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DEVELOPMENT OF AN APPLICATION FOR A UNIVERSAL RESTAURANT THAT CAN DISPLAY THE MENU AND FACILITATE ORDERING

Abstract

FOODI is a cutting-edge mobile application designed to streamline the dining experience in restaurants by replacing traditional waitstaff with a digital ordering system. In this innovative setup, servers use wireless technology on their mobile devices to take orders directly from customers. These orders are instantly transmitted to the main server over a local wireless intranet. The main server, stationed at the counter, performs a variety of essential tasks. It calculates bills, processes orders, and distributes them to the relevant departments within the restaurant. The restaurant's operations are primarily divided between two key areas: the Cashier and the Kitchen. In the Kitchen, the orders are displayed on screens for the kitchen staff to view and prepare. This ensures that the preparation process is efficient and timely. The FOODI system supports two main user roles: Administrator and Waiter. Administrators enjoy a robust and intuitive interface that simplifies management tasks, while waiters benefit from the ability to take orders swiftly and accurately using their mobile devices.

Keywords: FOODI mobile application, restaurant, kitchen, Flutter, waiter, order, product, menu.

Introduction

In today's fast-paced world, the restaurant industry is continually seeking innovative ways to enhance customer service and operational efficiency. One of the most promising advancements in this sector is the development of digital solutions that streamline the dining experience for both customers and staff. This dissertation focuses on the development of an application designed for universal use in restaurants, which can display the menu and facilitate the ordering process.

The proposed application aims to revolutionize the traditional dining experience by integrating modern technology into everyday restaurant operations. Customers will be able to view detailed menus, place orders, and make special requests directly from their mobile devices or designated tablets at their tables. This not only reduces the dependency on waitstaff for order-taking but also minimizes errors associated with manual entry.

The application is designed to cater to a wide range of restaurant types, from casual dining to fine dining establishments, ensuring versatility and adaptability. By utilizing a centralized system, restaurant managers can easily update menus, track inventory, and analyze customer preferences, leading to more informed decision-making and improved customer satisfaction.

The development of this application addresses several critical issues faced by the restaurant industry, such as reducing wait times, improving order accuracy, and enhancing overall efficiency. As consumer expectations continue to evolve, adopting such technology becomes essential for restaurants aiming to remain competitive and meet the demands of the modern diner.

In this dissertation, we will explore the technical aspects of designing and implementing this application, its potential impact on restaurant operations, and the benefits it offers to both customers and restaurant management. Through a detailed examination of current technological trends and

industry needs, we aim to provide a comprehensive solution that enhances the dining experience and drives business growth [1].

Problem Statement

In today's fast-paced and technology-driven world, many restaurants still rely on traditional methods of displaying menus and taking orders, which can be inefficient, inconvenient, and prone to errors. Customers often face delays in receiving menus and placing orders, leading to dissatisfaction.

Additionally, staff can struggle with managing handwritten orders, which can result in miscommunications, incorrect orders, and billing mistakes. These issues negatively impact customer satisfaction and the overall efficiency of restaurant operations.

The development of a universal application that can display menus and facilitate ordering aims to address these challenges. Such an application would provide customers with easy access to the menu on their mobile devices or on tablets at their tables, allowing them to place orders directly. This would streamline the ordering process, reduce errors, and improve communication between customers and the kitchen staff. By integrating seamlessly with existing restaurant systems, the application would enhance operational efficiency, improve customer satisfaction, and support business growth in the competitive restaurant industry.

Additionally, the FOODI application integrates seamlessly with existing point-of-sale systems, ensuring a smooth transition without disrupting current workflows. This integration provides real-time updates on order status, inventory levels, and customer preferences, allowing managers to make data-driven decisions to optimize menu offerings and staffing. Furthermore, FOODI supports digital payment options, giving customers a convenient and secure way to pay their bills. By leveraging such advanced technological solutions, restaurants can stay competitive, meet evolving customer expectations, and improve overall operational efficiency.

This system uses a mobile application, which named FOODI to take orders, sending them directly to the kitchen via the device. Waiters no longer need to physically go to the kitchen or bar to relay orders, as the order lists are displayed on screens in the relevant departments. This makes the transactions between waiters and the kitchen or bar, as well as between waiters and the cashier, more systematic and efficient[2].And about this FOODI application best case to solve problem about restaurants between clients and waiters.

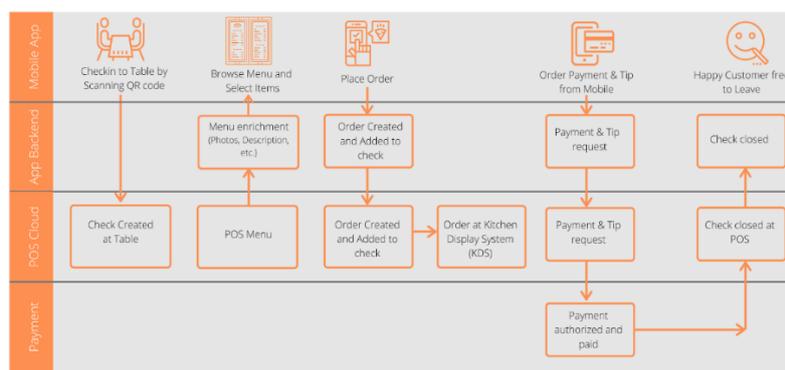Below you can see the picture about how clients order and this order go to menu as shown in Figure 1.

Figure 1. This is diagram of an FOODI that order between client and waiter in a restaurant by scanning a QR code [3].

Requirement Analysis of FOODI

The development of an application for a universal restaurant that can display the menu and facilitate ordering requires a thorough requirement analysis to ensure it meets the needs of both

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customers and restaurant staff. The following are the key requirements identified for the application FOODI:

Functional Requirements of app:

1. User Interface (UI) Design:
   - Intuitive Interface: The application must feature a user-friendly interface that allows users to easily browse through the menu, view detailed descriptions, and see images of menu items.
   - Multi-Language Support: To cater to a diverse customer base, the application should support multiple languages.

You can see thedesign picture about FOODI design in Figma in Figure 2.

2. Menu Display:
   - Dynamic Menu: The application should allow restaurant managers to update menu items, prices, and descriptions in real-time.

3. PaymentMethods:
   - Secure Payments: The application must support multiple secure payment options, including credit/debit cards, mobile wallets, and in-app payments.
   - Transaction History: Customers should have access to their transaction history within the application for easy record-keeping [4].
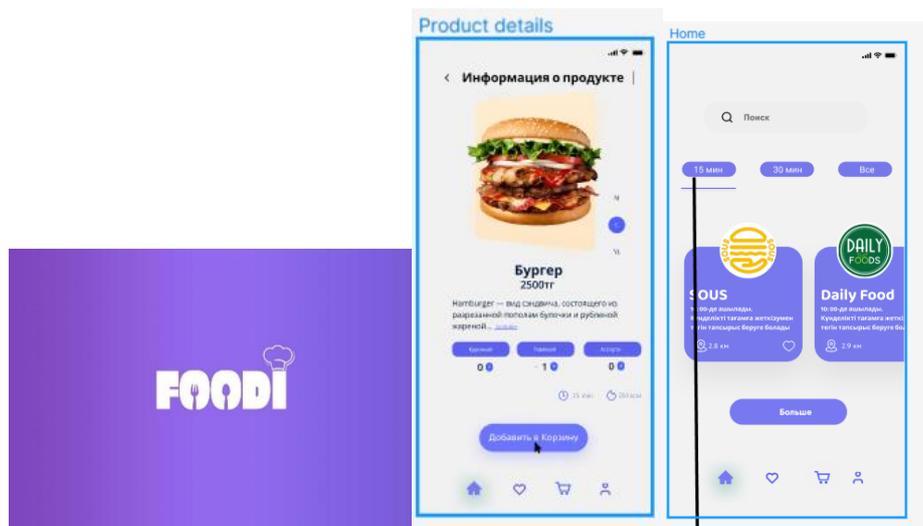
Figure 2. The design of FOODI app [5].

Implementation of an FOODI

The application is programmed in accordance with the design specifications during the implementation stage.This involves translating the detailed blueprints and architectural plans from the design phase into actual code. Developers use programming languages and tools that best fit theproject's requirements, ensuring that each component of the application is built to function seamlessly with others. Throughout this stage, rigorous testing is conducted to identify and resolve any bugs or issues, ensuring the software operates smoothly and securely. Additionally, developers focus on optimizing performance and ensuring that the application can handle the expected load. By adhering strictly to the design specifications, the implementation stage transforms the conceptual design into a functional, reliable, and efficient application [6].

Key Components:

Frontend Implementation:

> Flutter Widgets:The user interface is built using modular Flutter widgets, which are used to create menu items, order forms, and status notifications. These widgets allow for a flexible and dynamic UI design, making it easy to update and maintain.

> State Management:To provide a seamless and consistent user experience, the application uses Riverpod for state management. This ensures that the application's state is efficiently managed, leading to smooth navigation and interaction within the app.

Backend Implementation:

❖ API Endpoints: To manage the creation, reading, updating, and deleting (CRUD) of menu items and orders, RESTful APIs are built with Express.js.

❖ Authentication: To provide safe access, secure user authentication and authorization procedures are put in place, maybe utilising JSON Web Tokens [7].

Database Schema:

❖ Fields for item name, description, price, category, and availability are included in the menu schema.

❖ Order Schema: Consists of fields for order status, total cost, ordered items, user information, and timestamps.

You can see how the order will go from the menu to the manager and the code in the DatabaseManagement System (DBMS) in Figure 3.

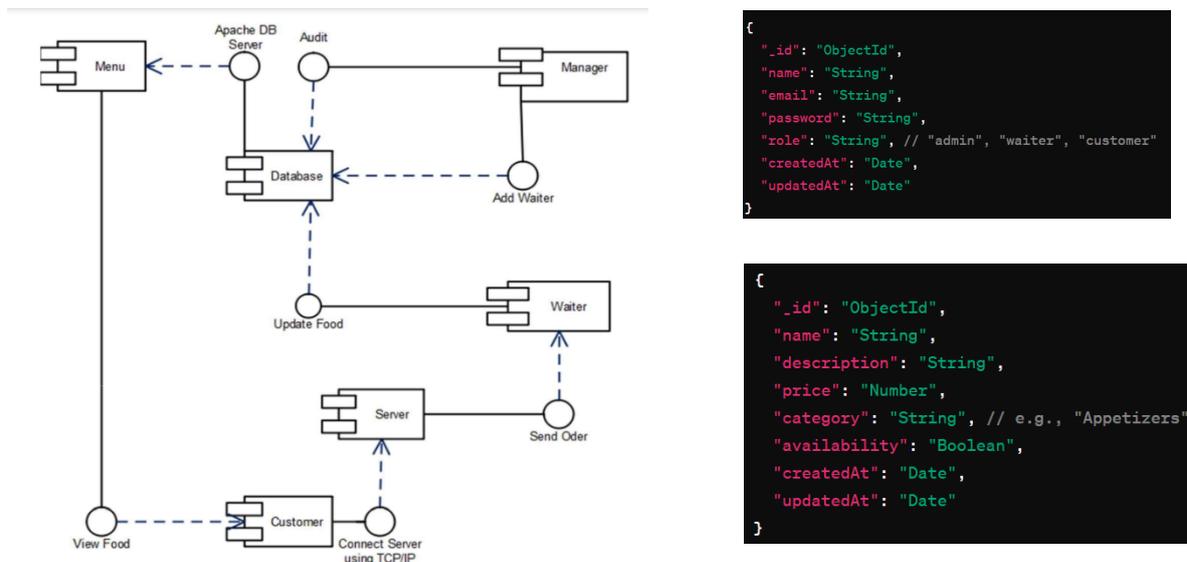*Figure 3. The schema about using Restaurant Management Database System*

Ordering - restaurant mobile ordering app

The FOODI app starts by creating a check and adding the user's initial order. Subsequently, the user's whole order history is appended to the bill until the bill is closed by payment from the user. As seen in Figure 4, the user first submits an order to the system and waits for verification.
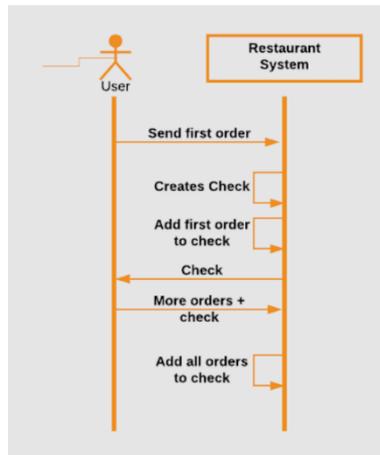
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Figure 4. Order from User to Restaurant System [3].

The app offers numerous advantages of application FOODI:
- ✓ Improved Customer Experience: Customers enjoy a simplified and efficient ordering process with real-time updates, leading to higher satisfaction.
- ✓ Enhanced Operational Effectiveness: By decreasing human labour and mistakes, automated order management frees up employees to concentrate on other duties.
- ✓ Data-Driven Insights: Analytics tools offer insightful information on patron behaviour, which supports operators of restaurants in making choices and improving their offerings.
- ✓ The programme exhibits scalability, readily accommodating rising restaurant operations and growing user bases.

User reviews, business effect, and performance data are used to assess the application:
- ➢ User happiness: To determine areas for improvement and assess user happiness, surveys and feedback forms are employed.
- ➢ Order Processing Time: Performance indicators are monitored to assess how well orders are handled from beginning to end.
- ➢ Operational Metrics: Order volume, peak time, and resource utilisation data are analysed to determine potential for further optimisation and to evaluate operational efficiency.

Conclusion

In order to meet the demands of the modern restaurant sector, FOODI offers a reliable and scalable solution that improves both operational effectiveness and customer happiness. By utilising cutting-edge web technologies for the backend and Flutter for cross-platform development, FOODI raises the bar for digital transformation in the hospitality industry. To further improve the eating experience, future improvements may incorporate cutting-edge features like AI-driven suggestions, more comprehensive data, and more payment choices [8].

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МӘЗІРДІ КӨРСЕТЕТІН ЖӘНЕ ТАПСЫРЫС БЕРУГЕ ЖЕҢІЛДЕЙТІН УНИВЕРСАЛДЫ РЕСТОРАНҒА ӨТІНІШТЕРДІ ӘЗІРЛЕУ

Түйін

FOODI - дәстүрлі күтушілерді цифрлық тапсырыс беру жүйесіне ауыстыру арқылы мейрамханалардағы түскі ас тәжірибесін жеңілдетуге арналған озық мобильді қосымша. Бұл инновациялық қондырғыда серверлер тұтынушылардан тікелей тапсырыстар алу үшін мобильді құрылғыларында сымсыз технологияны пайдаланады. Бұл тапсырыстар жергілікті сымсыз интранет арқылы негізгі серверге бірден жіберіледі. Есептегіште орналасқан негізгі сервер әртүрлі маңызды тапсырмаларды орындайды. Ол шоттарды есептейді, тапсырыстарды өңдейді және мейрамхананың тиісті бөлімдеріне таратады. Мейрамхананың қызметі негізінен екі негізгі салаға бөлінеді: кассир және асхана. Ас үйде тапсырыстар асхана қызметкерлері көру және дайындау үшін экрандарда көрсетіледі. Бұл дайындық процесінің тиімді және уақытылы болуын қамтамасыз етеді. FOODI жүйесі екі негізгі пайдаланушы рөлін қолдайды: Әкімші және Даяшы. Әкімшілер басқару тапсырмаларын жеңілдететін сенімді және интуитивті интерфейсті пайдаланады, ал даяшылар мобильді құрылғылар арқылы тапсырыстарды жылдам және дәл қабылдау мүмкіндігін пайдаланады.

Кілттік сөздер: FOODI мобильді қосымшасы, мейрамхана, ас үй, Flutter, даяшы, тапсырыс, өнім, мәзір.

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РАЗРАБОТКА ПРИЛОЖЕНИЯ ДЛЯ УНИВЕРСАЛЬНОГО РЕСТОРАНА, КОТОРОЕ МОЖЕТ ОТОБРАЖАТЬ МЕНЮ И УПРОЩАТЬ ЗАКАЗ

Аннотация

FOODI — это передовое мобильное приложение, предназначенное для оптимизации обедов в ресторанах путем замены традиционного официанта цифровой системой заказов. В этой

инновационной системе серверы используют беспроводную технологию на своих мобильных устройствах, чтобы принимать заказы непосредственно от клиентов. Эти заказы мгновенно передаются на главный сервер через локальную беспроводную интрасеть. Главный сервер, расположенный у стойки, выполняет множество важнейших задач. Он рассчитывает счета, обрабатывает заказы и распределяет их по соответствующим отделам ресторана. Деятельность ресторана в основном разделена между двумя ключевыми зонами: кассой и кухней. На кухне заказы отображаются на экранах, которые персонал кухни может просмотреть и подготовить. Это гарантирует, что процесс подготовки будет эффективным и своевременным. Система FOODI поддерживает две основные роли пользователя: Администратор и Официант. Администраторы пользуются надежным и интуитивно понятным интерфейсом, который упрощает задачи управления, а официанты получают возможность быстро и точно принимать заказы с помощью своих мобильных устройств.

Ключевые слова: мобильное приложение FOODI, ресторан, кухня, Flutter, официант, заказ, продукт, меню.