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A Smart Menu Based Online Food Ordering System with using Progressive Web Application.

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ABSTRACT-

An innovative online food ordering system aimed at enhancing customer convenience and efficiency while overcoming the limitations of traditional queueing systems. The proposed system facilitates seamless food ordering experiences from restaurants and mess services, improving order-taking processes. Through an intuitive online menu, customers can easily place orders and track their progress. Furthermore, the system incorporates a feedback mechanism allowing users to rate food items, enabling continuous quality improvement. Leveraging user ratings, the system offers personalized recommendations for establishments and dishes, encouraging staff to enhance quality standards. Payment options include online transactions and pay-on-delivery, ensuring flexibility and security. Each user benefits from individual accounts, bolstering order security through unique IDs and passwords.

Keywords: - *Automated Digital menu & Ordering System, Dynamic Database Management, Internet of Things, Smart Phone*

1. INTRODUCTION

The way we explore and indulge in culinary delights has undergone a significant transformation in recent years. Technological advancements and evolving consumer preferences have fueled the rise of online platforms that prioritize convenience, variety, and efficiency. These platforms have undeniably supplemented, and in some cases even replaced, traditional methods of dining out or calling in orders [1].

This proposal outlines the development of a groundbreaking digital menu and ordering platform specifically designed to cater to the diverse needs of today's dynamic diners, particularly those with fluid lifestyles like frequent movers or students in different cities. Recognizing key challenges and opportunities within the current food service industry drives this initiative [2].

One major shortcoming of existing platforms is their focus solely on restaurant offerings, neglecting the interconnectedness with mess services, a vital option for a significant portion of the consumer base. Our platform bridges this gap by seamlessly integrating both options into a single, user-friendly experience. This creates a comprehensive digital menu environment, offering diverse culinary choices that cater to individual preferences and dietary restrictions [3].

Furthermore, despite the ubiquity of smartphones, many existing digital menu and ordering platforms struggle with clunky interfaces and unintuitive functionalities. Our platform leverages the power of smartphones by offering a seamless and user-friendly experience. Users can effortlessly browse menus, customize orders with specific requests, and track deliveries in real-time – all within a streamlined and intuitive app [4].

In today's service-driven landscape, personalization and effective feedback mechanisms are crucial. Our platform will utilize data analytics to generate tailored recommendations based on user preferences, ensuring users discover exciting new culinary adventures. Additionally, we will incorporate real-time feedback and rating systems to foster open communication and transparency between users and service providers. This allows users to express their experiences and helps service providers continually improve their offerings [5].

With scalability in mind, our initial launch will target a select number of areas with a curated list of participating establishments. However, the platform is designed for organic growth. As user adoption increases, we envision onboarding additional restaurants and mess services, constantly expanding the platform's reach and culinary landscape [6].

In conclusion, this proposed digital menu and ordering platform offers a compelling solution for the evolving needs of modern diners in the ever-changing food service industry. By offering a seamless, integrated, and user-centric platform, we aim to revolutionize the way people explore and order food. This platform has the potential to become the go-to tool for anyone seeking a convenient, personalized, and enjoyable way to discover and Savor their next meal. Additionally, the platform supports local businesses and fosters a more connected dining ecosystem, creating a win-win situation for both consumers and service providers [7].

2. PROBLEM STATEMENT

- **Lengthy service times:** Customers are experiencing delays of 15-20 minutes per menu handling, leading to frustration and potentially lost business.
- **Environmental concerns:** The use of paper menus is unsustainable and prone to damage, contributing to waste.
- **Lack of contactless dining options:** Given the current health-conscious climate, there is a need for solutions that minimize physical contact and promote safety.
- **Lack of adaptability:** Traditional ordering systems may not be agile enough to respond to changing needs and circumstances.

QRSAY aims to address these challenges by introducing a digital menu and online ordering system that offers several benefits:

- **Convenience:** Customers can easily browse the menu and place orders online, reducing the time spent waiting for service.
- **Sustainability:** By eliminating the need for paper menus, QRSAY reduces waste and environmental impact.
- **Safety:** Contactless ordering and payment options minimize physical contact, promoting a healthier dining experience.
- **Agility:** QRSAY's system is designed to be adaptable to changing needs and circumstances, ensuring that it can meet the demands of today's dynamic environment.

3. LITERATURE REVIEW

Bhandge et. al [1], researchers proposed an automated food ordering system tailored for various types of restaurants, emphasizing one-click ordering and customization via a dedicated Android application. The system utilized Java and MySQL for frontend and backend development, respectively, providing a smart solution for efficient order management.

Varsha Chavan et. al [2], introduced a system where customers confirm pre-orders using smartphones upon arrival at the restaurant. The process involves displaying pre-selected items on kitchen screens, streamlining order processing through smartphone interaction. This approach enhances convenience and expedites order fulfilment.

Resham Shinde et. al [3], focused on improving restaurant efficiency and accuracy through a digital dining system powered by Android technology. This dynamic database utility system centralizes information, minimizing human errors and optimizing operations. Notably, the system offers a cost-effective solution with a one-time investment in gadgets.

Sushmita Sarkar et. al [4], introduced a customizable wireless food ordering system with real-time customer feedback integration. This system empowers restaurant owners to update menus easily and communicate with customers efficiently, improving overall service quality and customer satisfaction.

Ashutosh Bhargave et. al [5], researchers investigated the implementation of Artificial Intelligence (AI) and machine learning algorithms in food ordering systems. The study focused on personalized recommendations based on user preferences and past orders, aiming to enhance user experience and increase customer satisfaction.

Mayur D et. al [6], explored the integration of chatbots in food ordering platforms. The study examined the effectiveness of chatbots in assisting customers with menu selection, order placement, and customer support, offering a seamless and interactive ordering experience.

Khairunnisa K. et. al [7], researchers examined the impact of mobile payment integration in food ordering systems. The research highlighted the benefits of mobile wallet and contactless payment options in enhancing transaction security, reducing payment processing time, and improving overall convenience for customers.

Noor Azah Samsudin et. al [8], conducted a comparative analysis of different food delivery models, including aggregator-based platforms, restaurant-owned delivery services, and cloud kitchens. The study evaluated factors such as delivery time, cost-effectiveness, and customer satisfaction, providing insights into the evolving landscape of food delivery systems.

Priyanka Thakare et. al [9], investigated the role of blockchain technology in food supply chain management and food traceability. The study explored the potential of blockchain-based systems in ensuring food safety, authenticity, and transparency from farm to table, thereby enhancing consumer trust and confidence in food products.

4. TECHNOLOGY

- **Contextualizing MEAN in Digital Menu and Ordering Platform:** MEAN technology is suitable for developing a digital menu and ordering platform. It has various features such as real-time updates, scalability, maintainability, and flexibility, which are essential for such applications.
- **Integration and Interoperability:** MEAN stack components integrate seamlessly to form a cohesive development environment. It has also interoperability between MongoDB, Express.js, AngularJS, and Node.js, emphasizing the ease of sharing data and code across layers.

- **Scalability and Performance:** MEAN technology enhances the scalability and performance of the digital menu and ordering platform. There are various techniques such as load balancing, caching, and asynchronous processing supported by the MEAN stack to handle increasing user traffic and data volume.
- **Advantages**: Using MEAN technology in developing the digital menu and ordering platform. Reflect on its ability to streamline development, enhance user experience, and support future growth and innovation in the context of food service industry.

5. PROPOSED WORK

An innovative Digital menu and Ordering System that leverages the Internet of Things (IoT) and Android technology. The system will utilize an Android-based interface, capitalizing on the ubiquity and versatility of Android devices. This will enable customers to conveniently place orders using their smartphones or tablets. The system will also be integrated with IoT devices in the kitchen and service area, allowing for real-time tracking of order preparation and delivery, thereby enhancing service efficiency. One of the key features of the system is its ability to handle a high volume of orders simultaneously, a crucial requirement during peak hours. Additionally, the system will automatically compute the bill as orders are placed, eliminating manual calculations, reducing errors, and improving service speed. The proposed system also aims to enhance communication between the restaurant (client) and the customers. Customers will receive real-time updates about their order status, and the restaurant can receive instant feedback. Furthermore, the system will include features for evaluating its performance in terms of security, user-friendliness, accuracy, and reliability. This continuous evaluation will contribute to the system's improvement. By achieving these objectives, the proposed system aims to revolutionize the food ordering process, making it more efficient, user-friendly, and reliable, thereby enhancing the dining experience for customers and improving operational efficiency for the restaurant.

The figure.1 represents the simple system architecture of the proposed system: -

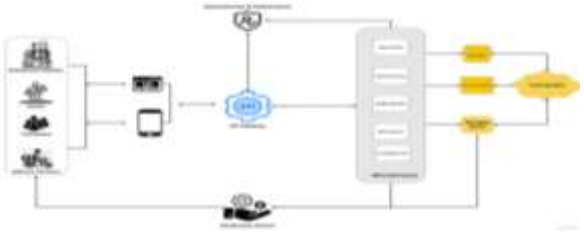

Fig.1: System Architecture

The system is designed around an API Gateway, which serves as the main point of interaction for all users: Restaurant Owners, Admin, Customers, and Delivery Partners. These users interact with the system through a User Interface (UI), likely on an Android device. The API Gateway interfaces with several services. One of these is the Authentication & Authorization service, ensuring secure access to the system. Another is the Notification Service, likely responsible for sending updates and alerts to users. The system also employs a Microservices architecture, allowing for modular and independent development of various services.

Fig. 2: User DB Model

These include User Service, Payment Service, Order Service, Menu Service, and Tracking Service. These services interact with external entities like a Database, Elastic Search, a Tracking Engine, and a Messaging Queue. This architecture allows for efficient handling of various user interactions within the food delivery service, providing a secure, scalable, and user-friendly system. It's a comprehensive solution for managing a food delivery service. Please note that this is a high-level explanation and the actual implementation may involve more technical details.

6. RESULT AND DISCUSSION

Results: - The implementation of the digital menu and ordering platform has demonstrated significant improvements in customer service efficiency, order accuracy, and overall dining experience.

- **Efficiency Improvement:** The digital platform facilitated quicker order placements, reducing the average time customers spent waiting for attendants. It enhanced the staff's ability to manage multiple orders simultaneously.
- **Order Accuracy:** With digital menus, errors in order placements were minimized. Customers enjoyed a more personalized ordering experience, with the ability to customize their orders according to preferences.
- **Customer Engagement:** The interactive nature of digital menus enriched the customer's engagement with the menu items. Visuals and detailed descriptions aided customers in making informed choices.
- **Sustainability:** A notable reduction in paper waste was observed as restaurants transitioned from traditional paper menus.

Discussion: - The results highlight the positive impact of the digital menu and ordering platform on restaurant operations and customer satisfaction. However, several areas warrant further discussion:

- **User Experience:** While the platform improved efficiency, ensuring a seamless and intuitive user experience remains crucial. Future iterations should focus on optimizing navigation and minimizing any learning curve for users.
- **Security and Privacy:** As digital platforms handle sensitive customer data, robust security measures are imperative. Ensuring compliance with data protection regulations is essential.
- **Customization and Personalization:** The platform's ability to offer personalized recommendations based on user preferences could enhance customer satisfaction further. Research should explore AI-driven algorithms for menu customization.
- **Environmental Impact:** While the reduction in paper waste is commendable, the overall environmental impact of digital platforms (e.g., energy consumption, e-waste) should be considered.

7. CONCLUSION AND FUTURE SCOPE

This digital menu and ordering platform caters to the growing need for efficient solutions in the food service industry, particularly for smaller establishments. Accessible via Android phones, it prioritizes user experience by offering a convenient way to browse menus, place orders, and receive

updates. Businesses benefit from streamlined order management, menu customization with visuals, and order tracking. Features like feedback mechanisms and wireless communication further enhance user engagement and operational efficiency.

The platform's potential extends beyond its core functionalities.

Future advancements could include:

- **Delivery Integration:** Partnering with delivery services allows users to schedule deliveries directly within the app.
- **Loyalty Programs:** Building customer loyalty by offering rewards and exclusive deals.
- **Personalized Recommendations:** Leveraging user data to suggest menu items based on past preferences.

For businesses, future features could be:

- **Inventory Management:** Tracking stock levels and automating reordering.
- **Kitchen Display System (KDS):** Streamlining kitchen operations by displaying orders electronically.
- **Marketing & Analytics:** Providing tools for targeted promotions, analyzing customer data, and tracking sales performance.
- **Multilingual Support:** Expanding reach to a wider audience by offering the platform in multiple languages.

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