Allows the chef to interact with the system, such as accepting or rejecting orders and updating order status.
- **Blynk Terminal:** Sends order status updates back to the customer side via the Wi-Fi module.

Working:

1. The kitchen receives the order via the ESP32 microcontroller.
2. The order details are displayed on the GLCD screen for the chef.
3. The chef can interact using the touchscreen to update the order status.
4. Status updates are sent back to the Blynk terminal, notifying the customer.

Receiver Side (Kitchen/Chef Side)

This diagram represents the chef's interface for receiving and updating order statuses.

Components and Working

- **Display (PC or Mobile):** The customer interacts with the e-menu on a PC or mobile device.
- **HyperTerminal:** Acts as an interface between the display and the Wi-Fi module, enabling communication.
- **Wi-Fi Module:** Sends the selected food order data to the receiver side (kitchen).
- **Blynk Terminal:** Receives order updates and notifications from the kitchen.

Working:

1. The customer selects items from the touchscreen e-menu.
2. The order is transmitted via the Wi-Fi module to the kitchen side.
3. The Blynk terminal receives status updates, such as "Order Received," "Preparing," or "Ready."
4. This information is displayed on the PC or mobile screen for the customer.

4. METHODOLOGY:

The methodology for the Wireless Two-Way Restaurant E-Menu Food Ordering System with Chef Alert is structured into several stages, ensuring a smooth development process. It begins with problem identification, where limitations of traditional restaurant ordering systems are analyzed.

The system aims to address delays, miscommunication, and human errors by implementing a touchscreen E-Menu, real-time wireless communication, and a chef-side alert system using the Blynk app. The focus is on creating a user-friendly, cost-effective, and scalable solution with reliable and fast communication.

The system design phase divides the architecture into two main components: the customer side, featuring a touchscreen E-Menu with an LCD and microcontroller, and the chef side, which uses the Blynk app for order alerts. Wi-Fi facilitates seamless communication between the two. Customers browse the menu, place orders, and receive real-time order status updates. The system components include an ESP8266 or ESP32 microcontroller, a touchscreen LCD, and the Blynk app for chef-side management.

During hardware implementation, the touchscreen LCD is connected to the ESP8266/ESP32 microcontroller, and the E-Menu interface is developed. A Wi-Fi module ensures wireless data transmission. On the chef's side, the Blynk app is configured for real-time notifications and order updates. A stable power supply is ensured for all components, guaranteeing uninterrupted operation.

Software development involves programming the microcontroller to display the menu, capture customer inputs, and send order data to the Blynk cloud. The Blynk app is set up to receive order notifications and send status updates. MQTT or HTTP protocols handle communication, ensuring efficient data exchange between the customer and chef interfaces.

System integration connects the hardware and software into a functional unit. The microcontroller and touchscreen LCD are linked to the Wi-Fi network, allowing real-time data transfer between the customer's E-Menu and the chef's Blynk app. The workflow is tested to ensure seamless order transmission, instant notifications, and accurate status updates.

Testing and validation confirm system reliability and usability. Functional testing ensures proper order placement, notifications, and status updates. Performance tests measure response times and Wi-Fi stability, while user testing gathers feedback from real customers and chefs to refine usability. A detailed project report and user manuals are created for future reference.

Future enhancements may include multi-table support, integrated payment options, an order history database, and AI-based recommendations. This structured methodology ensures a reliable, efficient, and modernized restaurant ordering system that enhances communication, reduces errors, and improves customer satisfaction.

5. APPLICATIONS:

- **Restaurants and Cafes**
  The system reduces wait times and enhances customer satisfaction by streamlining

food ordering. Direct communication between customers and the kitchen minimizes errors, while the digital menu allows easy order placement, reducing staff workload.

- **Food Courts and Quick-Service Restaurants (QSRs)**
  In high-traffic areas, the system ensures efficient order management by reducing reliance on manual order-taking. Digital processing improves accuracy, speeds up service, and allows staff to focus on food preparation.

- **Hotels and Resorts**
  Guests can place room service orders through a digital menu, making the process more convenient and interactive. This eliminates the need for phone calls, improving efficiency and enhancing the overall guest experience.

- **Corporate Cafeterias**
  Employees can order meals digitally, reducing queues and saving time during breaks. Kitchen staff can manage bulk orders efficiently, ensuring smooth service and minimizing delays.

- **Food Trucks and Pop-Up Restaurants**
  The system provides a compact and efficient solution for managing orders in limited spaces. Customers can browse the menu and receive real-time updates, improving service speed and customer satisfaction.

- **Elderly Care Facilities and Hospitals**
  Patients and residents can easily place meal orders, ensuring timely delivery and adherence to dietary needs. Real-time updates help staff track orders and improve food service management.

By modernizing the ordering process, this system enhances efficiency, reduces errors, and improves customer experience across various food service industries.